Competition to collaboration: exploring co-management models for the Spencer Gulf Prawn Fishery

K. L. Hollamby, P. E. McShane, S. Sloan and J. Brook

Australian Government

Fisheries Research and Development Corporation

Government of South Australia

Primary Industries and Resources SA

Project No. 2007/025

Competition to collaboration: exploring co-management models for the Spencer Gulf Prawn Fishery. FRDC Report 2007/025

K. L. Hollamby, P. E. McShane, S. Sloan and J. Brook

1 February 2010

Spencer Gulf and West Coast Prawn Fishermen's Association

ISBN: 978-0-646-53481-7

Table of Contents

Acronyms and Abbreviations

Association	Spencer Gulf and West Coast Prawn Fishermen's Association Inc
By-catch	Non-target species, not permitted to be retained (must be returned to the water)
By-product	Non-target species which may be retained
CCSA	Conservation Council of South Australia
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Act of the Commonwealth Government of Australia)
ERA	Ecological risk assessment
ESD	Ecologically sustainable development
FAO	Food and Agriculture Organisation (of the United Nations)
FCSA	Fisheries Council of South Australia
Fisheries Management Act	*Fisheries Management Act 2007*
FMC	Fisheries Management Committee
Former Fisheries Act	*Fisheries Act 1982*
FRDC	Fisheries Research and Development Corporation
Gazette	South Australian Government Gazette
Management Committee	Management Committee of the Spencer Gulf and West Coast Prawn Fishermen's Association Inc
Management Plan	Management Plan for the South Australian Spencer Gulf Prawn Fishery
PIRSA	Primary Industries and Resources of South Australia
RTM	Real Time Management
SARDI	South Australian Research and Development Institute
SGPF	Spencer Gulf Prawn Fishery
TEPS	Threatened, Endangered and Protected Species
UN	United Nations
WFSA	Wildcatch Fisheries of South Australia

FRDC 2007/025 **Competition to Collaboration: exploring co-management models for the Spencer Gulf Prawn Fishery**

Principal Investigator: **Ms Karen L Hollamby**

Address: Spencer Gulf and West Coast Prawn Fishermen's Association Inc
PO Box 8
PORT LINCOLN SA 5606

Phone: 08 8682 4600
Fax: 08 8682 6253
Email: eo@prawnassociation.com.au

Objectives

1. Develop effective working relationships between three key stakeholder groups regarding future management of the Spencer Gulf Prawn Fishery.
2. Identify, document and evaluate new fisheries management models for the Spencer Gulf Prawn Fishery.
3. Develop a preferred management model for the Spencer Gulf Prawn Fishery with discussions of the implications and potential risks of the model.

Non Technical Summary

Outcomes Achieved

The project outcomes have contributed to:

1. Constructive working relationships between three stakeholder groups (industry, government and the conservation sector).
2. Identification, documentation and evaluation of new fisheries management models for the Spencer Gulf Prawn Fishery.
3. Development of a preferred management model for the Spencer Gulf Prawn Fishery with discussions of the implications and potential risks of the model.
4. Equip fishers with skills and understanding to enable them to pursue alternative strategies to implement a new co-management model for the Spencer Gulf Prawn Fishery.
5. Broader involvement and understanding within industry, government and the community of what is required for a commercial fishery to move towards a greater level of responsibility under a co-management model, while ensuring long-term sustainability of the resource.
6. Conservation Council of SA representation on the Spencer Gulf and West Coast Prawn Fishermen's Association Inc's Research Sub-Committee on a twelve month trial basis.

The Spencer Gulf Prawn Fishery (SGPF) currently participates within a co-management framework and is taking stronger ownership over the day-to-day management of the resource on which they rely. A gap remains between fishers creating effective business outcomes for the industry and wider community and the legislative management framework adopted by government. The SGPF is striving for co-management to promote more effective, efficient and equitable management regimes for dealing with the plethora of issues relating to harvesting a public resource. A new management regime, built on strong partnership between government, industry and other key stakeholders such as the conservation sector, has the potential to integrate sustainability within a context of industry's business needs. This project explored and evaluated alternative management models for the SGPF and provided insight into alternative management arrangements that other fisheries may wish to consider.

The SGPF operates under the Fisheries Management Act 2007 (the Fisheries Management Act) and other subordinate legislation. In particular, fisheries management of the SGPF is directed by the harvest strategy and decision rules in its Management Plan 'Management Plan for the South Australian Spencer Gulf Prawn Fishery' (Dixon and Sloan 2007). Co-management within the SGPF has evolved from a centralised management regime to collaborative and partially delegated management (between industry and government). The SGPF has embraced co-management for the following reasons:

- There is high confidence in stock sustainability, demonstrated in the annual stock assessment process
- Historically, industry has demonstrated a willingness to meaningfully engage with government
- The industry association is representative, credible and financially secure
- The industry association is well resourced, has an independent chairperson and an executive officer
- The industry association has transparent reporting arrangements in place
- There is a history of constructive working relationships and trust between government and industry
- There is minimal stakeholder conflict associated with the fishery and the industry has a track record of working with stakeholders to address conflict issues
- There is an effective management plan in place
- Industry has had a clear desire and has built its capacity to take on more responsibility
- Industry is developing stronger links with other stakeholder groups such as the conservation sector
- Government has a willingness to collaborate and share responsibility.

Three co-management models were evaluated by Spencer Gulf Prawn Fishery stakeholders: the status quo, a partially delegated model, and a fully delegated model. Stakeholders were: industry (represented by the Spencer Gulf and West Coast Prawn Fisherman's Association Inc (the Association)), government (represented by the Department of Primary Industries and Resources South Australia (PIRSA)) and the conservation sector (represented by Conservation Council of SA (CCSA)). The attributes of the three models were evaluated and the partially delegated model was the preferred model, at this point in time. Duplication of a number of management functions by government and industry was considered to be inefficient. Potential for efficiencies and cost savings were identified by formally delegating these functions to industry under the partially delegated model. Other incentives identified included:

- Greater industry stewardship of the resource
- Improved environmental performance (habitat protection and reduced impact on threatened, endangered and protected species)
- Depoliticising fisheries management
- Reducing unnecessary administration ('red tape')
- Improving management flexibility
- A shared responsibility among stakeholders for management of the fishery
- Improved communication among stakeholders
- Increased transparency of fishery operations and fisheries management processes.

Key features of the preferred co-management model include a phased approach to implementation to facilitate a smooth transition and a formal conflict resolution process, in the event that conflict cannot be resolved informally. Under the preferred co-management model, the following responsibilities would be formally delegated to industry:

- Developing, implementing and managing harvest strategies
- Contracting research and stock assessment services, including stock assessment surveys, subject to audit / oversight of research performances by a research sub-committee and the government
- Managing the spot survey data and authorisation
- Management of qualified observers
- Further delegation of management / administration services may be considered based on performance audit and assessment and willingness by government, industry and other stakeholders.

The following responsibilities would be retained by PIRSA Fisheries:

- Full independent audit process of all delegated functions
- Enforcement and compliance functions
- Conducting ecological risk assessment
- Leading development of the next management plan in consultation with the Fisheries Council of SA, the Association, its research sub-committee and other stakeholders
- Establishing ecosystem benchmarks in consultation with the Association and with the conservation sector
- Collating logbook data and providing this to the research provider under confidentiality agreements
- Cost recovery of core management processes delegated to the Association.

The following roles and responsibilities would involve the conservation sector:

- Active participation with the Association and with the government, but also more generally in the consideration of future management initiatives among stakeholders
- Active participation on any relevant Association sub-committees (involving stakeholder representatives)
- Greater involvement in management planning
- Proactive input into environmental management issues including:
    - participation in the ecological risk assessment process
    - evaluation of ecosystem benchmarks
    - development of strategies to manage impacts on threatened, endangered, and protected species (TEPS)
    - assisting in a shared approach to habitat protection (e.g. threats to the Spencer Gulf ecosystem more generally)
- Participation in conflict resolution (informally through improved communication among stakeholders, and formally through the Fisheries Council of South Australia).

During the life of the project, it became apparent that other commercial fishery organisations were interested in the outcomes for consideration of potential application to their fishery. In particular, the FCSA indicated that the outcomes would provide direction for the FCSA's co-management obligations to 'promote the co-management of fisheries', under S16 (c) of the Fisheries Management Act. The outcomes of this project will inform the co-management activities of the FCSA. Other fishing sectors within South Australia (SA), Australia and internationally are also interested in pursuing further responsibilities under co-management arrangements. Consistent with this, an industry workshop was held to present the results and outcomes of this project.

The workshop aimed to inform other commercial fishing sectors within South Australia and within other fisheries management bodies of the work of the SGPF in developing a preferred co-management model, as well as gain feedback on the preferred co-management model. Holding this industry workshop also provided an opportunity for participants in commercial fisheries (including fishers and managers) to reflect on management and governance arrangements to identify suitable co-management arrangements for their own fishery.

The results of the co-management project are expected to:

- Strongly influence future fishery management arrangements for the SGPF
- Influence management planning and the establishment of performance criteria for the SGPF
- Drive co-management arrangements for other SA Fisheries
- Guide the Fisheries Council of SA and other SA fisheries in determining co-management arrangements (including their benefits, drawbacks and challenges)
- Influence Conservation Council of SA policy in regards to fisheries co-management arrangements and more generally, provide an example of successful conservation sector engagement in fisheries management
- Improve stakeholder engagement in fisheries management decisions and policy making.

In considering the outcomes of this project, further developments could include:

1. Identifying co-management models for other fisheries
2. Developing business cases for implementing co-management arrangements
3. Evaluation of the implementation of the preferred co-management model in SGPF including an assessment of the potential for a fully delegated model
4. Comparison of co-management arrangements between fisheries across Australia (including benefits, adoption, problems arising, support for co-management, stakeholder engagement, legislation, governance arrangements and lessons learnt).

Keywords
Spencer Gulf, prawn, shrimp, co-management, self-management, fishery management, fisheries management, industry management, conservation stakeholder involvement.

Acknowledgements

This report has been prepared with the assistance of Steering Committee members who have provided valuable input. Steering Committee members are sincerely thanked for their time and effort in providing input into this report and throughout the project.

Dr Paul McShane has provided valuable input and advice throughout the project, as well as developing discussion papers for Phases 2 and 3 of the project. Dr McShane also facilitated Steering Committee discussions, creating a positive direction and environment for all participants.

Ms Samara Miller and Mr Martin Smallridge had developed the original FRDC project proposal. Ms Miller also conducted all of the legwork to get the proposal approved and was the catalyst for leading the Spencer Gulf Prawn Fishery to increase its fishery management responsibilities under new Co-Management arrangements.

Mr Will Zacharin, Executive Director of Fisheries, has supported and encouraged co-management within the Spencer Gulf Prawn Fishery, making this project possible.

Dr Shane Roberts and Mr Cameron Dixon have provided assistance in progressing the project, including preparing materials for workshops and delivery of scientific advice to the Conservation Council of SA Steering Committee.

The Management Committee of the Spencer Gulf and West Coast Prawn Fishermen's Association has provided support for the project and to the Principal Investigator throughout the project. The Management Committee's support has allowed for the project to be conducted successfully and has involved many volunteer hours in learning about the project, providing advice and leading co-management within the South Australian commercial fishery sector.

Mrs Jenny Kranz has provided administration support for the project and to project participants throughout the project.

Dr Gary Morgan coordinated and supported the industry wide workshop. The contribution made by industry, fisheries managers and other stakeholders at the workshop supports the project outcomes.

The Conservation Council of SA must be additionally thanked for their contribution to this report and to the project. The commitment made from the Conservation Council of SA to participate in this project, and the members of the Conservation Steering Committee providing many volunteer hours toward workshops, meetings and input into documents, has given a holistic approach to co-management. This project would not have been achieved without this contribution.

Many thanks go out to the fishermen who provided historical input into fishing operations including Barry Evans, Greg Palmer, Gig Bailey, Jock Montgomery and John Hood. It is these pioneering fishermen, their fathers and others who took the chance with prawn fishing, who have made the Spencer Gulf Prawn Fishery the well managed fishery that we see today.

A special mention also needs to go out to Neil Carrick; the government biologist that worked closely with the Spencer Gulf Prawn fishermen over many years to introduce the pioneering spatial management system which has presented the fishery as an exemplar of sustainable shrimp fisheries management world wide. Neil's vision is realised in this co-management project.

Background

In September 2002, the Spencer Gulf and West Coast Prawn Fishermen's Association Inc (the Association) developed a ten year plan. One of the goals was that '*We manage the fishery ourselves with minimal involvement of the government and have the finances to do this*'. Whilst at the time some believed that this goal was ambitious and possibly unrealistic, others suggested that an emphasis on legislative controls is not the most efficient way of sustainably managing the prawn resource in Spencer Gulf.

The South Australian fishing industries are managed under a general framework of 'Co-Management' whereby industry and other stakeholders are involved in the management and decision-making process. Involvement included membership on Ministerial Advisory Bodies – Fisheries Management Committees – providing stakeholders with a voice on all issues relating to management and including the services that are required to manage the fisheries each year. In some fisheries, most notably the Spencer Gulf Prawn Fishery (SGPF), this model enabled the development of a fisheries management model which required the implicit involvement of industry members in the day to day running of the fishery.

Since 2002, with the resignation of a long-serving senior research scientist, the Prawn Association took over the coordination of the research surveys. This change resulted in cost savings and an increased level of professionalism within the Association. This has since progressed to a state where the Prawn Association is now formally contracted by Government to provide Co-ordinator At Sea and Real Time Management services to the fishery. An Association elected member of industry coordinates a Committee At Sea comprising skippers who are responsible for making harvest strategy decisions during fishing trips, when they are needed in real time. This is the 'Real Time Management' process referred to throughout this paper.

In addition, the Prawn Association has entered its fourth contractual arrangement with government to provide Co-Management services to the fishery. These services are aimed at enhancing the Association's level of responsibility for management with the industry based co-manager taking an active role in managing and improving the operational processes in partnership with PIRSA.

The *Fisheries Management Act 2007* (Fisheries Management Act) came into operation on 1 December 2007 and contains provisions for the delegation of management responsibilities to an industry association or other organisation, with government taking an audit role against the Fishery Management Plan. The Fisheries Management Act also provides for the promotion of co-management of fisheries, as a function of the Fisheries Council of South Australia (Fisheries Council), established under the Fisheries Management Act. In parallel to these government processes the Association has either directly or indirectly implemented policies, processes or governance arrangements to support a future move towards taking on more responsibility for managing the fishery.

The above arrangements have positioned the Association to take advantage of the opportunity to move towards a greater level of co-management. It is anticipated that the outcomes of the project will be a return on investment by way of increased flexibility and management responsiveness which will engender a more commercial focus for management. The management regime of the SGPF, including Industry's strong role in managing the prawn stock, has recently been recognised by the Food and Agriculture Organisation of the United Nations as 'the best example of shrimp fishery management' (Gillett, 2008).

Need

Fisheries management across Australia relies on maximising the benefits to the community from a limited seafood resource. A range of stakeholders have an interest in sustainable fisheries management. Up until now, the focus of fisheries management had been on ensuring sustainability of the marine resources and on legislative and other regulatory controls to support this. However, a gap remained between fishers creating effective business outcomes for the wider community and the legislative framework adopted by government. There is a need to consider sustainability within the context of industry's business needs for sustainable environmental outcomes to be really driven by participants in a fishery.

The Spencer Gulf Prawn Fishery currently participates within a co-management framework and is taking stronger ownership over the day-to-day management of the resource on which they rely. More and more industry management processes are being based on business concepts, rather than legislative controls. For example, the fishery has implemented environmental management systems that address fisheries risks on the environment, the welfare of its people and the welfare of customers.

'Co-management' has become a vision for the Spencer Gulf Prawn Fishery as a way of promoting more effective, efficient and equitable management regimes for dealing with the plethora of issues relating to harvesting a public resource. The need to describe and assess alternative management models and gain an understanding of the wider public opinion of partnership approaches to fisheries management was an important aspect to furthering the co-management arrangements for the fishery.

This project aims to explore the best management option for the fishery in the future as well as provide insight into models for alternative management arrangements that other fisheries may wish to consider.

Objectives

The objectives of this project were to:

1. Develop effective working relationships between three key stakeholder groups regarding future management of the Spencer Gulf Prawn Fishery.
2. Identify, document and evaluate new fisheries management models for the Spencer Gulf Prawn Fishery.
3. Develop a preferred management model for the Spencer Gulf Prawn Fishery with discussions of the implications and potential risks of the model.

Objective 1 was achieved through opening dialogue, identifying contacts within each stakeholder group and collaboration on initiatives outside of the project. Constructive meetings were held between each stakeholder group breaking down barriers to communication, whilst informing each stakeholder group on perspectives of the other stakeholders. Primary Industries and Resources South Australia (PIRSA) recently initiated, together with the CCSA, a project to further investigate how the conservation sector can better be involved in and participate in the fisheries management process in South Australia. Additionally, the Spencer Gulf and West Coast Prawn Fishermen's Association Inc (the Association) is trialling conservation involvement (from the Conservation Council of SA (CCSA)) on its Research Sub-Committee for a 12 month period. The Association is also managing the Observer Program, with involvement and collaboration between the Association, PIRSA, South Australian Research and Development Institute (SARDI) and the CCSA. Proactive engagement, particularly between the Association and the CCSA could see added benefits of collaboration on resource issues detrimentally impacting on the fishery or wider ecosystem.

The identification, documentation and evaluation of new fisheries management models (Objective 2) was achieved through the second phase of the project. Two new fisheries management models were presented for consideration by the three stakeholder groups, in comparison to existing management arrangements. The benefits and issues were evaluated with the partially delegated model and the preferred model. Industry led this process, with Primary Industries and Resources South Australia (PIRSA) and the CCSA being responsive to the current management arrangements and industry's aspirations.

The third objective (Objective 3) was met through selecting the preferred co-management model from the models identified in the second phase of the project and further developing the model by ensuring arrangements met the needs of all stakeholders. Risks involved in implementing the co-management model preferred by the industry Association (the partially delegated model) were addressed through the development of co-management arrangements for this model. Whilst the preferred co-management model is not a fully-delegated model (not all functions are delegated to industry), there is opportunity to further delegate responsibility to industry following implementation and evaluation of the preferred co-management model performance.

Methods

To develop effective working relationships between three key stakeholder groups, three investigators were appointed, one from each stakeholder group, to the Project Working Group. The Project Working Group led each Steering Committee consisting of representatives from their representative group with membership established from individuals interested in co-management or fisheries management more broadly or possibly affected by any outcomes. The three stakeholder groups involved in the project comprise of individuals representing:

- Commercial fishing industry: Spencer Gulf and West Coast Prawn Fishermen's Association Inc
- Government: The Department of Primary Industries and Resources South Australia
- Conservation sector: Conservation Council of South Australia

The Spencer Gulf and West Coast Prawn Fishermen's Association Inc (Association) led the project from an 'industry' perspective. The Association is recognised by fisheries managers, other industry groups, and the general public as the peak body for the Spencer Gulf Prawn Fishery. The Association has an extremely strong membership base and has an interactive framework for communicating with and managing its activities with members, in particular with respect to co-management. Therefore, the Association was best suited to manage the project and deliver outcomes on behalf of its members, as well as other stakeholders. Membership of the industry Steering Committee is from Association staff and members.

Table 1 Industry Steering Committee members

Member	Role
Ms Karen Hollamby	Principle Investigator, Association Executive Officer
Mr Barry Evans	Licence holder, previously the Association's President
Mr Greg Palmer	Coordinator At Sea, Management Committee member, skipper, member of several Association Sub-Committees
Mr Darko Bralic	Management Committee member, skipper

The Minister for Agriculture, Food and Fisheries is responsible for managing the Spencer Gulf Prawn Fishery (SGPF) and the marine resources that the SGPF utilise under the *Fisheries Management Act 2007* (Fisheries Management Act). As part of standard administrative procedure, the management functions have been delegated to the Fisheries Division of the State Government Department of Primary Industries and Resources South Australia (PIRSA). PIRSA has a legislative responsibility to ensure that the SGPF utilises the resources in an ecologically sustainable manner. The PIRSA Steering Committee was made up of individuals with differing areas of interest or expertise, including from within the business areas of fisheries policy and management, fisheries compliance and research (SARDI).

Table 2 PIRSA Steering Committee members

Member	Role
Mr Sean Sloan	Co-Investigator, Manager Fisheries Policy
Ms Kelly Crosthwaite	Fisheries Division
Mr Martin Smallridge	Fisheries Division
Mr Shane Gassner	Fisheries Services (compliance)
Dr Shane Roberts	SARDI, Aquatic Sciences
Mr Cameron Dixon	SARDI, Aquatic Sciences
Dr Tim Ward	SARDI, Aquatic Sciences

The Conservation Council of South Australia (CCSA) was invited to participate in the project as their membership represents informed people in the general community who have an interest in sustainability and biodiversity of ecosystems in relation to commercial fishing.

They are also the peak environmental body in South Australia, with membership from environmental organisations as well as the general public. Other major stakeholder groups, the recreational and indigenous sectors, were not considered key stakeholders to engage for this project as there is negligible recreational catch and no record of indigenous fishing for King Prawns (Agriculture, Food and Fisheries, 2007). Whilst the views of the CCSA Steering Committee does not necessarily form the opinion of the CCSA, it will strongly direct CCSA's policy.

Table 3 CCSA Steering Committee members

Member	Role
Mr James Brook	Co-Investigator, CCSA consultant
Mr Chris Ball	Alternate Co-Investigator, CCSA staff member
Ms Alex Gaut	CCSA staff member
Mr Matt Osborne	Fishers for Conservation
Ms Kathryn Warhurst	Whale and Dolphin Conservation Society
Mr Neville Skinner	Marine Life Society of SA
Ms Shen Dycer	Wilderness Society (SA Branch)

The Project Working Group, consisting of Investigators, met on many occasions to discuss the progress of the project, to develop suitable discussion papers and to advance the project. Project Working Group members also lead their respective Steering Committee in workshops and attended the Steering Committee meetings of other groups, where input was required. A number of additional workshops were held, either in closed sessions or with representatives to discuss co-management concepts and fisheries management. Workshops were run with 'closed' sections to allow Steering Committees to discuss co-management in a confidential manner, creating an open and free communication forum, so that meetings were not unduly influenced from other representative groups.

Whole of Steering Committee workshops were also held, where all participants were invited to attend the discussion of a suitable co-management model for the Spencer Gulf Prawn Fishery. These workshops also provided each Steering Committee member with the opportunity to meet representatives from each stakeholder group and gain an understanding of other stakeholder points of view. In addition, PIRSA and the CCSA Steering Committee representatives were invited to an Association Management Committee (governing body of the Association) meeting to present its views on co-management and the preferred co-management model for the Spencer Gulf Prawn Fishery. Since the commencement of the project, the Association has also invited a representative from the CCSA to sit on the Research Sub-Committee on a 12 month trial basis, together with Association, PIRSA and SARDI representatives.

1. Spencer Gulf Prawn Fishery

This Chapter describes the Spencer Gulf Prawn Fishery (SGPF), how the fishery operates, relevant rules and legislation, and the structure of decision making. The purpose of this chapter is to provide relevant information on the SGPF to allow the reader to understand the progression of management arrangements between the fishery and government, why the fishery was selected to undergo this project (to identify an alternative co-management model(s)), and how an alternative co-management model would be applied for the fishery. The SGPF is recognised as one of the best managed fisheries in the world (Gillett, 2008; McPhee, 2008), and also leads other fisheries in its 'co-management' arrangements with government and was, therefore, an obvious choice for furthering co-management arrangements between a fishery with government within Australia.

The SGPF is an important element of South Australia's commercial fishing industry. EconSearch (2009a) evaluated the SGPF, in combination with the West Coast Prawn Fishery, as having a direct economic impact to South Australia in 2007/08 of $48.5 million including employment of 333 full-time equivalent (fte) individuals. A further $50.6 million and 265 fte downstream jobs in 2007/08 were indirectly contributed by the SGPF, in combination with the West Coast Prawn Fishery (EconSearch, 2009a) from the documented total catch of prawns within the Spencer Gulf of 2,028 tonnes (EconSearch, 2009a). EconSearch (2009a) documented that only 60 tonnes of prawns were caught within the West Coast Prawn Fishery, which would create a negligible overall impact of the West Coast Prawn Fishery in comparison to the SGPF in the economic impact to South Australia.

The SGPF is a public resource, utilised by the commercial fishing licence holders and managed by the South Australian (SA) State Government. The SA State Government, in particular the Fisheries division of Primary Industries and Resources South Australia (PIRSA), has put into place a number of legislative controls to better manage Spencer Gulf. State legislation that directly relates to the management of the SGPF includes:

- *Fisheries Management Act 2007*
- *Fisheries Management (Prawn Fisheries) Regulations 2006*
- *Fisheries Management (General) Regulations 2007*
- Management Plan for the South Australian Spencer Gulf Prawn Fishery, 2007

In addition, the SGPF is reviewed and an assessment is conducted under Parts 13 and 13A of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EBPC Act) relating to impacts on threatened, endangered and protected species and for export approval (without this, prawns from the fishery cannot be exported). The SGPF (together with the other South Australian prawn fisheries) has recently undergone a re-assessment and meets all requirements until November 2014, when the fishery will be reviewed again. There are also a number of other legislative controls and priority plans that ensure activities undertaken by the SGPF, whether by the fishing industry or by the community generally, are maintained within the context of environmental sustainability. These legislative controls can also provide a basis for management of the fishing industry, through reducing protected species loss, correct disposal of waste, identifying invasive marine pests for reducing spread etc. State legislation that the SGPF should consider in developing strategic plans, research and development plans or in priority setting include:

- *Environment Protection Act 1993*
- *Natural Resources Management Act 2004*
- *Marine Parks Act 2007*
- South Australia's State Strategic Plan 2007

1.1. History of the Spencer Gulf Prawn Fishery

King Prawns (previously termed / commonly referred to as Western King Prawns), *Melicertus latisulcatus*, were first trawled from the Spencer Gulf by the Fishery Investigations Ship *Endeavour* in 1909. The first commercial attempt at prawn trawling by a Danish seine boat was made in 1948, but was unsuccessful. The South Australian Department of Fisheries and Fauna Conservation carried out exploratory trawling using the *Weeruta* between 1957 and

1964, again with no commercial success. In 1964 a number of Port Lincoln fishermen attempted commercial prawn trawling on Fishing Vessel *Mameena* and had limited success.

The industry showed its true potential through the work of a Port Lincoln fisherman, Roger Howlett, in 1967, who began extensive surveying of the Spencer Gulf in July 1967. After two and a half months of surveying the southern area during daylight and dark he finally caught the first commercial quantity of prawns in the Spencer Gulf: at the bend of the 'Gutter' in October 1967. Other fishermen joined the new fishery and it rapidly developed.

In March 1968, the Director of Fisheries (at the time) introduced restricted entry and 25 prawn permits were granted. These early management measures were introduced to prevent over-exploitation of the resource and over-capitalisation within the fishery and to rationalise the development and quantify the extent of the resource. It was in 1968 that the Spencer Gulf and West Coast Prawn Fishermen's Association (the Association) formed and it was in these early days that the fishermen made 'gentlemen's agreements' to restrict fishing. The Spencer Gulf Prawn Fishery also documented catch and effort statistics from its inception in 1968, in the form of fishermen's logbooks.

The Spencer Gulf and West Coast Prawn Fisheries began as separate fisheries when restricted entry was implemented. They merged soon after and essentially became one fishery: prawn fishermen could fish in either the Spencer Gulf or in West Coast fishing grounds. It was in these early days that fishermen spent much of their time at sea in the hopes of catching prawns, spending up to 300 nights a year out fishing. The fishery was only restricted to fishing in areas greater than 10 metres depth and little was known about prawn movements, so fishing was conducted across the entire Spencer Gulf and all along the West Coast of South Australia.

Five zones were then created: two in the Spencer Gulf; and three in the West Coast. These zones allowed restricted access for fishing, however, the zones in the Spencer Gulf did not meet the needs of the fishermen and they were merged in 1971. Fishing was still permitted in the Spencer Gulf and within the zones along the West Coast of South Australia.

In the 1970's many of the prawn fishermen also had tuna fishing permits. The State Government of South Australia introduced a single permit entry system in 1972/73, where an individual or company could not hold both a prawn and tuna fishing permit. Fishermen were made to choose between the prawn and tuna permits. Many of the choices made at that time are still evident today: many of the permits (now called licenses) are still held by the family (passed from father to son). Some are even experiencing their third generation of operation.

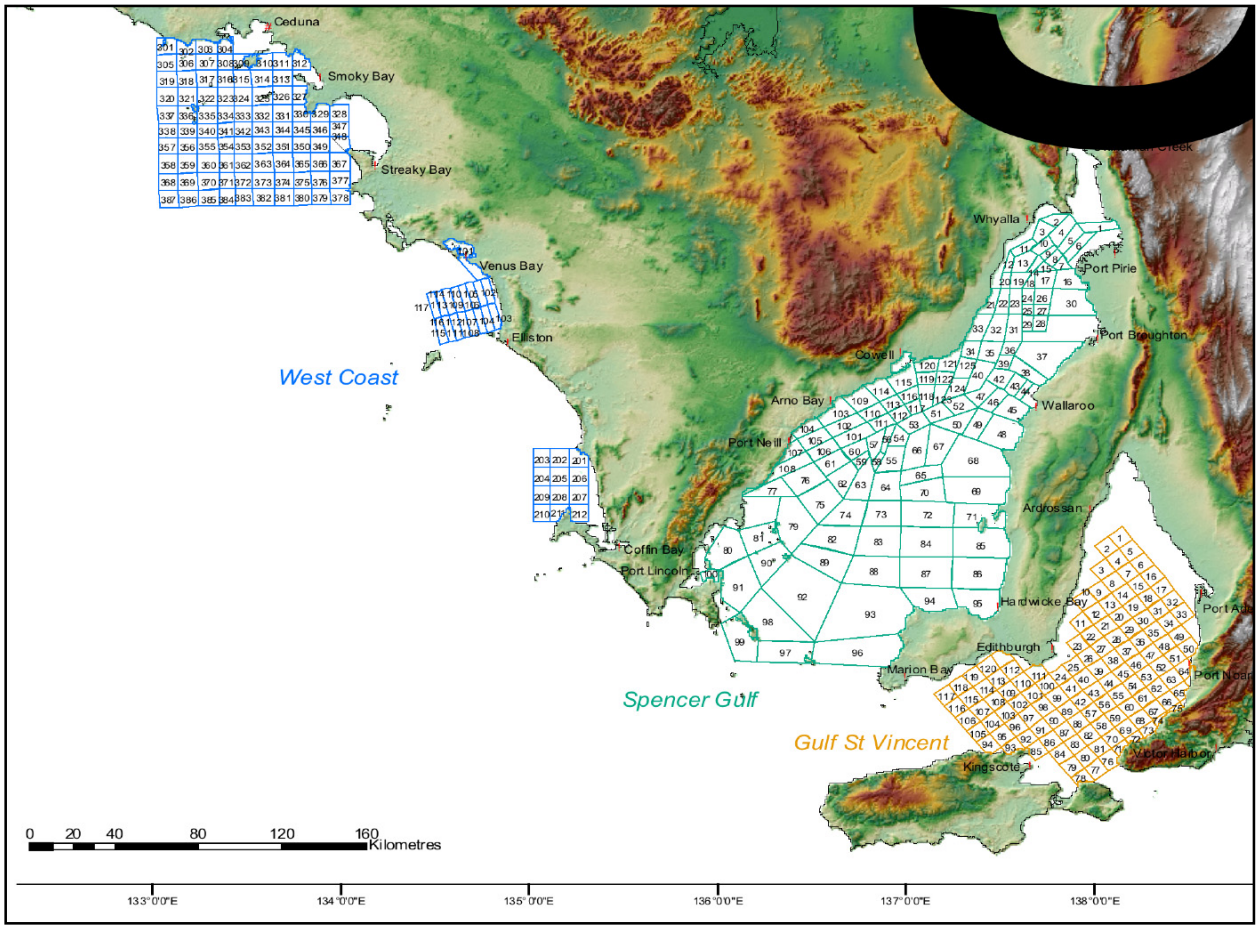
By 1975 there were a total of 34 licences issued for prawn fishing in the Spencer Gulf. A further five licenses were granted in 1975, increasing the total number of licences from 34 to 39, as is still evident today. In 1976 'zones' were abolished and the Spencer Gulf and West Coast Prawn Fisheries separated. Fishing could take place in the Spencer Gulf or along the West Coast of South Australia. Fishermen had the option to hold a fishing permit in the Spencer Gulf or along the West Coast, with most choosing to remain in the Spencer Gulf.

1.2. Current Management of the Spencer Gulf Prawn Fishery

The Spencer Gulf Prawn Fishery (SGPF) is one of three prawn fisheries within South Australia: West Coast; Spencer Gulf; and Gulf St Vincent. There are currently 39 commercial fishing licenses issued for the SGPF. It is a single species commercial prawn fishery, capturing the King Prawn, *Melicertus latisulcatus*. In addition to prawns, licence holders are permitted to retain and sell two by-product species incidental to fishing, slipper lobster (*Ibacus* spp) and southern calamari (*Sepioteuthis australis*).

The Spencer Gulf Prawn Fishery is permitted to fish in all Spencer Gulf waters greater than 10 metres in depth, north of the geodesic joining Cape Catastrophe (Latitude 34°35.4'S, Longitude 136°36.0'E) on Eyre Peninsula and Cape Spencer (Latitude 34° 9.6'S, Longitude 135°31.2'E) on Yorke Peninsula, as shown in Figure 1. Spencer Gulf prawn fishing areas are legislated under the *Fisheries Management Act 2007* (Fisheries Management Act).

Figure 1 South Australia's prawn fishing grounds



Courtesy of: Fisheries Statistics Unit, SARDI AQUATIC SCIENCES

Fishing takes place at night, generally between the last quarter of the moon, through the phase of the new moon to the first quarter (referred to as the dark of the moon). The fishing season lasts from November through to and including June of the following year, during which only six fishing trips are usually carried out. The fishery does not fish in January or February to ensure that spawning can occur with limited stock interference. Fishing occurs in November and December to meet Christmas demands for stock, however, these fishing periods are limited in catch to minimise the impact on prawn spawning and recruitment. A total of 51 nights were fished per prawn vessel in the Spencer Gulf during the 2008/09 fishing season.

McPhee (2008, p. 90) identifies fisheries as being controlled through three different mechanisms: input control; output control; and access control. The SGPF is largely an input controlled fishery: in which the amount of effort and the efficiency of that effort is controlled (McPhee, 2008 p. 90). However, the fishery is managed using a combination of input controls together with output (allowable catch) and access controls. The legislated controls are provided in Table 4, and more specific and detailed controls relevant to a fishing period or data derived during fishing are documented in the Management Plan for Spencer Gulf Prawns South Australia (Dixon and Sloan, 2007).

Table 4 Spencer Gulf Fishing Controls

Fishing Control	Obligation / Legislated Requirement
Permitted Species	King Prawns; Slipper Lobster; Southern Calamari
Limited Entry	39 licenses
Licence Transferability	Permitted
Corporate Ownership	Permitted
Spatial and Temporal Closures	Adjusted based on survey and fishing results
Closed Areas	No trawling in waters shallower than 10m
Method of capture	Demersal otter trawl
Trawl rig	Single or double rig
Trawling times	Not during daylight hours
Maximum headline length	29.26m
Minimum mesh size	4.5cm
Maximum vessel length	22m
Maximum vessel power	272kW
Catch and effort data	Daily and monthly logbook submitted monthly
Landing locations	Landings permitted anywhere in the State of South Australia
Landing times	Landings permitted at any time during the season

Sloan and Dixon, 2007

1.3. Conduct of Prawn Fishing in the Spencer Gulf

Commercial prawn fishing is undertaken using the demersal otter trawl technique; consisting of towing a funnel shaped net leading into a bag (referred to as a cod-end), see Figure 2. A separate large meshed bag (referred to as a crab bag) within the cod end acts to retain blue crabs and other animals caught, while the prawns flow to the cod-end. The crab bag reduces crab mortality, incidental damage to prawns and allows animals to be promptly discarded alive to the sea. Otter boards (also described as 'bison trawl boards' or 'bison boards') are used to keep nets open horizontally while they are being towed, see Figure 3.

The duration of trawl 'shots' are generally around 50 minutes, after which the catch is emptied into a hopper-conveyor system for sorting, grading and packing. By-catch is returned to the water via the conveyer belt system (including crab racks)The short shot duration and the hopper–conveyer belt system return by-catch to the water quickly, greatly decreasing the risk of by-catch mortalities. The prawn catch is graded, cooked or dipped (into a preservative solution) if not cooked, to suit market demand, packed and immediately snap frozen.

There have been a number of areas closed seasonally or during each fishing period aimed at protecting newly recruited and juvenile prawns or ensuring maintenance of adequate levels of egg production. The closures have also been used to improve the size of prawns caught in order to optimise the value of the catch and to protect areas of juvenile finfish or other important species. Some of these areas are significant to the fishery and were introduced by fishermen (self imposed closures). These self imposed closures have remained in place since their implementation, and include the closures at Port Broughton and north of Point Lowly (since the early 1970's), in the Shoalwater area (since 2000) and at Wardang (since 2002). The closures are included in gazettal notices associated with any harvest strategies developed for the six fishing trips.

Figure 2 Trawl net configuration

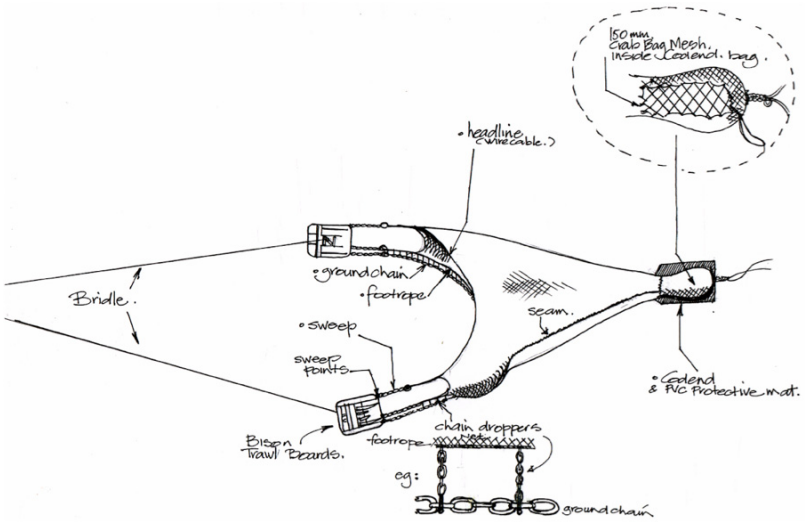
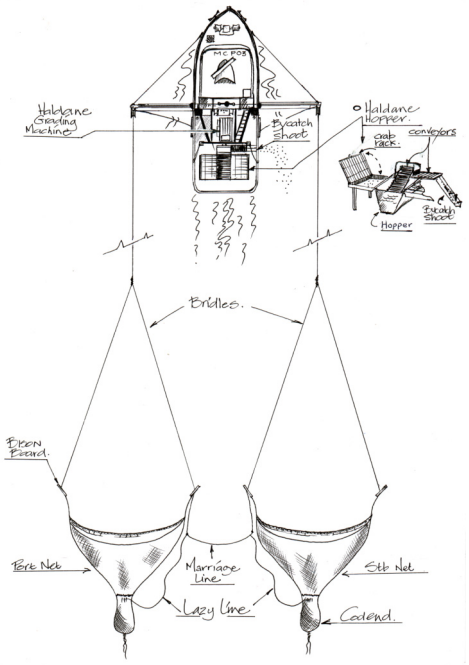


Figure 3 Double rig trawl gear



Since the inception of the fishery to present, the prawn catch has remained relatively consistent in the SGPF, with approximately 1,800 to 2,000 tonnes caught each year. However, the effort expended to catch the fish has greatly reduced from around 300 nights in the early days, to only 51 nights fishing in the 2007/08 season. The area that prawn fishing is conducted in has also greatly reduced. The SGPF was limited to fish in waters greater than 10m depth, but were able to fish in any other area of the Spencer Gulf. Carrick (2003) identified that less than 10% of the permitted Spencer Gulf prawn fishing grounds were fished and that there are areas which have never been fished. Patterns in effort are monitored by SARDI and significant changes in effort are recorded by SARDI in their stock assessment reports. SARDI reports have not noted any significant increase of effort distribution, but instead have noted that there has been a contraction of effort distribution (pers comm. Dixon, 2009).

1.4. Research and Data

The SGPF and the Association contributes significant investment into research each year for economic, environmental and social outcomes. SGPF licence holders contribute financially to research through their licence fees for surveys, other ecological research, economic research and through Fisheries Research and Development Corporation (FRDC) levy payments. The Association contributes financially to specific projects that are of benefit to its members or that meets a need more generally for the fisheries it works for. The projects undertaken by the Association need to meet the objectives and vision of the Association and are at the discretion of the Association's Management Committee or one of the Association's sub-committees, where a budget has been allocated for that work. Financial contributions made through licence fees for core fisheries management activities, which ensure that there is an equitable distribution of costs across all licence holders. Association activities are not necessarily those considered essential for fisheries management, but are conducted to advance, promote and safeguard the industry.

Historically, extensive research has been conducted on King Prawns within the Spencer Gulf since the late 1970's and the first prawn surveys were conducted in 1981, carried out on several occasions throughout the year. The surveys were aimed at improving the understanding of prawn distribution and abundance in Spencer Gulf. A sound understanding has been gained from this research including biological characteristics, the spatial distribution of adults and juveniles and the processes associated with spawning and recruitment of King Prawns.

Prawn surveys are still conducted since the first survey in 1981; three fishery independent 'stock assessment surveys' and usually three fishery dependent 'spot surveys' are conducted each fishing season. The primary objective of stock assessment surveys is to determine the status of the resource (Dixon and Sloan, 2007). The results of the survey are used explicitly to determine the harvest strategies for the following fishing periods. The conduct of regular stock assessment surveys provides confidence that gross over-fishing is unlikely to occur, as the harvest strategies are tailored to match the results observed in the surveys. Stock assessment surveys are carried out in November, February and April at 208 fixed shots throughout the Spencer Gulf each fishing season (Dixon and Sloan, 2007). Dixon and Sloan, 2007, set out the data collected for each survey to include: total catch weight; catch weight per commercial prawn grade; mean prawn size; sex-specific length frequency; and reproductive index (November and February only).

In between stock assessment surveys the SGPF fleet undertakes spot surveys. Dixon and Sloan, 2007, set out the data collected for each spot survey to include: catch weight total; catch weight per commercial prawn grade; and mean prawn size. Spot surveys usually target areas with high catch rates or known catches to determine if smaller fish have moved into the area or if more area could be opened to the fishery. Spot survey data is then used in conjunction with the previous stock assessment, prawn fishing and historical data to develop a harvest strategy for the fishing period. Spot surveys, along with 'Real Time Management' (explained later in this Chapter), enables the fishery to avoid the capture of small prawns as the adult distribution changes throughout the season; providing certainty that gross over-fishing is unlikely to occur.

Information gathered through stock assessment surveys, spot surveys and commercial fishing logbooks are collated and analysed by SARDI. This information is presented to PIRSA in reports:

- Survey Report (three per year, one for each survey); presents the interim results from the fishery-independent survey and compares the results with previous data collected for the same fishing period
- Status Report (one per year); provides a brief on the previous fishing season soon after the season is finished
- Fishery Assessment Report (one per year); provides a detailed analysis of a fishing season, including all information gathered from surveys and commercial catch data and undergoes a rigorous review / verification process. Fishery Assessment Reports are publicly available and can be accessed via the SARDI website.

Extensive by-catch research has also been conducted in the SGPF. In 1997 an extensive by-catch study was undertaken in the SGPF, based on information obtained over many years. Fishery independent surveys of by-catch then began (in 1997), although discontinued for a period and recommenced in 2000. In March 2002, a voluntary logbook system was introduced to record by-catch information. SARDI prepared a consolidated report in 2005 on by-catch and by-product from historic research, 'Monitoring and assessment of by-catch and by-product species of the Spencer Gulf Prawn Fishery', (Dixon et al., 2005). Then in 2006 the Spencer Gulf Prawn Fishery began funding a three-five year independent by-catch and by-product research project, finalised in 2009 'Fishery-independent by-catch survey to inform risk assessment of the Spencer Gulf Prawn Trawl Fishery' (Currie et al., 2009).

In addition, the Association has supported numerous research projects, utilising prawn licence holders FRDC levy contributions, to gain further understanding of the environment in which the SGPF operates, by-catch survival and reduction, economic improvements and prawn distribution, movements and abundances. FRDC funding is an integral component for the SGPF to undertake projects of significant value that would not ordinarily be achieved. The Association's Research Sub-Committee is responsible for strategic research priority setting, which has been developed around environmental, economic and social outcomes and not just prawn specific research.

1.5. Harvest Strategies and Real Time Management

The process for developing harvest strategies is based around measures of catch (size composition catch rates) in the Management Plan (Dixon and Sloan, 2007) from stock assessment surveys as well as input controls, output controls and access controls. Input controls, other than those listed in Table 1, include available nights for fishing and the time available for fishing on any given night. Output controls are related to average catch per vessel and size of the total catch and for pre-Christmas fishing the total tonnage caught. Fishing is also generally 'capped' when it reaches in excess of 1,800 tonnes of total catch for the fleet; although not documented or limited within the Management Plan. Access controls are determined through size composition and catch rates of prawns as well as limited minimum depth for fishing, permanent closure areas, and when fishing can be conducted (ie seasonal closures and day closures).

Harvest strategies provide details on where the SGPF fleet may fish or where fishing is prohibited, the target size of fish to be taken, and the amount of fish to be caught using stock assessment survey, spot survey and commercial fishing data as well as lunar cycles and prawn biological data. Using this data and the decision rules the Association's Management Committee develops harvest strategies, in consultation with PIRSA Fisheries. If survey results are low by historic standards, measures are in place in the Management Plan to ensure that subsequent harvest strategies are conservative, with the explicit aim that the survey results will be back to normal levels on the next occasion. The notices developed that provide for dates of fishing, open and closed areas during any fishing period and fishing times are approved by the Minister's delegate and then gazetted in the South Australian Government Gazette (the Gazette).

Harvest strategies can be amended during a fishing period at any given time, referred to as 'Real Time Management'. These amendments are generally associated with reductions in the harvest area, unless a spot survey specifically indicates that new areas can be sustainably opened for harvest. The 'Committee At Sea' (made up of nine skippers from the Spencer Gulf Prawn Fishery) use catch and effort information provided to the Coordinator At Sea to determine open and closed areas and generally fine tune lines of closure. This is done to protect juvenile/small stock and/or by-catch (high rates of by-catch or species of significance). Real Time Management has been an effective tool for the Spencer Gulf Prawn Fishery to sustainably manage the fishery as well as create responsible leadership from within its ranks.

1.6. The Existing Management Plan

The 'Management Plan for the South Australian Spencer Gulf Prawn Fishery' (Management Plan) developed by Dixon and Sloan, 2007, in association with the industry, was established under the *Fisheries Act 1982* (former Fisheries Act) to further the objectives of the former Fisheries Act and inform discretionary decision making provided for the former Fisheries Act. As part of the broader harvest strategy for the fishery, performance measures and performance indicators have been outlined in the Management Plan to allow for assessment of the degree to which management objectives are being achieved (Dixon and Sloan, 2007). Reference points and decision rules are also identified to guide harvest strategy development and decision making. The Management Plan sets out short term performance indicators to ensure that the fishery operates each year according to the measures for developing harvest strategies and decision rules applied, based on those measures. Long term performance indicators are also identified to ensure that the SGPF is continuing to operate under an ecosystem framework (ie to avoid or reduce by-catch; avoid, reduce and report on threatened, endangered or protected species; assess impacts on benthos etc).

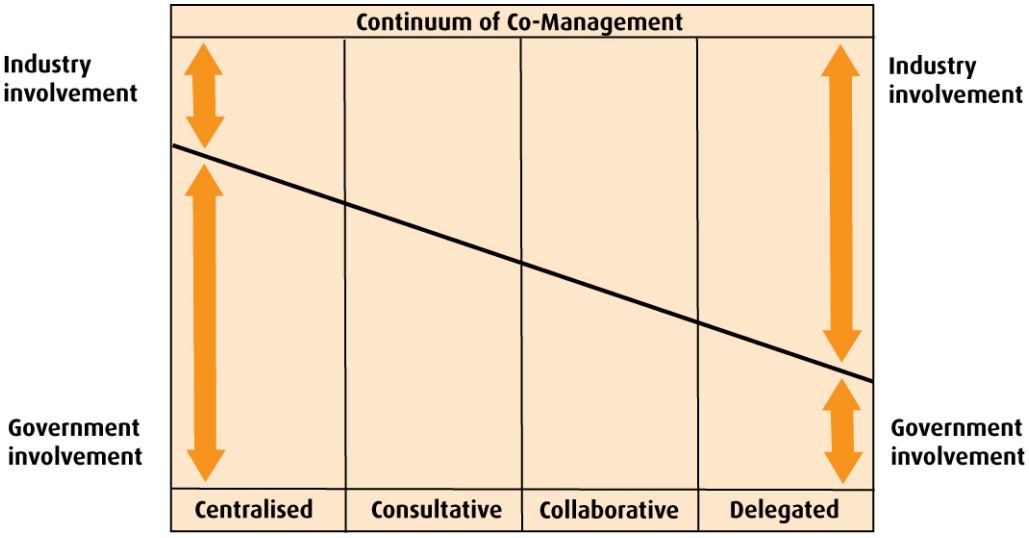
The Management Plan is essentially the main document guiding day to day and strategic management of the SGPF, how it operates, limit reference points for its activities, and activities that must be carried out in the future to meet recommendations under the EPBC Act. The Management Plan is in operation from 2007 to 2011 and is subject to annual reviews and amendments (Dixon and Sloan, 2007). As the Management Plan was prepared as a policy document under the former Fisheries Act and is subject to amendment under that legislation, whereby public consultation is not required. The preparation of a revised Management Plan will be made under obligations outlined within the *Fisheries Management Act 2007* (Fisheries Management Act). Any amendments to a revised Management Plan will require public consultation unless the amendment will not change the content of the Management Plan.

2. Existing Fisheries Management Arrangements

The South Australia Government is responsible for the management of State owned community resources. The fisheries resources are managed under the *Fisheries Management Act 2007* (the Fisheries Management Act) and subordinate legislation (regulations, policies, plans). Management of the fishery is a responsibility of the fisheries minister, the Minister for Agriculture, Food and Fisheries, as defined in the Fisheries Management Act, and can be delegated to a 'person or body' (S10). The State Government Department of Primary Industries and Resources South Australia (PIRSA), Fisheries Division (PIRSA Fisheries) is responsible for managing the fisheries in accordance with the objectives of the Fisheries Management Act.

PIRSA Fisheries has strong relationships with fishing industries in the management of commercial fisheries and through these relationships has developed co-management arrangements with fishing industries and their relevant Associations. Neville (2008) identified four models for fisheries management (presented in Figure 1) as follows: centralised; consultative; collaborative; and delegated. As a fishery moves along the continuum of management, industry has a greater level of decision making and responsibility, and the functions undertaken by government decrease. Whilst it is widely recognised that other stakeholders, including the conservation sector, have an interest in fisheries management, it is unlikely that any specific functions will be delegated to a representative stakeholder body outside of the fishing industry – government relationship.

Figure 4 Levels of parties' engagement in decision making (Neville, 2008)



Using Neville's (2008) fisheries management models, the South Australian Government and fishing industries have moved along the continuum of co-management from centralised to consultative / collaborative, and in the case of the Spencer Gulf Prawn Fishery (SGPF) to a somewhat delegated model. Applying the same models to conservation sector involvement, arrangements fall more within the centralised – consultative models. This section discusses existing management arrangements of the three stakeholders represented in this project, the structure of the SGPF Association and stakeholder involvement in fisheries management and the potential for increasing management responsibilities and engagement with stakeholders.

2.1. Evolution of Co-Management in the Spencer Gulf Prawn Fishery

The Association was established at the inception of the SGPF, with industry commitment to the fishery and amongst themselves. The SGPF, through the Association, requested the introduction of permanent closed areas at Port Broughton and north of Point Lowly, which were not supported by the PIRSA government at the time. The fishermen strongly believed that the closures were important for the fishery and for other stakeholders and therefore introduced gentlemen's agreements through the Association. The closure was not supported by PIRSA, and was managed by the fishermen themselves through Association membership. The closures have been built on since this time to include another two permanently closed areas at Shoalwater and Wardang. These closures are still in place and are now supported by PIRSA, through gazettal notices.

In 1983/84 SARDI scientists began working with fishermen and developed a constructive relationship that involved fishermen in research activities and an enthusiastic scientist who provided a dedicated research service. This relationship identified the benefit of having industry assist in research activities. For example surveys undertaken by commercial prawn fishing vessels provide a more accurate reflection of commercial fishing activities (gear, methods, speed, efficiency are the same as during commercial fishing) rather than using research vessels that are not adequately equipped and without the experience of professional fishermen research results were not . It also allowed the flow of fishing industry knowledge to better equip researchers to identify suitable methods to undertake prawn research activities; experience of fishermen can add value to data around environmental factors that cannot be drawn from data. This relationship saw the slow hand over of some responsibilities: utilising commercial prawn fishing vessels and crew to conduct surveys (government observers present on each vessel), fishing industry input into research activities, fishing industry input into harvest strategies.

Fisheries Management Committee's (FMC's) were established in 1997, under the *Fisheries Act 1982* (former Fisheries Act), following the move to a cost recovery model for South Australia's commercial fishing industries. The FMC's provided fishing industries with a voice for the management of their fishery. The *Fisheries (Management Committees) Regulations 1995* outlined a set of co-management principles that underpinned the formation of the Prawn FMC. An active consultation approach was taken through the Prawn FMC to develop Management Plans, develop and review harvest strategies and identify issues that needed to be addressed. The Prawn FMC was represented by different stakeholders including from the West Coast, Spencer Gulf and Gulf St Vincent Prawn Fisheries, recreational sector, peak commercial fishing industry body, PIRSA, and SARDI and were chaired independently. Prawn FMC meetings were often lengthy given the wide gamut of issues for all three fisheries, as well as being extremely costly and time intensive.

In 2002 the Association developed a ten year plan, with a major goal to 'Manage the fishery ourselves with minimal involvement of the Government and have the finances to do this'. When the SARDI scientist left in 2004, the Association gained greater responsibility in the coordination of research surveys. The coordination of stock assessment surveys became jointly managed by industry, through the Association, and SARDI. Spot surveys became entirely managed and coordinated by the Association. The change in survey coordination and management and the goals set for the Association resulted in industry cost savings, an increased level of professionalism, forward thinking and planning, independence and the view that the Association could take a more autonomous role, with PIRSA Fisheries taking on more of an auditing role against the fishery management plan.

In 2007 when the Fisheries Management Act came into operation, the Association became closely involved with PIRSA and SARDI, in developing harvest strategies and conducting research. The Fisheries Management Act facilitates co-management in a number of ways, including through the formation of the Fisheries Council of SA (FCSA) and by providing scope for the delegation of functions. The Fisheries Management Act recognises stakeholder importance by having expertise on the FCSA from a number of stakeholder sectors and having requirements for consultation on important planning processes. Section 10 of the Fisheries Management Act sets out the provisions for the delegation of functions or powers of

the Minister to a person or a body to facilitate shared responsibility in fisheries management, where this is considered appropriate. Under the Fisheries policy formal delegations are proposed to be made to a central body such as an industry association. This approach will provide a forum for collaboration and engagement, particularly between government and industry. However, successful co-management will be dependent on how well the structure of fisheries management involves all stakeholders in a participatory regime (Neville, 2008). It is anticipated that the outcome of taking on more responsibility by the Association will provide the Association with: a return on investment through increased flexibility and management responsiveness, which will engender a more commercial focus for management whilst ensuring sustainability of the fishery.

Industry was at a stage where research was needed to assess an alternative co-management model and what would be needed at an operational level to achieve it. The research component has to go hand in hand with requirements from State Government and the public to meet legislative controls, ensure sustainability, provide transparency of industry processes and provide a level of confidence to all stakeholders (of the public resource – Spencer Gulf). To meet these needs, the Association developed this project in partnership with PIRSA and Conservation SA. These groups have provided input into the processes that are currently managed by the various bodies and have developed a suitable 'co-management model'. The co-management model has been handed to the Management Committee of the Association for assessment in-line with fishing and has provided preliminary findings, incorporated into this project report.

2.2. Association Structure

The Spencer Gulf and West Coast Prawn Fishermen's Association Inc (the Association) is a voluntary independent seafood sector entity that represents Spencer Gulf and West Coast Prawn Fishery licence holders. It is a non-profit primary resources development organisation that formed in 1968 and was incorporated in South Australia on 14 February 1984. It has a strong membership base, consisting of 38 members from the Spencer Gulf Prawn Fishery and 3 members from the West Coast Prawn Fishery (all but one Spencer Gulf Prawn Fishing licence holders are members).

The rules of the Association, as required under the *Associations Incorporation Act 1985*, are set out in the Constitution of the Spencer Gulf and West Coast Prawn Fishermen's Association Inc. They include membership, duties, powers and appointment of the committee, general meetings, and alteration of the rules. The committee (or governing body) of the Association is the 'Management Committee'. The Constitution allows for establishing sub-committees and in so doing the Management Committee prescribes the name, role, membership and other arrangements as necessary for that sub-committee. The Constitution also prescribes the appointment of a Coordinator At Sea for the management of operational prawn fishing activities within the Spencer Gulf. Two staff, the Executive Officer and the Administration Officer, are employed by the Association to carry out management and administration functions. The Executive Officer operates as part of the management team and represents the Association for management activities.

The Management Committee has established a number of sub-committees for the efficient running of Association business. Sub-committees must consist of at least one member of the Management Committee, but can have government and other stakeholder representation. Sub-committees that have been established are as follows:

- Committee At Sea; provides Real Time Management (fishery management) services for the Spencer Gulf Prawn Fishery whilst at sea.
- Research Sub-Committee; prioritises research needs, conducts investigations, reviews research proposals and reviews and discusses outcomes of research activities.
- Cost Recovery Sub-Committee; reviews and discusses the proposed PIRSA Fisheries licence fees and activities charged, and makes a recommendation to the Management Committee for their approval.
- Environmental Management System (EMS) Sub-Committee; reviews, amends and updates the 'On Boat Management System' as required.

- Promotions Sub-Committee; markets and promotes the Association, the prawn fishing industries it represents, and the product to 'increase the price of prawns'.

The Association has developed a number of documents to ensure the effective and professional running of the Association, its committees and fishing activities, some of which are agreements between the Association and its members. Documents include:

- Management Committee Code of Conduct
- Committee At Sea Charter
- Prawn Survey Contract (between the Association, licence holders and skippers)
- Bad Weather Deed
- Skippers Code of Practice
- Wallaroo Marina Code of Practice

Important to the process of evolving co-management arrangements are the Management Committee Code of Conduct (Code of Conduct), Committee At Sea Charter and the Prawn Survey Contract. These documents are further explained to provide an understanding of the structure, professionalism and management of the Association. The Association's governing body, the Management Committee, is elected from its membership, in addition to the appointment of an Independent Chairperson. The Management Committee is responsible for the management and financial wellbeing of the Association and it is these responsibilities and the Management Committee member responsibilities for and whilst at meetings that are detailed in the Code of Conduct. Committee At Sea members, not elected to the Management Committee, are also required to attend a number of Management Committee meetings. Committee At Sea members are also bound by the responsibilities laid out in the Code of Conduct, provided for in the Committee At Sea Charter.

A Committee At Sea Charter (the Charter) has been developed and approved by the Management Committee of the Association. The principal aim of this document is to ensure that Committee At Sea members provide leadership within the SGPF fleet by being aware of their responsibilities, fishing obligations and decision rules and support sustainable fishing practices within the SGPF including harvest strategies developed by the Management Committee. The Charter also outlines membership to the Committee At Sea, membership obligations, voting rights of members as well as review of the Charter. Ultimately, the Committee At Sea is responsible for management of fishing activities and amendment of harvest strategies whilst out at sea (Real Time Management). Therefore, it is imperative that the Committee At Sea acts responsibly within the framework of the Management Plan and other legislative controls.

The Association contracts the services of registered survey licence holders, skippers and vessels to conduct surveys. The contract outlines observer presence, equipment required, records to be kept and other management functions. To support surveys (participating crews and observers), a manual in addition to specialist equipment (survey box) is provided to each participating survey vessel at the time of survey. These survey boxes are returned to the Association at the end of each survey to allow for: equipment checking and repairing or replacing where required; stocking of appropriate forms and materials; and for documentation and instructions to be added as necessary.

The Association has a contract with the Minister for Agriculture, Food and Fisheries to provide Coordinator At Sea and Real Time Management services. The functions provided by the Association, through the Coordinator At Sea, Committee At Sea, Executive Officer and the Management Committee, are provided for as a schedule to the contract. In addition, the Management Plan outlines operational activities, under which the fishery operates. Specifically, the Management Plan provides the framework for decision making including the role of the Association and the decision rules.

The Association has a Memorandum of Understanding (MoU) with SARDI, to provide a number of research services for the management of stock assessment surveys. This MoU permits recovery of costs by SARDI, for the Association's activities in undertaking stock assessment surveys, which are then paid to the Association. The research costs recovered from the Spencer Gulf Prawn Fishery and paid to the Association are for essential 'core' management activities. Core management activities are defined as those activities that must

occur for the fishery to be able to operate in accordance with legislation and subordinate regulations, policies and plans.

2.3. Work Involved in Managing the Spencer Gulf Prawn Fishery

The work that is involved in managing the SGPF can broadly be categorised within eleven areas of function, or 'Processes', that have specific work / duties required to carry out the function as a whole. The process areas include: Harvest Strategy Development; Spot Surveys; Research; Observer Program; Other Research; Legislation / Policy; Licensing; Communication; Enforcement; Industry Development; and Human Capital Development. The full list of work is itemised in Tables 5 and 6.

Table 5 provides the requirements for day-to-day running of the fishery, which are recorded in the Management Plan. Importantly, these activities will ensure sustainability of prawn stocks within the Spencer Gulf. Table 6 provides the requirements for all other activities, that may be conducted as needed. These functions do not necessarily impact on the day-to-day management of the SGPF's operational activities. Tables 5 and 6 both include the current delegation / management function for each task / duty.

Table 5 Operational functions for managing the SGPF under current co-management model

Process	Task / Duty		PIRSA Fisheries	SARDI	Conservation Sector	Association
Harvest Strategies	TEPS reporting (interactions)					M
	TEPS impact assessment		M	I		
	Review of stock assessment survey data for harvest strategies		M	I		D
	Review of spot survey data for harvest strategies		M	I		D
	Determine spatial harvest strategies (areas open to fishing)		M	I		D
	Catch / effort (number of nights) restrictions		M	I		D
	Gazettal / implementation of fishing notices		M	I		I
	Amendments to fishing notices		M			I
	Coordination of Committee at Sea (to direct fishing operations)					D
	Catch and prawn size data collection during fishing (logbook)					M
	Closing original harvest strategy areas nightly (RTM)		D			M
	Notifying the fleet of changes		M			D
	Fishing trip report					M
Spot Surveys	Survey development and design		I	I		D
	Survey coordination and logistics					D
	Survey data collection					D
	Survey data collation, verification and analysis			M		D
	Survey authorisation		D			
	Assessment of effectiveness of Harvest Strategies		M	M		
Research *Stock assessment surveys, catch & effort data, and by-catch / by-product research*	External review of stock assessment		M			
	Survey data collation			M		
	Coordinate and manage the survey		M	M		I
	Survey development and design		I	M		I
	Survey logistics		I	I		D
	Survey data collection			I		D
	Survey data verification and analysis			M		I
	Manage fishing logbook program, including validating returns			M		
	Logbook data: collate, enter, maintain database (storage)			M		
	Assessment of fishery against Management Plan		M	I		I
	Assessment of effectiveness of Harvest Strategies		M	D		I
	Collection and storage of other biological data			M		
	Fishery assessment report (X1)	Data collation and analysis		M		
		Report writing		M		
		Peer review	I	M		
	Stock status report (X1)	Data collation and analysis		M		
		Report brief	I	M		
	Survey interim reports (x3)	Data collation and analysis		M		
		Report writing	I	M		
Observer Program	Develop observer program		I	M	I	D
	Facilitate observer training		I	M		D
	Maintain observer database		I	I		D

M = Managing Authority; D = Delegated Authority; I = Input

Table 6 Other functions for managing the SGPF under current co-management model

Process	Task / Duty	PIRSA Fisheries	SARDI	Conservation Sector	Association
Other Research	Research priorities	M	I		I
	Economic research	M			I
	Non-target species research	M	I		I
	Biosecurity	M	I		I
	Ecosystem and habitat research	M			
	Broader research	M	M	M	M
Legislation / Policy	Establishing ecosystem impact benchmarks	M	I	I	I
	Development of over-arching policy to guide fisheries management	M	I	I	I
	Regulations development and review	M	I	I	I
	Management Plan development and review	M	I	I	I
	Public consultation on above	M			
	Act development and review	M	I	I	I
Licensing	Setting conditions	M			I
	Issue (determining if the licence can be issued)	M			
	Demerit points	M			
	Transfer	M			
	Cost Recovery (fee setting) / Invoicing	M	I		I
	Boat transfers and Master registration	M			
	Management of the Public Register	M			
Communication	With commercial licence holders	M	M		M
	To the public	M	M		
	With other government departments	M	M	M	M
	With the media	M	M	M	M
Enforcement	Prosecutions	M			
	Prior reporting (notifying of departure and return, including changes)	M			
	Vessel and equipment inspections	M			
	Audit of exemptions and prior reporting to data collection	M			
	Audit of fishing reports	M			
	Development and implementation of compliance strategy	M			I
	Review of risk assessment	M	I		I
	Promoting compliance within the Spencer Gulf Prawn Fishery	M			M
Industry Development	Market research	I			M
Human Capital Development	Capacity building	M			M

M = Managing Authority; D = Delegated Authority; I = Input

2.3.1. Harvest Strategies

Harvest strategies define how the SGPF will operate, where fishing will take place and the effort involved in the fishing activity. The measures and rules for development of harvest strategies are defined in the Management Plan. Harvest strategies can be developed prior to fishing using stock assessment survey results; prepared hours after the completion of the stock assessment survey and the morning of commencement of fishing. When fishing commences prior to a stock assessment survey or if a stock

assessment survey will not be conducted (ie in December, March, May or June), a harvest strategy is developed based on the nature of harvest strategy (conservative; standard; or increasing) from the previous stock assessment survey, from catches from the previous commercial fishing trip, and/or spot survey data. The Management Committee develops the initial harvest strategy, together with PIRSA Fisheries and SARDI representatives, in-line with the measures and rules in place. Notices to permit fishing are drafted by the Coordinator At Sea and then checked, amended where necessary, approved and gazetted by PIRSA Fisheries. The SGPF fleet is notified of the initial harvest strategy by the Association.

Harvest strategies can be amended during fishing (RTM), using real-time data from commercial catches or spot surveys, by the Association's Committee At Sea. The Coordinator At Sea collects and analyses the real-time data and provides this information to the Committee At Sea. The Committee At Sea may amend fishing boundaries by reducing the area available for fishing. The Coordinator At Sea prepares an amended notice, which is then checked, approved and gazetted by PIRSA Fisheries. A number of changes can occur during the course of one night's fishing, and each amendment to the fishing area is subject to this process. The SGPF fleet is notified of the amended harvest strategy by the Coordinator At Sea.

The Coordinator At Sea writes a detailed fishing report identifying the actions that took place by the fishery (including details of any spot surveys), the reasoning for actions, and other important fishing information. This fishing report is presented to PIRSA Fisheries, SARDI and the Management Committee. A verbal brief is also provided by the Coordinator At Sea at the next Management Committee meeting, where both PIRSA Fisheries and SARDI representatives are invited to attend. The actions are scrutinised against the measures and rules in the Management Plan.

2.3.2. Spot Surveys

Spot surveys are generally conducted at the beginning of a fishing trip, when a stock assessment survey will not be performed and so cannot inform the harvest strategy. A spot survey may also be conducted following a few nights fishing to open up areas that are closed, based on the previous fishing trip data. These surveys are conducted to identify any changes to the fishery (prawn movements) and open or close areas to fishing.

Spot surveys generally form part of a harvest strategy developed by the Management Committee and will include: the number of nights that the spot survey will be conducted over; which nights the survey will be carried out (can be based on moon phases); areas to be surveyed; and vessels required for the survey. The Coordinator At Sea will arrange the survey with participating survey vessels and will collect, verify and analyse the survey information, together with SARDI. Any changes to a harvest strategy based on spot survey results are discussed under 2.3.1. Harvest Strategies. The Coordinator At Sea advises PIRSA Fisheries of the intent to conduct a spot survey, who then prepare a suitable survey authorisation. The survey authorisation is provided to the Coordinator At Sea to disseminate to the vessels conducting the survey.

Following the completion of the fishing trip, PIRSA Fisheries and SARDI assess the spot survey information against the harvest strategy or amendments to the harvest strategy. The assessment is presented to the Management Committee at meetings and by SARDI within Fishery Assessment Reports. The Committee At Sea gain a general understanding of the effectiveness of the spot survey to develop harvest strategies whilst fishing, and adjustments are made during to the harvest strategy where required.

2.3.3. Research

This is specifically related to conducting fishery independent stock assessment surveys (stock assessment surveys) and other by-catch and by-product work (requiring the use of prawn vessels) as well as collecting commercial fishing information, assessing the SGPF performance against Management Plan criteria and documenting the

assessment in public documents. The Management Plan outlines specific dates for stock assessment surveys, based on lunar cycles and prawn biological characteristics. Surveys are coordinated by the Association together with SARDI, through a contract held between the Association and PIRSA. The contract outlines the requirements of PIRSA, SARDI and the Association throughout the stock assessment survey.

Three stock assessment surveys are conducted each year in November, February and April. The Management Plan for the SGPF specifies information requirement for surveys. The Association arranges vessels within the fleet to conduct the survey, survey areas for each vessel, observers for the survey, requests permission from PIRSA Fisheries to undertake the survey and reports on intended vessel movements prior to the survey (prior reporting is included under section 2.3.9. 'Enforcement'). Surveys are operated under contractual arrangements between the Association and the licence holder and skipper of the survey vessels. Industry vessels are used to conduct the stock assessment survey to provide the coverage and collection of prawns required for surveys to derive the information needed to inform fishing operations.

The Association and SARDI arrange for observers to collect data during the survey. Observers come from a number of sources, including government personnel, a number of industry contacts, and where additional observers are required the Association has a pool of skippers / crew that may be able to undertake observer work (from vessels that are not participating within the survey). Observers are crucial to the survey process as they collect the stock assessment survey data, with assistance of crew on board vessels, required under the Management Plan.

The stock assessment survey data is entered into a spreadsheet by the skipper and emailed to the Coordinator At Sea and SARDI, which is then collated and analysed by SARDI. SARDI maintains the data collected during stock assessment surveys, as well as information collected during spot surveys and commercial fishing in a database, enabled through the provision of funds from licence holders. SARDI provides three stock status reports; one for each survey. These reports inform harvest strategies, and form the basis for the survey interim and fishery assessment reports.

SARDI assesses stock assessment survey data collected during a fishing season (for November, February and April), which is presented in a preliminary report each year. A full assessment of the fishery (including survey information and commercial fishing results) is conducted annually following the close of the fishing season and recorded in a fishery assessment report. Fishery assessment reports also include an assessment of the fishery against performance criteria (performance indicators and reference points) under the Management Plan. This report undergoes a rigorous peer assessment review and is published for PIRSA: the fishery assessment report is provided to the Association and licence holders and is also available to the public.

2.3.4. Observer Program

Observers come from a number of sources, including government personnel, industry contacts, and where additional observers are required, the Association has a pool of skippers and crew that may also undertake observer work. During stock assessment surveys, skippers and crew are not used as observers from vessels that are participating in that survey. During spot surveys, crew are generally swapped between survey vessels, as commercial fishing may continue when a spot survey is conducted.

SARDI currently conducts training of observers through informal workshops and maintains a record of trained observers. It is important that observers are aware of their obligations during a survey in addition to having the skills and experience to collect the correct information (ie use of equipment, sexing prawns, determining the reproductive stage of females etc). The Association is currently developing a recognised formal training program, in consultation with PIRSA, SARDI and the CCSA, to ensure that observers have the skills needed to collect information required during surveys.

2.3.5. Other Research

PIRSA is responsible for other research required within the SGPF to meet statutory obligations. Obligations are determined on a state and national level through PIRSA fishery management and reporting requirements, including assessment against the EPBC Act. Research requirements are identified within the Management Plan for the fishery and are defined by the goals listed in the Management Plan (Dixon and Sloan, 2007):

1. Maintain ecologically sustainable stock levels
2. Ensure optimum utilisation and equitable distribution
3. Minimise impacts on the ecosystem
4. Enable effective and participative management of the fishery

While PIRSA is responsible for managing SGPF research, each stakeholder is capable of developing research proposals and managing its own research priorities, needs and projects. Specifically, the Association has established a Research Sub-Committee that has Association, PIRSA and SARDI membership and is currently trialling CCSA membership. The Research Sub-Committee operates according to the tasks delegated by the Association's Management Committee, which includes: the establishment of research priorities; reviewing of research proposals with the view to offer Association support (or otherwise) for that research; investigate other research that has been conducted; develop research proposals to secure grant funding; and reviewing research activities undertaken for the SGPF. It is anticipated that the outcomes of the Research Sub-Committee, particularly priority setting, directs investment made by FRDC and other organisations.

2.3.6. Legislation / Policy

PIRSA is responsible for all work relating to the development, review and amendment of the Fisheries Management Act, and subordinate regulations and policies (including management plans for commercial fisheries). PIRSA legislation and policies direct fisheries management to ensure effective ecosystem-based fisheries management. To meet legislative and policy requirements it is imperative that legislation and policy development is approached comprehensively to ensure the future of the commercial fishing sector, the protection of threatened, endangered and protected species, minimising ecosystem impacts, and protection against the demise of species affected as a consequence of fishing.

2.3.7. Licensing

Licensing activities includes condition setting (outside of legislation and policy requirements), determining the issue of licenses, issuing demerit points and acting on any demerit point criteria, transferring licenses and keeping records of vessels / masters permitted to act under a licence, setting fees, invoicing and revenue collection, and managing the public register of licenses within the commercial fishing sector. Many of these functions are prescribed in the Fisheries Management Act or subordinate legislation, and are mandatory for the SGPF. PIRSA Fisheries carries out these functions, using the PIRSA database 'Primary Industries Information System (PIIMS)'.

The SGPF is operated under a cost recovery model, where PIRSA charges licence holders 100% of the fees required for the management of the fishery. Costs include fee for service work (ie licensing and policy), core research activities (stock, ecosystem and economic research), compliance and enforcement work, as well as a nominal fee paid into a FRDC levy for prawn related research. Therefore, cost recovery is conducted in consultation with the Association, through the Cost Recovery Sub-Committee. The Cost Recovery Sub-Committee is responsible for reviewing and negotiating costs and services and making a recommendation to the Association's Management Committee. The Association's Management Committee is responsible for the final approval of the licence fees, through the recommendation of the Sub-Committee, and provides this advice to PIRSA. Fees are generally only charged when suitable arrangements for

costs and services are reached between PIRSA and the Association, through the Cost Recovery Sub-Committee.

2.3.8. Communication

Each stakeholder has its own management responsibilities, obligations and goals to be achieved and the communication of these are at the discretion of each stakeholder. This section details the responsibilities specifically related to the management of the SGPF under legislative obligations or the formal chain of command. Communication with the media would be at the discretion of all stakeholder parties to meet its own individual goals and objectives. PIRSA has a responsibility to communicate with all fishery stakeholders, and is the principle point of contact for public enquiries. Also, SARDI publishes fishery assessment reports and is responsible for the integrity of those reports.

2.3.9. Enforcement

This component relates to activities undertaken by PIRSA Fisheries Services to ensure compliance within the SGPF. PIRSA Fisheries Services has conducted a risk assessment for the SGPF. The risk assessment provides for potential issues of non-compliance by the SGPF fleet; it does not include non-compliance by other sectors (from other commercial fisheries, and the recreational and indigenous sectors). The risks are then addressed in a compliance strategy for the fishery in which a set of initiatives (or activities) are enacted by PIRSA Fisheries Services. Costs involved in ensuring compliance within the SGPF are charged back to industry, through the cost recovery process. Therefore, the Association provides input into the risk assessment process and compliance strategy. The risk assessment is reviewed regularly and the compliance of the SGPF informs the program for the next PIRSA Fisheries Services strategy.

2.3.10. Industry Development

Industry is responsible for industry development, and the Association takes up many initiatives based on requirements for the SGPF as directed by Association members. Market development is a key component of industry development, as market prices offered for prawns determines the performance of the prawn industry. Consequently good market performance sees a healthy lifestyle for industry members: being able to provide wages to attract and retain employees, provision of adequate training and up-skilling, prosperity of industry for investment, providing a significant platform to voice concerns which are listened to and often accepted and the ability to influence standards or projects. The SGPF industry is always open to new practices that ensure optimum utilisation of the resource and best environmental practices that promote and safeguard the industry, whilst delivering commercial benefits to the fishery.

2.3.11. Human Capital Development

The Association and PIRSA are responsible for developing individuals to appropriately manage the SGPF. The Association currently employs or contracts the services for an Executive Officer, Administration Officer and Coordinator At Sea, as well as provides remuneration to Management Committee members. The Association has a succession planning regime to up-skill industry representatives to understand the fishery under Management Plan responsibilities and promote good industry practices. Additionally, PIRSA is responsible for governance of the SGPF, which requires appropriately skilled staff to manage the fishery in accordance with legislation and policies.

2.4. Government Role

The South Australian Government, through PIRSA Fisheries, is responsible for managing the marine resources utilised by commercial prawn fishers in the SGPF. As such, legislation states that the Minister, or the Minister's delegate, is responsible for fisheries management activities. These responsibilities have been delegated to PIRSA Fisheries and in some circumstances have been delegated to SARDI or the Association. Neville (2008) states that there is no 'one size fits all' model for co-management. To ensure transparency for all

stakeholders, PIRSA has identified the following base criteria to support movement by industry sectors towards the adoption of delegated co-management arrangements:

- There is a high confidence in stock sustainability, demonstrated in the annual stock assessment process
- Industry demonstrates a willingness to meaningfully engage with government
- The industry association is representative, credible and financially secure
- The industry is well resourced, has an independent chairperson and an executive officer
- The industry association has transparent reporting arrangements in place
- There is a history of constructive working relationships and trust between government and industry
- There is minimal stakeholder conflict associated with the fishery and the industry has a track record of working with stakeholders to address conflict issues
- There is an effective management plan in place
- Industry has had a clear desire and has built its capacity to take on more responsibility
- Industry is developing stronger links with other stakeholder groups
- Government has a willingness to collaborate and share responsibility.

The SGPF (and the Association) has met these criteria, therefore PIRSA has delegated some functions to the Association, including coordination of surveys, utilisation of prawn vessels to conduct research, development and implementation of harvest strategies, and development and implementation of the observer program. PIRSA are also working with industry to identify research priorities that meet operational objectives. Neville (2008) outlines many functions that must always remain with government. However, as the governing body, PIRSA has indicated that government will only fully retain the following functions:

- Full independent audit of all delegated functions
- Enforcement and compliance functions
- Conducting the fishery ecological risk assessment
- Leading development of the next management plan in consultation with the FCSA, the Association, the Association's
- Legislative development and enactment
- Government policy development
- Initial issuance of licences
- Addressing fisheries access and allocation issues.

PIRSA has delegated functions of the management of the SGPF through a contract with the Association which outlines responsibilities and functions of all parties involved. The contract is reviewed regularly to ensure it meets the current operational obligations. PIRSA regularly meets with the Association to ensure that contractual arrangements are being adhered to, in addition to developing harvest strategies. PIRSA works closely with the Executive Officer and the Coordinator At Sea to deliver on outcomes, including development and implementation of harvest strategies. PIRSA also manages its obligations through the Association structure, where particular activities are dealt with through the Management Committee or a Sub-Committee, as established by the Management Committee to manage a particular function. For example, PIRSA directs research activities to the Research Sub-Committee or licence fee setting to the Cost Recovery Sub-Committee.

Under the current co-management arrangements PIRSA retains the following management functions:

- Government policy development
- Legislative development and enactment
- Licensing functions
- Development of the management plan, including establishing sustainability benchmarks, in consultation with the Association and other stakeholders
- Addressing fisheries access and allocation issues
- Participating in development of harvest strategies
- Formalising and implementing all harvest strategy decisions made by the Association's Management Committee
- Conducting ecological risk assessment and establishing ecosystem benchmarks

- The cost recovery process, including determining service levels required and licence fee setting.

2.5. Industry Role

Industry, through the Association, currently has co-management arrangements in place with PIRSA Fisheries to provide a number of core fisheries management services. These include the coordination of stock assessment surveys together with SARDI, coordination and management of spot surveys, development of harvest strategies, and Real Time Management. In some instances, the work is undertaken by industry, through the Association, but is then endorsed by PIRSA Fisheries, as the service has not been formally delegated to the Association. The Association also has a Memorandum of Understanding with SARDI to deliver on core research activities (ie the provision of survey vessels and observers), required for the effective operation of the SGPF.

The Association employs or contracts staff and provides for committees to conduct work in relation to delegated functions, including the Coordinator At Sea, Executive Officer, Administration Officer, Independent Chairperson, Management Committee, Research Sub-Committee, and Cost Recovery Sub-Committee. The Association is responsible for managing the functions outlined in the contract developed between the Association and PIRSA, as well as administer functions provided in the Memorandum of Understanding between the Association and SARDI. The Association includes stakeholder input into fisheries management activities and proactively engages with government in development of legislation and policies. The Association enjoys a close working relationship with PIRSA and SARDI developed over decades of collaboration in fishery management activities.

Responsibility for the management functions that are delegated to industry under current co-management arrangements are as follows:

- Coordinating and managing stock assessment and spot survey activities, including contracting vessels to conduct surveys, organising survey logistics and industry based observer coverage. This activity is conducted under an exemption issued under Section 115 of the Fisheries Management Act, which is provided to the Association annually.
- Development of harvest strategies following industry-coordinated spot surveys and stock assessment surveys. The harvest strategies developed under this arrangement require government approval and are implemented by government using Section 79 of the Fisheries Management Act through published notices in the government gazette.
- Management of harvest strategies during fishing through the Association's Committee At Sea, primarily by spatially managing harvests to avoid the capture of small prawns.
- Fleet management, including dissemination of fishing notices, area closures and other information.
- Management of the observer program, in close consultation with SARDI and the CCSA.

2.6. Conservation Role

Historically, stakeholder groups have been engaged in more of an ad hoc fashion through workshops, public meetings and consultative processes run by PIRSA Fisheries or the Association. Other stakeholder groups have had more direct involvement in fisheries co-management, as demonstrated through recreational sector involvement on FMC's, although conservation sector input has always been welcomed throughout the development and implementation of legislation, policies and management planning processes. The conservation sector has had limited involvement in fisheries management due to a combination of a lack of resources and a lack of fisheries management expertise within the sector, rather than a lack of interest or commitment.

Conservation stakeholder input into fisheries management is recognised by PIRSA through the formation of the FCSA, under the Fisheries Management Act, requiring conservation expertise. Additionally, PIRSA and the CCSA have built a rapport during the conduct of this

project, which has been demonstrated in the collaboration of fisheries management discussion forums.

The Association has also recognised the importance of conservation sector input into fisheries management, thereby including CCSA representation on its Research Sub-Committee (on a 12 month trial basis) and involving the CCSA in the development of the observer program. Governance arrangements and strategic planning under these arrangements will provide the framework for the Association's research activities and priorities (determining where research funding should be invested), and build a robust system for observers, which are important processes for the future operation of the SGPF. The Association's proactive involvement with the CCSA (outside of the bounds of the project) demonstrates the commitment and willingness of fishers to engage with the CCSA and the conservation sector more generally. CCSA involvement in the Research Sub-Committee will also assist the Association through expertise in broader fisheries management issues.

The engagement of the conservation sector in this project represents a shift towards improved stakeholder engagement in the fisheries management process. It should be noted that this has only been possible as a result of the funding provided through FRDC to enable effective CCSA participation. Additionally, PIRSA has contributed funding outside of this project (through the Fisheries Council of SA) for CCSA participation in the Association's Research Sub-Committee, to allow for effective engagement of the conservation sector during the trial period. PIRSA is also investigating, together with the CCSA, how the conservation sector can better be involved in and participate in the fisheries management process in South Australia. The conservation sector will require ongoing access to resources to build its capacity to effectively engage with the fishery.

2.7. Stakeholder Input into Fishery Management

Stakeholder engagement is recognised through the appointment of expertise on the FCSA and through the development of appropriate policies for the management of fisheries resources. The FCSA requires expertise in commercial fishing and the processing of aquatic organisms, recreational fishing, research and development relevant to the use of aquatic organisms, conservation of aquatic resources, socio-economics, business and law. Participation of stakeholders in PIRSA consultation is largely dependent on the interest and capability of those stakeholders to effectively engage with PIRSA in a meaningful way. Good stakeholder governance structures with a managing body that has resource capabilities are often those that are more effective in engaging with PIRSA.

PIRSA Fisheries manages marine resources, recognising three distinct user groups: commercial fishery; recreational fishery; and indigenous fishery. Specific stakeholder input is required through the appropriation of resources to the user groups and for the management of individual fisheries. The level of stakeholder input is somewhat determined by the use of the resource from each user groups and the level of engagement by stakeholders. While the recreational sector has had greater involvement with the SGPF, it is recognised that there is negligible recreational prawn fishing activities (Agriculture, Food and Fisheries, 2007). Also, there is no record of indigenous fishing for King Prawns (Agriculture, Food and Fisheries, 2007).

3. Co-Management Defined

During the first phase of the project, three stakeholder Steering Committees were established to understand fisheries management, current management practices for the SGPF and co-management through a number of workshops and information sessions. Stakeholders were: industry (represented by the Spencer Gulf and West Coast Prawn Fishermen's Association Inc (the Association); government (represented by the Department of Primary Industries and Resources South Australia (PIRSA)); and the conservation sector (represented by the Conservation Council of SA (CCSA). Steering Committee members were presented with processes and tasks undertaken in order to manage the fishery and were made familiar with those functions as they relate to the SGPF.

Possible co-management models / delegation of tasks to industry were discussed under the four management models along the continuum of fisheries management, as provided in Figure 1. These management models are broadly defined as:

- **Centralised** – government makes decisions with little to not consultation with stakeholders
- **Consultative** – government makes decisions with stakeholder consultation
- **Collaborative** – government and stakeholders jointly reach decisions; some functions potentially assigned or delegated
- **Delegated** – government and stakeholders negotiate management decisions based on management framework; functions assigned or delegated to industry group under formal agreements

PIRSA and the Association work under a collaborative – partially delegated model of co-management, where: decision making processes for the management of the SGPF involves discussion and negotiation between government and industry; and a number of functions have been delegated to industry but the majority of functions remain with government. The role of the conservation sector under existing management arrangements would be defined as operating under a consultative model; although the conservation sector has had limited involvement in fisheries management due to a combination of a lack of resources and a lack of fisheries management expertise within the sector, rather than a lack of interest or commitment.

3.1. What is Co-Management

In the original context of this project, industry was moving toward greater self-management. 'Self-management' was confusing and frightened stakeholders, as it presented the idea that industry would be completely responsible for all of its fishing activities, with no 'checks or balances'. Whilst the SGPF is duly responsible for its fishing management practices, there are perceptions (often from real examples) that industry cannot be trusted to do the right thing. Additionally, there are tasks that would always remain with government, given the ability of government to perform these functions and its non-bias toward establishing suitable standards and methods for best practices. Therefore, the term co-management was engendered, offering the possibility of management by several stakeholder groups in a meaningful way.

The experience of each stakeholder group in working under co-management arrangements or understanding of co-management as it applies to South Australian fisheries and the SGPF is very different. Also, co-management has not been defined by the Fisheries Management Act although responsibilities can be delegated to a person or body, and the FCSA is responsible for the promotion of co-management. However, the definition of co-management derived from each Steering Committee identified the need for collaboration, cooperation and sharing of management activities between stakeholders. It also highlighted the need for continued government involvement, where industry would not be solely responsible for its activities and management of the fishery.

Neville's (2008) definition of co-management provides a reasonable assessment of Steering Committee's understanding of co-management and how it would apply to South Australian commercial fisheries:

> "*An arrangement where responsibilities and obligations for sustainable fisheries management are negotiated, shared, and delegated between government, fishers, other interest groups and stakeholders.*"

3.2. Drivers to Move Towards Co-Management

A number of drivers and incentives were identified by stakeholders for progressing towards greater co-management, including:

- Greater industry stewardship of the resource
- Improved environmental performance (habitat protection and reduced impact on threatened, endangered and protected species)
- Depoliticising fisheries management
- Reducing unnecessary administration ('red tape') and improving management flexibility
- Sharing responsibility among stakeholders for management of the resource
- Improved communication among stakeholders
- Improved efficiency and reduced costs
- Increased transparency of fishery operations and fisheries management processes.

While co-management could be applied to any fishery, there is a need for industry to demonstrate its ability to be able to operate under co-management arrangements. In terms of industry involvement, the SGPF has moved further along the co-management continuum to a more collaborative and partially delegated co-management arrangement for the following reasons:

- There is a high confidence in stock sustainability, demonstrated in the annual stock assessment process
- Industry demonstrates a willingness to meaningfully engage with government
- The industry association is representative, credible and financially secure
- The industry is well resourced, has an independent chairperson and an executive officer
- The industry association has transparent reporting arrangements in place
- There is a history of constructive working relationships and trust between government and industry
- There is minimal stakeholder conflict associated with the fishery and the industry has a track record of working with stakeholders to address conflict issues
- There is an effective management plan in place
- Industry has had a clear desire and has built its capacity to take on more responsibility
- Industry is developing stronger links with other stakeholder groups
- Government has a willingness to collaborate and share responsibility.

These reasons also form the basis for the SGPF to continue to move along the continuum to a more delegated co-management arrangement with government. Progress in co-management, under the current Fisheries policy, would involve further delegation of government responsibility to industry through the Association. Other stakeholder organisations, including the conservation sector, will not necessarily have any formal delegated functions within co-management arrangements. However, greater stakeholder input (including from the conservation sector) in fisheries management processes has been identified as being important to achieve effective delegated co-management regimes. This applies not only to involvement in functions that remain with government but also some functions delegated industry. Constructive stakeholder engagement and input is supported by all stakeholder groups, and is described by Neville (2008) as '*genuine interaction and partnerships are at the heart of co-management*'.

In considering any further delegation of responsibilities to stakeholders, PIRSA Fisheries would take the following steps, in consultation with stakeholders:

1. *Establish pre-conditions* – A set of broad government pre-conditions will be developed, using the national co-management framework as a guide. These pre-conditions clarify the government's policy position and the requirements that need to be met by stakeholder groups before delegation of fisheries management functions.
2. *Establish operational standards* – A set of operating standards will be developed to ensure each pre-condition is met. The operating standards provide details of the 'on the ground' activities necessary to meet the pre-conditions. For example, a set of operating standards were developed for the scientific survey and stock assessment processes in the Spencer Gulf Prawn Fishery, during workshop discussions.
3. *Determine resource requirements* – The resource levels required by each stakeholder group to implement the operating standards will be determined. This step can be further investigated during evaluation of changed management arrangements.
4. *Establish performance audit process* – Auditable performance measures will be developed for each delegated function.

3.3. Risks in Moving Toward Greater Industry Involvement

There are a number of inherent risks associated with moving toward a greater level of co-management between industry and government, which can broadly be defined as operational and perception based. Operational risks require effective management arrangements, transparency of processes and outcomes, improved communication between stakeholder groups, effective planning and management to change management arrangements, suitable auditing regime, and capacity building to ensure effective governance. Perception risks are somewhat more difficult to manage but would largely be addressed through appropriate operational planning and management, as well as through good governance structures, greater stakeholder cooperation, effective communication and the sharing of management decisions and responsibilities.

Many criteria identified for assessment of performance of management programs, in moving toward co-management are qualitative not quantitative. A suitable co-management model will require effective delivery and performance against qualitative criteria. Criteria used to ensure risks are effectively managed as well as provide for successful co-management of the SGPF include:

- Transparency of processes and outcomes
- Flexibility of and de-politicised management arrangements
- Ownership and stewardship by fisheries managers
- Threat management and improved environmental outcomes
- Effectual compliance and enforcement
- Conflict resolution processes

Quantitative assessment of management performance can be facilitated through assessment of performance indicators and associated reference points through stock assessments.

These criteria will not only determine if co-management arrangements are effective for any industry, but will also determine the confidence of stakeholders in government and industry sharing management responsibilities. Also, better engagement with stakeholders will promote trust and ownership of management decisions, facilitating industry to take on a greater level of responsibility. Management plans will become increasingly important in the transfer of responsibilities from government to industry as the tool to mitigate risks and meet some qualitative criteria. The Management Plan for the SGPF (Dixon and Sloan, 2007) sets out objectives and strategies to maintain ecologically viable stock levels in the SGPF, consistent with the principles of ecologically sustainable development. The four key management goals are:

1. Maintain ecologically sustainable stock levels
2. Ensure optimum utilisation and equitable distribution
3. Minimise impacts on the ecosystem
4. Enable effective management with greater industry involvement

Working to meet the four key management goals will ensure good management of the fishery. Additionally, the Fisheries Management Act requires an ecological risk assessment (ERA) to be undertaken prior to development of a management plan, which includes stakeholder workshops. The next revision of the Management Plan for the SGPF will include a response to the high priority risks identified during the ERA process including strategies to manage impacts on threatened, endangered and protected species. Operational details for any additional environmental research following the ERA will be formulated with stakeholder input (under the proposed co-management arrangements). For example, strategies to address interactions with threatened, endangered, and protected species (TEPs) will be developed with input from the conservation sector. Operational details, including identifying those resources necessary to monitor interactions (consistent with provisions in the management plan) will emerge from such input.

4. Identifying Suitable Co-Management Models

Sharing of responsibilities, partnerships and strong governance arrangements are important components within any co-management model. The fact that individuals are dependent on the outcomes of collective group actions strengthens the need for structuring group outcomes and adopting robust co-management procedures (Neville 2008). South Australia is committed to progressing co-management opportunities in managing commercial fisheries consistent with principles of ecologically sustainable development (ESD) and economic efficiency. Co-management has the potential to reduce transaction costs in fisheries management, encourage and promote a collaborative approach to the sustainable management of natural aquatic resources, and to foster innovative approaches to fisheries management. Inevitably though, conflicts arise among users competing for access to a common property resource. Resource sharing arrangements and conflict resolution mechanisms must be part of effective co-management.

In promoting stakeholder input to the management of the fishery, social and cultural issues are to be considered when management strategies are being developed. Resource allocation issues are tractable because by far the largest user is the commercial fishing sector. Recreational use of the Spencer Gulf prawn resource is negligible and there is no record of indigenous fishing for King Prawns (Agriculture, Food and Fisheries, 2007). Even so, the activities of the Spencer Gulf prawn fleet encroach on resources of interest to these stakeholder groups and of other stakeholders such as the conservation sector. Furthermore, in conducting fishing in Spencer Gulf, interaction with other commercial sectors including other commercial fisheries (particularly marine scale and blue crab) and aquaculture operations will occur from time to time. Resolution of potential or actual conflict among users is an important task in co-management; although the actual determination of allocation between the user groups is defined through the management planning process, under the PIRSA Fisheries Allocation Policy.

The body representing Spencer Gulf commercial fishers / licence holders, the Spencer Gulf and West Coast Prawn Fishermen's Association Inc (the Association) and the fisheries management agency (PIRSA) aim to transfer greater responsibility for management to the licence holders (Zacharin et al., 2008). Many of the management tasks undertaken by government can potentially be more efficiently undertaken by the commercial fishing sector freeing up government resources for other important functions. There are other benefits including shared stewardship of the resource and collaboration among stakeholders (recreational and commercial fishers) which can depoliticise the management process (Zacharin et al. 2008). However, aspirations of successful co-management require active and collaborative participation among all stakeholders (e.g. representatives of the conservation sector present marine protection as a legitimate 'use').

There are a number of services required for effective management of the SGPF. The full cost of managing the SGPF is recovered from licence holders through licence fees. These services, their costs for 2008/9 and potential changes under a delegated co-management model, are presented below (see Table 7). Of note is the relatively high cost of research services (more than half of the total costs recovered). In reality, there is no way of determining whether research services are cost effective under the present single service provider system. There is a need to review costs and scope of research services aligned to efficiency of service delivery. There is also an obvious need for robust, reliable information on which to base management decisions.

Table 7 Comparison of service costs (2008/09) under the current co-management model.

Service	Cost to Industry 2008/09	Current arrangements	Under co-management
Research stock assessment	$448,328	SARDI	Commissioned
Research by-catch/ecosystem	$56,962	SARDI	Commissioned
Research economics	$13,355	EconSearch	Commissioned
Management (policy, industry liaison)	$45,874	PIRSA	Review given delegation
Management (legislation)	$6,986	PIRSA	Review given delegation
Management (enforcement)	$90,108	PIRSA	Review in relation to compliance
Co-management (including real time management and committee at sea)	$200,000	PIRSA/SGPFA	Review given delegation
FRDC levy	$87,296	PIRSA, Fishery	Review
TOTAL	**$966,898**		**Review**

Three models of co-management for the SGPF were identified for consideration by Steering Committees by McShane (2009): the status quo (model 1); a partially delegated model (model 2); and a fully delegated model (model 3). Model 1 was presented as a comparison of current management activities to determine its operation within the SGPF. Model 2 and 3 reflect industry's vision of co-management for the SGPF. In particular, daily management of the fishery and conduct of research services were identified as being of significance for the future of SGPF co-management arrangements, given the current role of the Association in managing the SGPF as well as the considerable cost to licence holders.

4.1. Status Quo (Model 1)

The status quo is a collaborative model in which management arrangements are negotiated between the Association and PIRSA Fisheries under oversight of the FCSA. Disputes over cost recovery and other management arrangements are addressed by the FCSA, although service delivery is also negotiated between PIRSA, SARDI and the Association (through the Association's Cost Recovery Sub-Committee). Some stakeholder input is provided by the FCSA, particularly in the development of management plans and in advising on resource allocation between user groups. Management arrangements, including research services, are provided or administered by the Government (PIRSA).

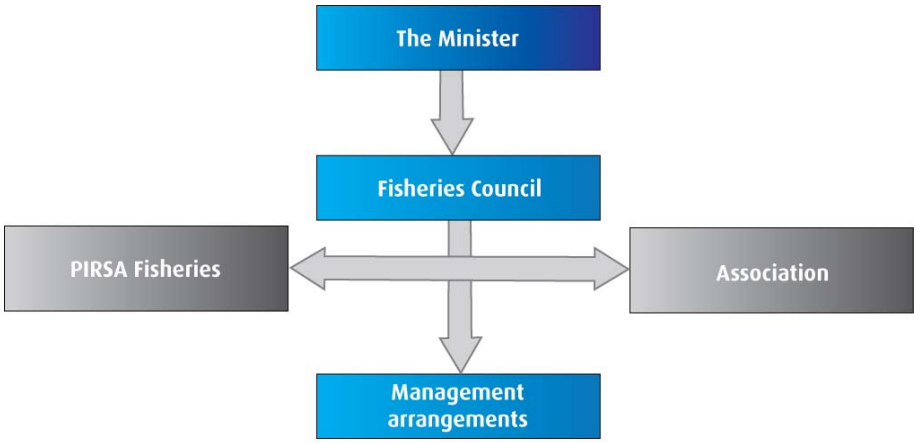
Current co-management arrangements have been detailed in section 2 of this report. Areas of co-management that the Association has specifically taken on include:

- Coordinating and managing stock assessment and spot survey activities, including contracting vessels to conduct surveys, organising survey logistics and industry based observer coverage. This activity is conducted under an exemption issued under Section 115 of the Fisheries Management Act, which is provided to the Association annually.
- Development of harvest strategies following industry-coordinated spot surveys and stock assessment surveys. The harvest strategies developed under this arrangement require government approval and are implemented by government using Section 79 of the Fisheries Management Act through published notices in the government gazette.
- Management of harvest strategies during fishing through the Association's Committee At Sea, primarily by spatially managing harvests to avoid the capture of small prawns.
- Fleet management, including dissemination of fishing notices, area closures and other information.
- Management of the observer program

Under existing arrangements, a Management Committee, comprising an Independent Chairperson, seven licence holders and a skipper representative, administers management issues on behalf of the Association. Such issues are addressed by sub-committees

responsible for cost-recovery, research, and advising on spatial closures (Committee At Sea). Costs of administration of the Management Committee (e.g. employment of the Independent Chairperson) and its sub-committees are borne by the Association through member levies. It is important to note, however, that not all licence holders are members of the Association and therefore do not contribute levies.

Figure 5 Relationship between stakeholders under current co-management arrangements



Pros

- the commercial fishery has a high degree of control over management arrangements including a Management Committee that develops harvest strategies (in consultation with PIRSA and SARDI) and the Committee At Sea which recommends fine scale spatial management and closures under authority of PIRSA Fisheries
- Research input using commercial vessels has a high degree of credibility by industry.

Cons

- Single service provider as defined by PIRSA Fisheries for research (SARDI for stock assessments and by-catch; EconSearch for economic reports) with relatively high costs of research services imposed on industry or lack of clear benefits of work
- No direct representation of stakeholders (including the conservation sector)
- Free riders by non-Association members capturing the benefits paid for by the Association
- No change / advancement of industry toward a co-management model.

4.2. Partially Delegated Model (Model 2)

A delegated model provides for principal control of fisheries management arrangements including the management of the SGPF (harvest strategy development) and conduct and reporting of research by the Association. The Association would be responsible for management of research services through employment of an appropriately qualified scientist or tendering research services to a service provider. Independent audit of research services would be facilitated by PIRSA. In this model, the Association's management activities are increased although PIRSA still provides an advisory role particularly with legislative advice, policy making, setting of regulations applicable to the fishery, and audit of research services managed by the Association.

Equitable recovery of costs from all licence holders for services required to manage the fishery (including the cost of all outsourced services such as research and of administrative costs for the Management Committee and its sub-committees) will be the responsibility of PIRSA. A key difference between this model and Model 1 is that the Association assumes responsibility for management of the fishery on behalf of all licence holders. Thus, free riders are removed by ensuring that costs are attributed and paid equitably.

To gain greater stakeholder input and partnership, it is anticipated that the Association's management arrangements will include increased participation by key stakeholders in

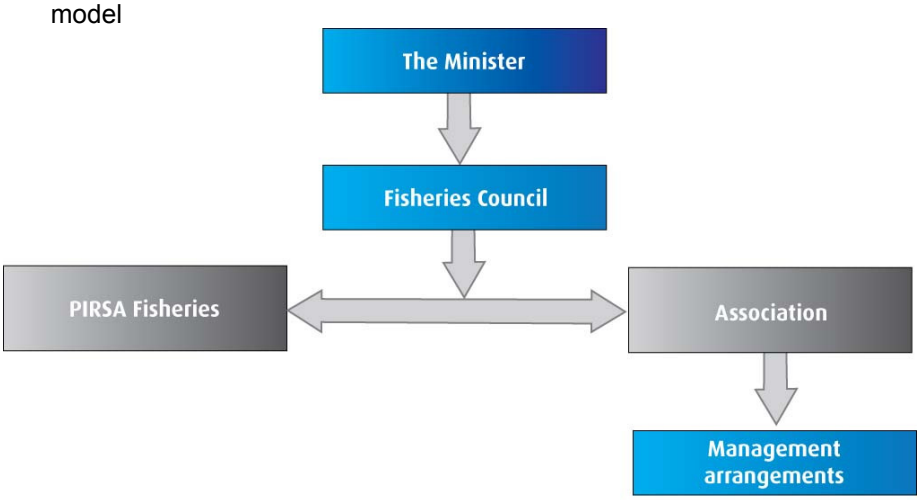
appropriate forums. The Association's constitution provides for stakeholder involvement in management of the SGPF at the sub-committee level. Position(s) can be made available on the Association's Research Sub-Committee to assist in research management of the fishery. This is important in providing transparency and shared responsibility for management decisions particularly in relation to ecosystem impacts of fishing. In any case, the Association would be responsive to independent audit of services managed by industry e.g. peer review of research services.

Under this model, responsibilities that the Association would adopt as part of co-management arrangements include:

- Delegation of decision making and review of harvest strategies
- Delegation of all responsibilities for spot surveys
- Research services (or the contracting of) including reviewing and reporting on management performance
- Management of the observer program, including maintaining the database of suitably certified observers.

These tasks would be overseen by the Association's Management Committee with input from its sub-committees. Importantly, under this model, annual costs of delegated tasks would be struck by the Association and passed onto all licence holders. For example, costs of employing a scientist, operating costs associated with research tasks addressing stock assessment, ecosystem performance, and economic performance would be managed by the Association but collected, on behalf of the Association, by PIRSA. PIRSA would continue to collect licence fees (including recovery of costs associated with delegated and non-delegated tasks). For delegated tasks such as research services, there would be costs applied to independently auditing performance. These costs, as for those incurred in the provision of other services, would be reflected in licence fees.

Figure 6 Relationship between stakeholders under a partially delegated co-management model



Pros

- Greater control by industry of the nature and costs of service delivery
- Greater stakeholder involvement (including the conservation sector)
- Minimal change in existing management arrangements
- Provides an intermediate step between existing co-management arrangements and a fully delegated model
- Government management of cost recovery / legislative / policy / auditing processes
- Removal of free rider issue with non Association members avoiding management costs.

Cons

- Limited stakeholder involvement in fishery management
- Stakeholder conflict including perceptions of poor quality control of research services
- Inability to securely collect levies to fund industry development programs (e.g. marketing).

4.3. Fully Delegated Model (Model 3)

Under a fully delegated co-management model decisions relating to management of the SGPF would be made by a body representing stakeholders. The principal difference between this model and model 2 above is that management arrangements for the SGPF are managed by the Association under an augmented governing board (the Board) including stakeholder representatives. Alternatively the governing body could be a newly established stakeholder representative body. A stakeholder representative body reflects the aspirations of co-management better than a purely commercial fishery representative body.

The Board would be responsible for strategic management and for the collection of annual levies/fees. Responsive to the Board, the Association would retain day to day operational management responsibilities including the spatial management of the fishery through the Committee At Sea. Thus, under this fully delegated co-management model, formal management arrangements overseen by the FCSA are delegated by the Minister (under provision of the Fisheries Management Act) from PIRSA Fisheries to the Board.

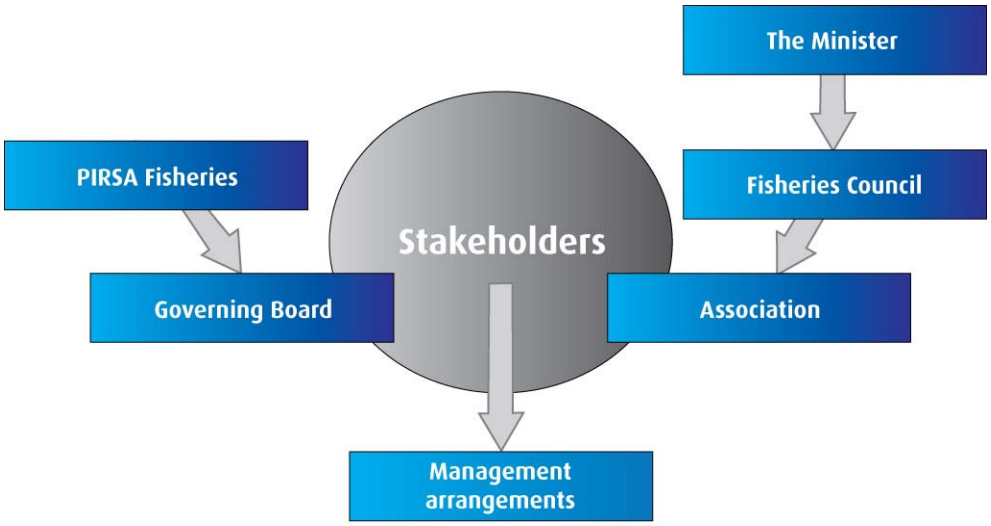
The Board would be responsible for all governance arrangements including establishment of appropriate committees to conduct specific functions (committees would have operational responsibilities), provide legislative advice, policy making, conduct research activities (including facilitation of contestable services), and report annually to stakeholders (including government). Government, through PIRSA, would retain responsibility for enforcement and for auditing management services.

The Board could utilise the current governance arrangements for the Association, under its current Constitution, including an Independent Chair, but would add stakeholder representatives through a transparent and consistent process, including one each from:

- Government
- Recreational fishery
- Commercial fishery
- Conservation
- Indigenous
- Aquaculture

Functions that would remain with government would include legislation, regulation and policy (related to broad fisheries management functions) development, review and amendment, compliance activities and development of management plans including ERA and ecosystem benchmarks. Core functions, such as enforcement and auditing, will not be delegated, as they remain a core function of government (Zacharin et al. 2008).

Figure 7 Relationship between stakeholders under a fully delegated co-management model



Pros

- Stakeholder representation reflecting genuine co-management
- Outsourced delivery of management services (including research) to improve cost effectiveness and transparency of service delivery
- Transparency of management regime and fishery performance
- Ability to collect levies from all licence holders for additional services.

Cons

- Additional Association resources required for management
- Re-development of the Fisheries Management Committee (FMC) model
- Reliance on voluntary stakeholder participation in management
- Potential increase of conflict with greater stakeholder participation
- Additional management layer to govern the fishery.

5. Co-Management Models Evaluated

Neville (2008) outlined some essential pre-conditions deemed necessary to progress a co-management model for a fishery. These pre-conditions are presented in the context of progressing co-management arrangements for the Spencer Gulf Prawn Fishery.

- *A willingness by governments to consider alternative management models involving greater shared responsibility*. South Australia is committed to progressing co-management opportunities in managing commercial fisheries, consistent with principles of ecologically sustainable development (ESD) as required by the Fisheries Management Act. The Fisheries Management Act permits the Minister to delegate functions prescribed under the Fisheries Management Act, allowing the sharing of responsibilities among stakeholders. Industry already has shared responsibilities with the government for some aspects of the management of the fishery.
- *Fishers groups with a significant proportion of members wanting to move to co-management*. The body representing industry, the Spencer Gulf and West Coast Prawn Fishermen's Association Inc (the Association) is committed to take on greater shared responsibility for management of the fishery.
- *Identified "champion/s" who can negotiate effectively with governments and build organisational ownership*. For some time the Spencer Gulf Prawn Fishery, through the Association, has had a close working relationship with the government. The Association employs a full time Executive Officer and has a governing Management Committee, which is leading the industry's involvement in co-management. The Management Committee also has responsibility for developing harvest strategies for the fishery. The Association has contractual arrangements with the government for a Coordinator At Sea to provide a link from industry through to government and its fishery managers. Further to this, the Association's Committee At Sea works to implement and manage harvest strategies in close consultation with the government. More recently, the Association has been working closely with Conservation Council of SA (CCSA). CCSA has a nominated representative who is working closely with the Association and with PIRSA Fisheries to evaluate co-management options for the fishery. This multi-lateral relationship has improved communication and understanding of the needs of major stakeholders in the fishery (including the conservation sector).
- *An effective fisher organisation structure with good governance and an ability to communicate with all fishers and other stakeholders*. The Association is an incorporated body with membership comprising most of the licence holders. It has a management committee with an independent chair and a number of sub-committees (including a committee at sea responsible for making daily spatial management decisions, and a research sub-committee for advising on research matters).
- *A fisher organisation with sufficient resources and skills to implement and deliver services, or an ability to negotiate and attract such resources.* The Association collects fees from its members for day to day operation on behalf of its members. Under the preferred model the Association will take a greater role in managing the fishery. This will require a capacity building strategy and additional resources including support for the Executive Officer and the Coordinator At Sea to undertake the formal liaison with government given the functions delegated. PIRSA Fisheries has confirmed that the government cost recovery process, used to set annual licence fees to fund management services, will be utilised to ensure that any 'core' management processes are securely funded before any functions being formally delegated from government to industry. Core management processes are those processes that are integral to fishery management involving all licence holders, and which would be delegated to the Association, e.g. scientific surveys, stock assessment and research, Coordinator At Sea services, harvest strategy development/application, and real time spatial management. The core management processes do not include other administration functions or other initiatives such as marketing, promotions, or provision of an Executive Officer) of the Association.
- *Existence of a legislative basis to delegate powers.* The Minister can delegate powers under the Fisheries Management Act to other bodies. Section 10 (1) states: *The Minister may delegate a function or power of the Minister under this Act … to …any other person or body*.

- *Ability to generate, and commit to, legally binding undertakings through an MOU, contract or other form of agreement between the parties.* The Fisheries Management Act provides for such legally binding undertakings consistent with the SA government's policy of encouraging co-management of fisheries. It is envisaged that the delegation of management responsibilities under section 10 of the Fisheries Management Act 2007 would require the development of a Memorandum of Understanding (MOU) between the Minister and the Association.
- *Ability for the fisher's organisation to legally enforce agreements through civil, contractual or company law.* The Association currently has contracts with survey vessels and operates under a constitution, management committee code of conduct and Committee at Sea charter. Further agreements and contracts could be developed as necessary.
- *Existence of conflict resolution mechanisms.* Conflict resolution is an essential pre-requisite to co-management. In the first instance, the aim is to resolve conflict through open and constructive communication among stakeholders. Participation by stakeholders on the relevant Association sub-committees will play an important role for communication and discussion of shared interests in the Spencer Gulf Prawn Fishery. In the event that conflict is unable to be resolved informally or through a process determined by stakeholders, the conflict would be escalated to a formal process. This process would include the FCSA, which has a formal channel for advising the responsible minister if the conflict cannot be resolved through other mechanisms.

The majority of South Australian fisheries have historically been, and currently are, managed using 'consultative' co-management arrangements, particularly between government and industry. In terms of industry involvement, the SGPF has moved further along the co-management continuum to a more collaborative and partially delegated co-management arrangement (referred to in this paper as the status quo) for the following reasons:

- High confidence in stock sustainability, demonstrated in the annual stock assessment process
- Historically, industry has demonstrated a willingness to meaningfully engage with government
- The industry association is representative, credible and financially secure;
- The industry association is well resourced, has an independent chairperson and an executive officer
- The industry association has transparent reporting arrangements in place;
- There is a history of constructive working relationships and trust between government and industry
- There is minimal stakeholder conflict associated with the fishery and the industry has a track record of working with stakeholders to address conflict issues
- There is an effective management plan in place
- Industry has had a clear desire and has built its capacity to take on more responsibility
- Industry is developing stronger links with other stakeholder groups such as the conservation sector
- Government has a willingness to collaborate and share responsibility.

The attributes of the three models were evaluated and discussed at a stakeholder workshop (government, industry, and the conservation sector) in April 2009. At the workshop, a number of incentives were identified by stakeholders for considering co-management. These include:

- greater industry stewardship of the resource;
- improved environmental performance (habitat protection and reduced impact on threatened, endangered and protected species);
- depoliticising fisheries management;
- reducing unnecessary administration ("red tape");
- improving management flexibility;
- a shared responsibility among stakeholders for management of the fishery;
- improved communication among stakeholders;
- improved efficiency and reduced costs;
- increased transparency of fishery operations and fisheries management processes.

5.1. Status Quo (Model 1)

The current co-management arrangements in place for the Spencer Gulf Prawn Fishery already reflect a high degree of collaboration between PIRSA Fisheries and the Association. Shared responsibility under this model includes advice on spatial management of Spencer Gulf following industry coordinated surveys; subsequent management decisions are formalised via the government (PIRSA). The status quo, which already involves a high level of collaboration (between industry and the government), was considered to be inefficient given that there was significant involvement of industry stakeholders in stock assessment surveys, and in development and application of harvest strategies. Replication of these functions by government was considered to be inefficient. It was recognised that efficiencies and cost savings could be gained by formally delegating these functions to industry under a partially delegated model.

Responsibility for the management functions that are delegated to industry under the current 'status quo' model, as follows:

- Coordinating and managing stock assessment and spot survey activities, including contracting vessels to conduct surveys, organising survey logistics and industry based observers. This activity is conducted under an exemption issued under Section 115 of the Fisheries Management Act, which is provided to the Association annually.
- Development of harvest strategies following industry-coordinated spot surveys and stock assessment surveys. The harvest strategies developed under this arrangement require government approval and are implemented by government using Section 79 of the Fisheries Management Act through published notices in the gazette.
- Management of harvest strategies during fishing through the Association's Committee-At-Sea, primarily by spatially managing harvests to avoid the capture of small prawns.
- Fleet management, including dissemination of fishing notices, area closures and other information.
- Management of the observer program.

Under the current 'status quo' model responsibility for the following management functions remain with PIRSA Fisheries:

- Government policy development
- Legislative development and enactment
- Licensing functions
- Development of the management plan, including establishing sustainability benchmarks, in consultation with the Association and other stakeholders
- Addressing fisheries access and allocation issues
- Participating in development of harvest strategies
- Formalising and implementing all harvest strategy decisions made by the Association's management committee
- Conducting ecological risk assessment and establishing ecosystem benchmarks
- The cost recovery process, including determining service levels required and licence fee setting
- Compliance, enforcement, monitoring and prosecution
- Formal communication with licence holders.

Under the current 'status quo' model, responsibilities for the following management functions remain with government through its research body, South Australian Research and Development Institute (SARDI) Aquatic Sciences:

- Stock assessment, including analysis of survey data
- Assistance with stock assessment surveys
- Provision of fishery independent observers for stock assessment surveys
- Provision of scientific advice for harvest strategy development
- Auditing of harvest strategy development, through annual stock assessment
- Collate and manage all commercial fishery logbook data collected by the fishery
- Conduct most other biological research underpinning stock assessment in the fishery including non-target species research, assessment and monitoring
- Communicating scientific information to licence holders.

Currently it is difficult for the conservation sector to comment / participate within consultation processes given the lack of expertise in fisheries management and resources available to successfully participate. Government has define processes, and every effort is made to consult with stakeholders throughout these processes, particularly as is statutorily required. However, it is difficult for government to individually engage (one-on-one) with all stakeholders to their full satisfaction. Participants recognise that this project is a step toward having more meaningful engagement between government, industry and the public and has opened communication channels. Ongoing work is required to ensure continued meaningful engagement. This issue extends further than just to the SGPF, fisheries management, government-public relationships and conservation sector engagement, but it is recognised that engagement could be improved.

Additionally, the SGPF has the capacity to more meaningfully engage with other stakeholders through its sub-committee structure, under the Association's constitution. In particular, the CCSA could provide valuable input into the Association's Research Sub-Committee, which deals with issues and topics in the interest areas of the conservation sector. The SGPF is aware that this stakeholder engagement does not need to be restricted within the confines of the co-management project, and has enacted CCSA representation on its Research Sub-Committee on a twelve month trial basis. Continued stakeholder involvement will require consideration of working arrangements (ie scope of work undertaken, meeting frequency, obligations etc) and address conflict issues. Preferably, the Sub-Committee will operate under a charter as directed by the Association, with a clear conflict resolution process.

The CCSA Steering Committee expressed the view that the existing arrangements for fisheries assessment and reporting do not necessarily meet the needs of the conservation sector or adequately address fishery management / ecosystem issues. Whilst the SGPF may be recognised as one of the best managed fisheries in the world (with innovative measures in place to limit impacts on the ecosystem), it is difficult for the conservation sector to feel comfortable with the level or transparency of information provided, given the previous experiences with other commercial fishing sectors. Conservation sector (and other stakeholder) involvement would give ownership to those stakeholders and lead to greater public confidence in government and fisheries management processes, including the transparency of information and the integrity of data. This in turn would lead to public support in commercial fisheries moving toward co-management and taking on more delegated responsibilities.

The PIRSA Steering Committee noted that a public consultation process is coordinated by the Commonwealth Department for Environment and Heritage on every export fishery under the assessment criteria within the EBPC Act. The assessment criteria have provision for ecosystem based impacts and fisheries management. The public, including the conservation sector, can participate in the assessment process. Also, under the Fisheries Management Act, there are requirements to undertake an ERA to ensure all ecological impacts posed by a fishery and all external impacts on a fishery are identified, evaluated, monitored and managed. This process should ensure greater transparency in fisheries management.

The CCSA Steering Committee expressed an interest in being involved in the observer program that is currently being developed by industry. The observer program is seen as an integral factor in the collection of data for management of the SGPF. The process for training and selecting observers must be developed robustly to provide transparency of processes and offer a level of public trust. The observer program would offer an incentive based mechanism for collecting and reporting data. For example, a reduced level of observer presence for accurately and truthfully recording data reduces costs to industry in the management of the fishery. It was noted that PIRSA is developing an observer policy for all South Australian fisheries, which will undergo a public consultation process in line with statutory requirements.

5.2. Partially Delegated Model (Model 2)

The partially delegated model was assessed as best suiting the needs of stakeholders given the inefficiencies of the status quo (Model 1) and the potential complexities of a fully delegated model (Model 3). The partially delegated model (Model 2) provides greater responsibility for industry including the conduct of research necessary to evaluate the status of the fishery (stock assessment). This differs from Model 1 which engaged government, via its research agency SARDI, as the mandatory research provider. In Model 2, responsibility for stock assessment and spatial management of the fishery is formally delegated to industry by removing the requirement for PIRSA endorsement of harvest strategies and the mandatory engagement of SARDI as the research provider. Additional stakeholder input (including the conservation sector) is proposed through active participation at the sub-committee level, within the Association.

Responsibility for the management functions that could be delegated to industry under the partially delegated model, in addition to the functions performed under the status quo (Model 1) arrangements, are as follows:

- Development of harvest strategies following industry-coordinated spot surveys and stock assessment surveys. The harvest strategies developed under this arrangement require government approval and are implemented by government using Section 79 of the Fisheries Management Act through published notices in the gazette
- Management of harvest strategies during fishing through the Association's Committee-At-Sea, primarily by spatially managing harvests to avoid the capture of small prawns
- Fleet management, including dissemination of fishing notices, area closures and other information
- Stock assessment, including analysis of survey data
- Assistance with stock assessment surveys
- Provision of fishery independent observers for stock assessment surveys
- Provision of scientific advice for harvest strategy development
- Auditing of harvest strategy development, through annual stock assessment
- Collate and manage all commercial fishery logbook data collected by the fishery
- Conduct most other biological research underpinning stock assessment in the fishery including non-target species research, assessment and monitoring
- Communicating scientific information to licence holders.

Management functions to remain with PIRSA Fisheries under the partially delegated model would be consistent with the status quo (Model 1) arrangements, with the exemption that PIRSA would not be involved in harvest strategy decision making, and formalising or implementing of harvest strategy decisions. The responsibilities currently with SARDI would be managed by the Association, through formal arrangements with PIRSA. It should be noted that SARDI may be the most appropriate research service provider, given their current management of the SGPF and their expertise, and the Association may chose to use SARDI to provide research services.

Fishery assessment work undertaken by industry would need specific employment arrangements agreed between PIRSA and the Association. A level of input would be required from PIRSA to ensure that the Association was adequately meeting criteria. This could be through the provision of a preferred PIRSA employment list where PIRSA makes a call for suitably qualified companies or individuals with whom industry could engage. Industry could have the ability to add to this list, where there is a direct employment relationship between the service provider and the Association and the service provider is selected based on a set of minimum criteria. The Association would be liable for contracting services; therefore the Association would need to ensure that the service provider meets the set of minimum criteria.

Under the existing fisheries management arrangements there is a great level of PIRSA involvement, including research services provided by SARDI. These services are provided on a cost-recovered basis where industry pays for the services provided. With a shift to a delegated co-management model (not just the SGPF but all SA commercial fisheries), where services are managed by industry, the impact on PIRSA could be a reduction in staffing

requirements. Reduced numbers of staff may also decrease the capability of PIRSA to be able to adequately provide services. This could in turn lead to less rigorous fisheries assessments and less informed advice. This could also apply to service areas, other than research, that are provided by PIRSA when delegated under a fully delegated model. A level of government capability must be maintained to ensure that commercial fisheries are operating sustainably within Management Plan parameters.

The Association currently provides a range of services to SGPF licence holders through voluntary membership fees. Core operational aspects of the SGPF that are provided by the Association are charge to SGPF licence holders through PIRSA licence fees. These fees are then paid to the Association under contracts between PIRSA and the Association. For the Association to take on research activities (as a core fishery management function) under co-management arrangements, these costs must be recovered from all SGPF licence holders. This cannot be on a voluntary basis (ie through the Primary Industries Funding Scheme or voluntary Association membership), and the Association does not currently have the legal capacity to recover these costs from all licence holders. The (industry) preferred method is for PIRSA to continue to collect licence fees from all SGPF licence holders, which are then paid to the Association for core operational services. PIRSA has the capacity to provide the fee collection service on behalf of industry, although 'core operational services' would need to be adequately defined. Defining core operational services would ensure that the Association (or any other body) did not take advantage of licence holders through the cost recovery process, where the Association negotiates costs on behalf of industry. Essentially, the Association would need to negotiate services and costs with industry.

A clear message throughout discussions was the importance of the Management Plan for the SGPF. The SGPF Management Plan would need to have a sufficient framework for ensuring appropriate management of the fishery (including ecosystem management) if industry was to conduct its won fishery assessment. The framework would need to include performance criteria that could be audited by a third party. Management Plan development would also need close stakeholder involvement and scrutiny to ensure that there is a high level of public confidence in the information presented in assessments (against performance criteria as well as the method(s) for collecting the information), and that an audit could adequately identify any issues in a timely manner. Rogers (2009) suggests that management plans should be the overarching framework for the way in which a fishery is managed, and that supporting guidelines are developed for specific fishery management functions (ie harvest strategies) to allow for flexibility in management arrangements. However, to provide for public confidence in fisheries management systems, it is believed that the Management Plan would need to be 'all encompassing' and cover all fishery requirements, being much more specific and prescriptive than is currently the case.

5.3. Fully Delegated Model (Model 3)

A fully delegated model (Model 3) transfers all major management responsibilities, except legislation, audit and compliance functions, to industry. It was recognised by project stakeholders that a fully delegated management model would require some activities to remain with government. Under this model, responsibility for management and administration would be delegated to stakeholders with an augmented governing body (the Association's Management Committee incorporating broader stakeholder representatives).

The Industry Steering Committee considered that the fully delegated model is visionary for the Association, possibly to be achieved over a longer time frame than that for Model 2. The Industry Steering Committee was reluctant to accept delegation of all functions of fisheries management, under this proposed model given the:

- Additional Association resources required for management
- Re-development of the Fisheries Management Committee (FMC) model
- Reliance on voluntary stakeholder participation in management
- Potential increase of conflict with greater stakeholder participation
- Additional management layer to govern the fishery.

The fully delegated model was considered to be too risky (legally and financially) for all stakeholders given that many core processes of management and administration of the fishery, particularly cost recovery, were not well suited to industry given its present capacity. Stakeholders considered that, pending audit performance and evaluation of the preferred model implemented over a phased period, further delegation may be undertaken.

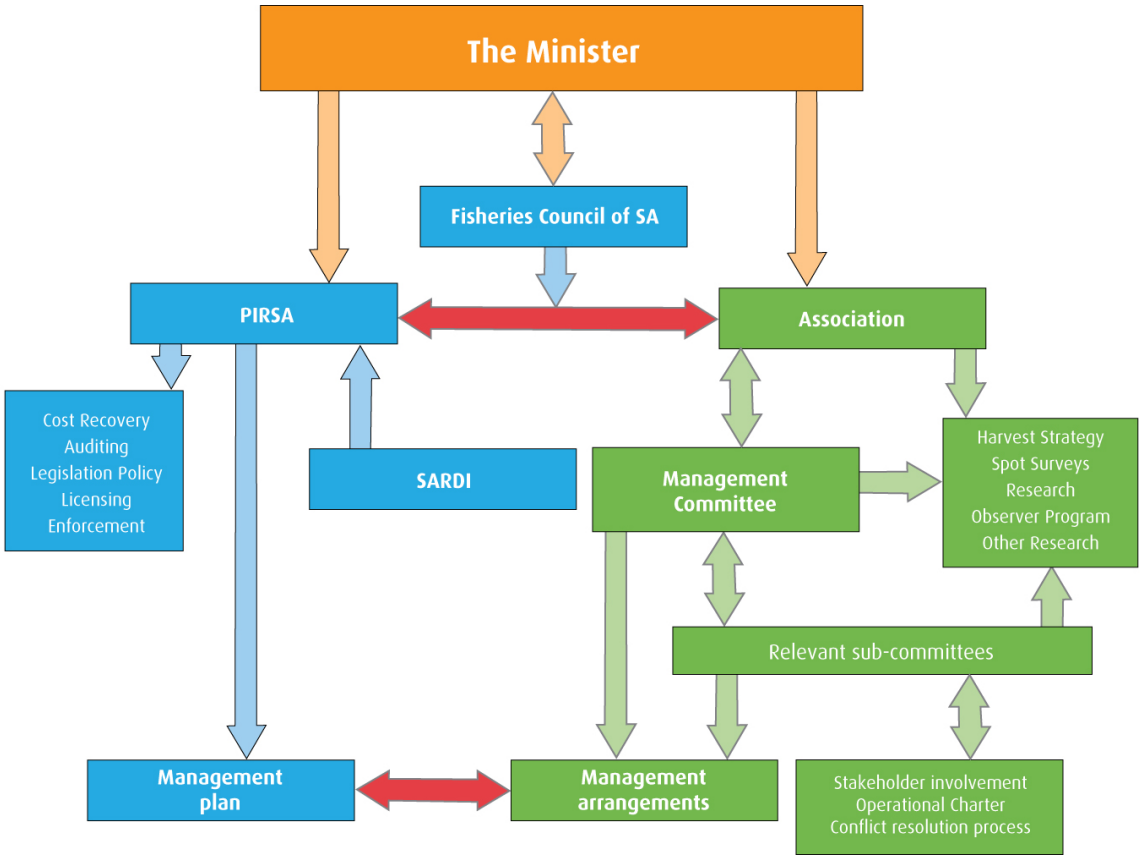
6. Preferred Co-Management Model

The Spencer Gulf Prawn Fishery has moved further along the co-management continuum to a more collaborative and partially delegated co-management arrangement (between industry and government), referred to as the status quo or Model 1. Incentives were identified by the three stakeholders for considering co-management, particularly within the SGPF. These include:

- Greater industry stewardship of the resource
- Improved environmental performance (habitat protection and reduced impact on threatened, endangered and protected species)
- Depoliticising fisheries management
- Reducing unnecessary administration ('red tape')
- Improving management flexibility
- A shared responsibility among stakeholders for management of the fishery
- Improved communication among stakeholders
- Improved efficiency and reduced costs
- Increased transparency of fishery operations and fisheries management processes.

The preferred co-management model is Model 2 (McShane, 2009) and provides for stakeholder involvement in Association sub-committees as well as through the public consultation process. Stakeholder involvement will inform management decisions and the Management Plan process. Model 2 engagement between stakeholders is represented schematically, in Figure 8. Many links, in Figure 8, have been omitted to allow clarity for the industry – government relationship. The conservation sector relationship under the preferred co-management model is detailed in Section 6.6 of this paper.

Figure 8 The preferred co-management model showing the delegation of management from government (blue) to industry / stakeholders (green)



6.1. Operational requirements for the preferred model

The preferred co-management model consists of the delegation of responsibilities associated with harvest strategies, spot surveys, research and the observer program. Table 8 below compares the current management model (Model 1) with the preferred model (Model 2). Under the preferred co-management model (the partially delegated model, or Model 2), the following responsibilities would be formally delegated to industry:

- Developing, implementing and managing harvest strategies
- Contracting research and stock assessment services, including stock assessment surveys, subject to audit/oversight of research performance by a research sub-committee (including stakeholders) and the government (PIRSA)
- Managing the spot survey data and authorisation
- Management of the list of suitably qualified observers
- Further delegation of management / administration services may be considered based on performance audit and assessment and willingness by Government, industry and other stakeholders.

Under the preferred co-management model, the following responsibilities would be retained by PIRSA Fisheries:

- Full independent audit process of all delegated functions
- Enforcement and compliance functions
- Conducting the ecological risk assessment
- Leading development of the next management plan in consultation with the Fisheries Council, the Association, its research sub-committee and other stakeholders
- Establishing ecosystem benchmarks in consultation with the Association and with the conservation sector
- Collating logbook data and providing this to the research provider under confidentiality agreements
- Cost recovery of core management processes delegated to the Association.

The preferred co-management model would involve the following roles and responsibilities for the conservation sector:

- The conservation sector to be formally involved in co-management through active participation with the Association and with the government, but also more generally in the consideration of future management initiatives among stakeholders
- Active participation on any relevant Association sub-committees (involving stakeholder representatives)
- Greater involvement in management planning
- Proactive input into environmental management issues including:
    - participation in the ecological risk assessment process
    - evaluation of ecosystem benchmarks
    - development of strategies to manage impacts on threatened, endangered, and protected species (TEPS)
    - assisting in a shared approach to habitat protection (e.g. threats to the Spencer Gulf ecosystem more generally)
- Participation in conflict resolution (informally through improved communication among stakeholders, and formally through the Fisheries Council of South Australia).

Other key features of the preferred co-management model include:

- A phased approach to delivery of the preferred model is considered necessary to facilitate a smooth transition to greater co-management of the fishery, to provide additional security to all stakeholders, to ensure audit requirements are being met and to allow for industry capacity building
- A formal conflict resolution process will involve the Fisheries Council of South Australia (empowered under the Fisheries Management Act to advise the responsible Minister) in the event that conflict cannot be resolved through informal processes.

Table 8 Comparison of current service delivery with the partially delegated co-management model. (All delegated functions will be audited by government.)

Process	Task / Duty		Model 1				Model 2			
			PIRSA Fisheries	SARDI	Conservation sector	Association	PIRSA Fisheries	SARDI	Conservation sector	Association
Harvest Strategies	TEPS reporting (interactions)					M			I	M
	TEPS impact assessment		M	I			M	I	I	I
	Review of stock assessment survey data for harvest strategies		M	I		D				D
	Review of spot survey data for harvest strategies		M	I		D				D
	Determine spatial harvest strategies (areas open to fishing)		M	I		D				D
	Catch / effort (number of nights) restrictions		M	I		D				D
	Gazettal / implementation of fishing notices		M	I		I				D
	Amendments to fishing notices		M			I				D
	Coordination of Committee at Sea (to direct fishing operations)					D				D
	Catch and prawn size data collection during fishing (logbook)					M				M
	Closing original harvest strategy areas nightly (RTM)		M			M				M
	Notifying the fleet of changes		M			D				D
	Fishing trip report					M				M
Spot Surveys	Survey development and design		I	I		D	I			D
	Survey coordination and logistics					D				D
	Survey data collection					D				D
	Survey data collation, verification and analysis			M		D				D
	Survey authorisation		M							D
	Assessment of effectiveness of Harvest Strategies		M	M			I			D
Research *Stock assessment surveys, catch & effort data, and by-catch / by-product research*	External review of stock assessment		M				M			
	Survey data collation			M						D
	Coordinate and manage the survey		M	M		I				D
	Survey development and design		I	M		I	M			I
	Survey logistics		I	I		D				D
	Survey data collection			I		D				D
	Survey data verification and analysis			M		I		I		D
	Manage fishing logbook program, including validating returns			M			I	M		I
	Logbook data: collate, enter, maintain database (storage)			M				M		I
	Assessment of fishery against Management Plan		M	I		I	I	I	I	D
	Assessment of effectiveness of Harvest Strategies		M	D		I	I			D
	Collection and storage of other biological data			M			I			D
	Fishery assessment report (X1)	Data collation and analysis		M			I	I		D
		Report writing		M			I			D
		Peer review	I	M			M	I	I	I
	Stock status report (X1)	Data collation and analysis		M			I			D
		Report brief	I	M			I			D
	Survey interim reports (x3)	Data collation and analysis		M			I			D
		Report writing	I	M			I			D

***M = Managing authority; D = Delegated authority; I = Input**

Process	Task / Duty	Model 1				Model 2			
		PIRSA Fisheries	SARDI	Conservation sector	Association	PIRSA Fisheries	SARDI	Conservation sector	Association
Observer Program	Develop observer program	I	M	I	D	I	M	I	D
	Facilitate observer training	I	M		D	I	M		D
	Maintain observer database	I	M		D	I	I		D
Other Research	Research priorities	M	I		I	M	I		I
	Economic research	M			I	M			I
	Non-target species research	M	I		I	M	I		I
	Biosecurity	M	I		I	M	I		I
	Ecosystem and habitat research	M				M			
	Broader research	M	M	M	M	M	M	M	M
Legislation / Policy	Establishing ecosystem impact benchmarks	M	I	I	I	M	I	I	I
	Development of over-arching policy to guide fisheries management	M	I	I	I	M	I	I	I
	Regulations development and review	M	I	I	I	M	I	I	I
	Management Plan development and review	M	I	I	I	M	I	I	I
	Public consultation on above	M				M			
	Act development and review	M	I	I	I	M	I	I	I
Licensing	Setting conditions	M			I	M			I
	Issue (determining if the licence can be issued)	M				M			
	Demerit points	M				M			
	Transfer	M				M			
	Cost Recovery (fee setting) / Invoicing	M	I		I	M	I		I
	Boat transfers and Master registration	M				M			
	Management of the Public Register	M				M			
Communication	With commercial licence holders	M	M		M	M	M		M
	To the public	M	M			M	M		
	With other government departments	M	M	M	M	M	M	M	M
	With the media	M	M	M	M	M	M	M	M
Enforcement	Prosecutions	M				M			
	Prior reporting (notifying of departure and return, including changes)	M				M			
	Vessel and equipment inspections	M				M			
	Audit of exemptions and prior reporting to data collection	M				M			
	Audit of fishing reports	M				M			
	Development and implementation of compliance strategy	M			I	M			I
	Review of risk assessment	M	I		I	M	I		I
	Promoting compliance within the SGPF (ie code of conduct, on boat management system)	M			M				M
Industry Development	Market research	I			M	I			M
Human Capital Development	Capacity building	M			M	M			M

***M = Managing authority; D = Delegated authority; I = Input**

The 'Input' occurring through broader public consultation processes are not included in this table, Table 8. Table 8, was designed to capture current co-management arrangements and new formalised arrangements under the preferred co-management model. It is a work in progress and represents the latest refinement.

6.1.1. Harvest Strategy Development

There are a number of permanent controls used to manage the fishery. These include limited entry, limits on vessel size and power, limits on gear (rig, headline length and mesh size), limits on fishing areas (i.e. greater than 10m depth) and limits on fishing times (i.e. only at night). Controls on the day to day management of the fishery are primarily based on closures (spatial and temporal). Some of these closures are permanent, some are voluntary and some are seasonal. Under status-quo management arrangements, spatial and temporal closures are determined in real time on the basis of survey research conducted by industry in partnership with government research agency (SARDI).

Currently the Association liaises and coordinates harvest strategy activities in consultation with PIRSA Fisheries and SARDI. The Association will take on full responsibility for harvest strategies under the preferred co-management model, which includes review of stock assessment surveys, spot surveys and commercial fishing information, gazetting and implementing fishing notices, and amending harvest strategies and fishing notices. Additionally, under the proposed co-management arrangements, responsibility for coordinating and undertaking research for the SGPF will be delegated to industry and audited by government.

A set of operating standards for the stock assessment survey will ensure the robustness of processes and reporting of industry, particularly in relation to the setting of harvest strategies under Management Plan criteria. The Management Plan for the SGPF sets objectives and strategies to maintain ecologically viable stock levels in the SGPF consistent with the principles of ecologically sustainable development. Utilising robust data gathered through auditable research services will provide the Association's Management Committee with the information to inform harvest strategy development. Regular reporting to the Research Sub-Committee (with stakeholder involvement) will ensure that harvest strategies are meeting Management Plan criteria.

6.1.2. Spot Surveys

Data for commercial fishing and spot surveys are collected in commercial fishing log books (completed by skippers in the SGPF). It is compulsory for licence holders to complete the logbook on a daily basis and submit the information monthly to SARDI Aquatic Sciences for fishery assessment. Data collected include catch rates (weight of prawns per minute trawled), size composition (weight of prawns in various size grades), mean size (number of prawns per 7 kg), depth, average trawl speed, and start/finish times. More recent changes include specific location data (GPS position) for at least 3 trawl shots per night fished, and retained by-product information (squid and bugs). Fishery dependent data are used to assess the status of the stock against reference points (total catch, numbers per 7 kg, and weights per 20+ grade) specified in the management plan (Dixon and Sloan, 2007). Under the preferred model such fishery dependent information will continue to be collected and used to assess the status of the Spencer Gulf Prawn Fishery. Commercial fishers are also required by law to complete a wildlife interaction logbook to record any wildlife interactions, particularly with threatened, endangered and protected species.

6.1.3. Research

Three fishery independent stock assessment surveys (stock assessment surveys) are conducted each year in November, February and April. Closures are also influenced by the results of 'spot surveys' conducted during fishing periods that stock assessment surveys are not conducted. The surveys, coordinated by industry, are proposed to continue under co-management, with formal delegation to industry. There are performance indicators (and reference points) which are derived from data collected from the research program (Dixon and Sloan, 2007). The current management plan for the fishery specifies information requirements for surveys. These requirements inform the operational details of the delegated research function under the proposed co-management arrangements, although they were not developed in the context of formally delegated co-management arrangements. The survey requirements are detailed as follows:

- collect fishery-dependent information through commercial logbooks;
- maintain the fishery-independent prawn survey program;
- assess the status of the stock through quantitative stock assessment;
- collect appropriate environmental data to aid assessment;
- review and update the strategic research and monitoring plan.

The three stock assessment surveys are currently undertaken each year with commercial vessels (i.e. fishing vessels owned and operated by Spencer Gulf prawn licence holders). Surveys are undertaken at each of about 200 fixed survey sites in Spencer Gulf by trawling for 30 minutes and recording the catch including catch rates, reproductive state and size composition. Commercial vessels are used to ensure data consistency with commercial fishing information. The actual number of sites surveyed varies slightly within and among years, depending on conditions and time available.

Fishery independent surveys provide information on prawn stock abundance and recruitment. The information collected during the survey process is central to the real time management of the fishery. Under current arrangements, the Association coordinates the stock assessment survey through a formal contractual agreement with PIRSA Fisheries. The Association will use the scientific survey design identified in the Management Plan. Following the survey process, the data are provided to SARDI Aquatic Sciences for analysis.

A significant difference between Model 1 (Status Quo) and the preferred model (Model 2) is the delegation of responsibility for undertaking stock assessment and research services to industry. Under the preferred model, industry would contract a researcher from a register of appropriately qualified and experienced providers. Such a register could be developed by government, industry and other relevant stakeholders and maintained by PIRSA. The preferred approach is to present a minimum set of criteria (e.g. job and person specifications) to guide the process of identifying which research providers could be placed on the research provider register, for engagement of a research provider by industry. Selection would be undertaken by the Research Sub-Committee of the Association. This would provide an opportunity for stakeholder input into the selection process and also provide for transparency in the process. Furthermore, provision for audit and independent review facilitated by PIRSA Fisheries will ensure accountability and rigour in assessing fishing impacts on the Spencer Gulf ecosystem.

It is important to note the role of SARDI, the government research provider. Purchase of research services from organisations other than SARDI potentially diminishes capability and relevant expertise in that organisation with consequent negative impact on local research capacity. Under the preferred model, SARDI may be a contracted research provider, or it may be involved in audit of contracted research services (as proposed in the phased introduction of the preferred model).

In addition to these research requirements, the Fisheries Management Act requires that an ERA is undertaken prior to development of a management plan, which includes stakeholder workshops. The next revision of the management plan for the fishery will include a response to the high priority risks identified during the ERA process including

strategies to manage impacts on TEPS. Operational details for any additional environmental research, following the ERA, will be formulated with stakeholder input (under the proposed co-management arrangements). For example, strategies to address interactions with TEPS will be developed with input from the conservation sector. Operational details, including identifying those resources necessary to monitor interactions (consistent with provisions in the Management Plan) will emerge from such input.

The next revision of the management plan will need to provide clearer direction for the stock assessment process, to facilitate the independent audit process (of delegated research functions). Under the proposed co-management arrangements, government will retain control of the performance audit function.

6.1.4. Observer Program

During the life of the co-management project, a number of industry based observers have been trained by SARDI scientists to collect prawn survey information. In addition to the industry based observers, SARDI scientists continue to participate in fishery independent surveys. Future surveys will also include evaluation of by-catch / by-product and environmental impact (including impacts on TEPS). Under the proposed arrangements, such surveys will be delegated to industry with a research provider commissioned to collect and analyse the survey data.

Under the preferred co-management model, some independent observers will be retained. An auditable certified training program will be established for all observers to complement the independent survey process. The Association has begun work to develop a certified observer training program. Once established, all observers will be required to undergo a certified auditable training program, provided by a Recognised Training Organisation, to ensure the effectiveness of service provided by observer coverage. Under the current co-management arrangements the Association is working, in consultation with PIRSA Fisheries, SARDI and CCSA to develop a suitable program. Observers who have successfully completed the training (and who can demonstrate at-sea training) will enter into an agreement with the Association to provide accurate and correct information. Qualified observers will be placed on a register kept by the Association. Observers can be sourced from credible observer service providers, including industry, government, independent service providers, or other stakeholders with an interest in the fishery (external to industry). An audit program, coordinated by the government, will evaluate the results of industry coordinated surveys, including the results of the observer program.

Legitimate concerns in relation to research quality, rigour, and potential conflicts of interest need to be addressed to the satisfaction of the government and other stakeholders. Thus, the preferred model will include provision for independent auditors to evaluate the efficacy of industry research services (including out-sourced research services). The process will allow for the ongoing maintenance of independent (of industry) observer coverage.

An incentive-based approach to utilising industry vessels and providing some industry observer coverage to collect information addressing ecological impacts should encourage compliance to desired standards of data integrity. Thus, the frequency (and therefore cost) of independent observer coverage (in stock assessment surveys, spot surveys and in environmental impact assessment) would reflect the quality of data collected by trained industry based observers. Where there is a significant difference between data collected by industry based observers and by independent observers, the frequency of independent observer coverage would increase. Similarly, where data quality is comparable, independent participation in research services (and therefore cost) would decrease. In any case, the extent (and therefore cost) of independent observer coverage will reflect the phased approach to co-management as presented below. Government will maintain its capacity to place independent observers on fishing vessels through the powers established under the Fisheries Management Act. Development of a certified auditable training program for observers is considered to be a key component of the observer program and necessary for quality assurance.

6.2. Cost Recovery

The Association currently provides a range of services to licence holders, through voluntary payment of membership fees. All but one of the Spencer Gulf Prawn Fishery licence holders are members of the Association. Therefore not all licence holders currently pay for Association services. However, core management processes, necessary for real time management of the fishery, that are undertaken by the Association are cost recovered from licence holders through PIRSA Fisheries licence fees. These fees are then paid to the Association under contractual agreements between PIRSA Fisheries and the Association. It is recognised that, for delegated co-management arrangements to be effective, the industry association must have a secure source of funding for core management services. It is acknowledged that costs must be recovered from all licence holders to deliver existing or new core management processes under the proposed co-management arrangements.

Under the preferred model, PIRSA Fisheries will continue to collect licence fees from all Spencer Gulf Prawn Fishery licence holders for core management processes. Funding for these activities could be provided to the Association under contracts, for core management processes. Core management processes currently not delegated to the Association would need to be adequately defined but would include:

- stock assessment and related research to address performance indicators as specified in the management plan;
- coordinating the observer program (including arranging training to the required standard);
- coordinating the survey program (including spot surveys);
- analysis and reporting of data (from survey and stock assessment);
- managing the relevant sub-committees where stakeholder involvement is necessary;
- developing and applying the harvest strategy (including managing the committee-at-sea process);
- liaison with government (including SARDI for access to log-book data and to respond to performance audits of delegated stock assessment, survey, and environmental research undertaken by industry);
- operational capability specific to core fishery management activities.

6.3. Conflict resolution

Conflict resolution will initially be addressed through the Association's sub-committees. If the conflict cannot be resolved through this forum, the matter will be referred to representatives of each stakeholder on the sub-committee for discussion and any resolution of these stakeholder representatives will be forwarded to the Management Committee for evaluation and determination. Should the determination not satisfy each stakeholder party and the matter remains unresolved, the matter will then be referred to the Fisheries Council of SA for determination, where one stakeholder representative from each stakeholder group will be able to lay out its argument for consideration. Stakeholders may not further influence the Fisheries Council. Any determination of the Fisheries Council will not be entered into debate. The Fisheries Council will be involved only when conflict is unable to be resolved through existing communication channels.

6.4. Phased implementation

A phased approach to implementing the partially delegated model is considered necessary to ensure a smooth transition to delegated functions and to allow for industry to incrementally build its capacity to undertake the delegated functions and enable stakeholders to build capacity to be effectively engaged. Three phases are suggested, during which an evaluation of the performance of industry-delegated functions is undertaken. This process is also useful to assess the potential for co-management of other fisheries (consistent with the aim of the present project). At this stage, a timeframe for phasing in of the co-management model has not been determined. The trajectory of the phased introduction will be determined by evaluation of the preferred co-management model by the Association, the progress of the co-management model once implemented and the government audit process.
A suggested phased approach for the preferred co-management model is outlined below.

6.4.1. Phase 1

The following functions/tasks will be delegated to the Association:

- harvest strategy development, implementation and communication;
- stock assessment survey and spot survey coordination;
- data collection;
- reporting (harvest strategy and stock surveys).

Prerequisites to move through this phase include:

- appropriate stakeholder representation on the Association's sub-committees;
- defined roles and responsibilities of the Association's sub-committees;
- direct engagement of the conservation sector and other stakeholders in key aspects of management of the fishery (i.e. ERA, management planning etc);
- operating standards developed for each responsibility to be taken on by industry;
- resource arrangements in place for adequate stakeholder representation;
- stakeholder approved criteria developed for Association selection of suitable staff/consultant;
- appropriate confidentiality agreement to enable survey data to be submitted to the Association.

During this phase the following quality assurance protocols will apply:

- PIRSA Fisheries audits each fishing period against a set of agreed operating standards;
- PIRSA Fisheries and SARDI will provide support to industry as necessary, to assist the transition to the delegated co-management model;
- survey data are verified by SARDI;
- the observer program is assessed by relevant stakeholders;
- at least three independent observers are provided for each stock assessment survey (independent of industry);
- the conflict resolution process is reviewed by relevant stakeholders.

Development of protocols and a training program for industry observers will proceed during this phase. A formal assessment of delegated functions in relation to the aims of co-management will be completed during this phase. Such an assessment could be managed through the Fisheries Council (SA) consistent with its aim of encouraging co-management of South Australian fisheries.

6.4.2. Phase 2

The following functions/tasks will be delegated to the Association:

- analysis, verification and reporting of scientific data collected through stock assessment and spot surveys (transferred from SARDI);

Prerequisites to move through this phase include:

- development of a certified auditable observer training program;
- creation of an observer database listing all observers trained under the certified program (use of certified observers only).

During this phase the following quality assurance protocols will apply:

- logbooks submitted to SARDI after data are collected;
- PIRSA Fisheries conducts annual audit of delegated functions;
- PIRSA Fisheries and SARDI will provide support to industry, as necessary, to assist the transition to the preferred co-management model.

A formal assessment of delegated functions in relation to the aims of co-management will be completed during this phase, as conducted during phase 1.

6.4.3. Phase 3

During this final phase the following functions/tasks will be delegated to the Association:

- stock assessment (linking surveys, observer program, data collection/analysis and reporting);

The following quality assurance protocols will apply:

- independent review/audit of all delegated functions, including stock assessment process;
- logbook data made available by industry to independent auditor (for audit purposes);
- enforcement and prosecution activities by PIRSA.

An evaluation of the potential to progress to a fully delegated model (Model 3) will be undertaken following the conclusion of the phased introduction of the preferred model (Model 2). The evaluation will include assessment of the effectiveness of stakeholder involvement.

6.5. Government position

In considering any further delegation of responsibilities to stakeholders, PIRSA Fisheries would take the following steps, in consultation with stakeholders:

1. *Establish Pre-conditions*: A set of broad government pre-conditions will be developed, using the national co-management framework as a guide. These pre-conditions clarify the government's policy position and the requirements that need to be met by stakeholder groups before delegation of fisheries management functions.
2. *Establish Operational Standards*: A set of operating standards will be developed to ensure each pre-condition is met. The operating standards provide details of the 'on the ground' activities necessary to meet the pre-conditions. For example, a set of operating standards were developed for the scientific survey and stock assessment processes in the Spencer Gulf Prawn Fishery, during workshop discussions.
3. *Determine Resource Requirements*: The resource levels required by each stakeholder group to implement the operating standards will be determined. This step will be further investigated during an evaluation of changed management arrangements planned for the 2009/10 fishing period.
4. *Establish Performance Audit Process*: Auditable performance measures will be developed for each delegated function.

PIRSA Fisheries is supportive of the preferred co-management model, which involves partial delegation of management functions from government to industry, based on adoption of the following broad conditions and processes:

- *Phased Approach*: Implementation of the preferred model will be through a phased approach that allows industry to build its capacity over time and allows for a government audit process to measure performance and success.
- *Audit process*: Development of full independent audit processes for all delegated functions, to be managed by PIRSA Fisheries (funded by industry).
- *Management Plan*: Refinement of the existing management plan to improve audit capacity, including establishing sustainability criteria. PIRSA Fisheries to lead this process in association with the Fisheries Council of South Australia, the Association and other stakeholders.
- *Scientific Services*: Development of criteria and process for contracting scientific services.
- *Stock Assessment*: Development of criteria for stock assessment, including surveys, data analysis and reporting.
- *Data Collection*: Maintaining a mix of fishery dependent and independent data collection, including provisions for independent scientific observers during surveys.
- *Data Storage*: Development of criteria and process for quality assurance of data verification, storage and security.
- *Scientific Observers*: A strategy developed to build capacity for industry based scientific observers, including a training program. Fishery-independent scientific observers would be used during stock assessment surveys.
- *Industry Capacity*: Development of an Association capacity building strategy.
- *Monitoring*: Prior reporting by licence holders before catch is landed.

- *Stakeholder Involvement*: Appropriate levels of stakeholder input and engagement in the co-management process.
- *Conflict Resolution*: A conflict resolution process to be facilitated by the Fisheries Council of South Australia.

A change from the status quo model to the partially delegated model would involve PIRSA Fisheries retaining the following functions:

- Full independent audit
- Management plan development
- Enforcement and compliance functions
- Conducting ecological risk assessment
- Establishing ecosystem benchmarks in association with industry and other key stakeholder groups
- Collating logbook data and providing this to the research provider under confidentiality agreements
- Cost recovery of core management processes that are to be delegated to industry.

The conditions outlined above provide a guide to industry for implementation of the preferred co-management model. Details on delegated tasks will be outlined as follows:

- Management function: A description of the management or administration function delegated;
- Operation: The business practices and processes that will be required to implement the delegated arrangements (i.e., what practical activities will be required to implement the proposed co-management);
- Resources: The resources required to implement the preferred co-management model;
- Quality assurance and audit: The accountability mechanisms that will be used to assess overall performance of the preferred model after each phase of implementation.

Under the obligations of the Fisheries Management Act, there is a requirement to undertake an ERA accompanying a Management Plan for the fishery. The management plan and the associated ERA are fundamental inputs to the co-management process as they will underpin the future independent Government audit process for the fishery under the partially delegated co-management model. The ERA process involves stakeholder workshops to ensure transparency and accountability in the determination of risks and risk management for each fishery.

6.6. Conservation sector involvement

The conservation sector is represented by Conservation Council of SA (CCSA), which is the peak body for non-government conservation groups in SA. With more than 50 member groups it represents over 60,000 South Australians. The conservation sector Steering Committee comprises CCSA staff and representatives from the following member groups: Wilderness Society (SA Branch); Marine Life Society of SA; Whale and Dolphin Conservation Society; and Fishers for Conservation.

Involvement of the conservation sector in fisheries management is seen as beneficial in facilitating greater communication and understanding of issues of mutual concern (e.g. habitat protection) among all sectors. Conservation sector involvement could also provide industry with additional expertise in conservation issues, including managing impacts on threatened, endangered and protected species and by-catch mitigation.

Support from the conservation sector for moving towards the preferred co-management model is dependent upon:

- Audit, compliance and ecosystem related responsibilities remaining with PIRSA Fisheries (as per Table 1); and
- Independent observer coverage being maintained at an effective level.

It is also based on the sector having:

- Active involvement in the implementation of the model;
- Membership on relevant Association sub-committees;
- Active involvement throughout the development of management plans;
- Active input into environmental management issues including :
    - participation in the ecological risk assessment process;
    - evaluation of ecosystem benchmarks;
    - development of strategies to manage impact on threatened, endangered, and protected species (TEPS);
    - assisting in a shared approach to habitat protection (e.g. threats to the Spencer Gulf ecosystem more generally);
- Involvement in the scientific observer program, including development and delivery of the training program, as appropriate.

All of the above are in turn dependent upon the sector being adequately resourced to do so.

6.7. Industry taking on more management responsibility

Industry, represented by the Association, is reluctant to accept delegation of all functions of fisheries management currently undertaken by the government (Model 3). This reluctance reflects the diversity and complexity of current fisheries management and administration in addition to the legal responsibilities (McShane, 2009). A partially delegated model (Model 2) was seen as more consistent with industry's aspirations in the short term. The reasons for the SGPF to move along the continuum under existing management arrangements are also recognised for the fishery to continue to move along the continuum to a more delegated co-management arrangement with government, as follows:

- High confidence in stock sustainability, demonstrated in the annual stock assessment process
- Historically, industry has demonstrated a willingness to meaningfully engage with government
- The industry association is representative, credible and financially secure
- The industry association is well resourced, has an independent chairperson and an executive officer
- The industry association has transparent reporting arrangements in place
- There is a history of constructive working relationships and trust between government and industry
- There is minimal stakeholder conflict associated with the fishery and the industry has a track record of working with stakeholders to address conflict issues
- There is an effective management plan in place
- Industry has had a clear desire and has built capacity to take on more responsibility
- Industry is developing stronger links with other stakeholder groups such as the conservation sector
- Government has a willingness to collaborate and share responsibility.

Importantly, adoption of Model 2 in a phased approach provides an opportunity for evaluation of the functions delegated and the capacity for the Association to undertake those functions. Additionally, a phased approach will provide other stakeholders with the ability to assess the delegation of functions to industry and determine confidence and transparency in the way in which functions have been enacted. Moving to a partially delegated model also provides industry, through the Association, an opportunity to consider other functions that could be delegated and the resources / responsibilities required to take on those functions in the future under a fully delegated model.

Any further delegation to industry must yield improved efficiencies and reduced costs consistent with industry's desire for sustainable profitability. While not detracting the importance of other incentives for moving to a more delegated co-management model it is important to note that all costs involved in fishery management affect individual licence holders and their businesses. Any adverse impacts on the fishery through increased bureaucratic requirements (reducing flexibility of fisheries management, particularly whilst fishing) or increased costs would not be supported. Thus, the active involvement of stakeholders under the preferred models must be consistent with industry's desire to improve

efficiency of management, reduce costs (financial and time) and present a demonstrable improvement on the status quo. This is also important in presenting the benefits (and costs) of co-management to other participants (in other fisheries) examining the SGPF as an example.

7. Industry Assessment

During the life of the project, it became apparent that many organisations were waiting on the results of the project and would potentially use the results to lead co-management in other fishing sectors. In particular, the FCSA indicated that the outcomes would provide direction for the FCSA's co-management obligations to 'promote the co-management of fisheries', under S16 (c) of the Fisheries Management Act. The FCSA is currently awaiting the outcomes of the project before progressing their co-management activities. Other fishing sectors within South Australia (SA) are interested in pursuing further responsibilities under co-management arrangements with PIRSA Fisheries. The FCSA could provide direction for these arrangements through their obligatory activities. Therefore, this project is likely to have an impact on other SA fishing sectors.

Also, the SGPF is leading fisheries in co-management arrangements with government. A number of other fishing sectors and organisations responsible for fisheries management, within Australia and internationally, have expressed their interest in the Association's existing co-management arrangements and the progress of the project. There is potential for the Association's project to guide the arrangements put in place for co-management in these fishing sectors as well.

Given the implications for other South Australian fishing industries, and potentially other national and international fisheries, obtaining feedback from other fisheries provides additional value to the current project. Therefore, the Association, with the assistance of Wildcatch Fisheries SA (the SA peak wild-caught fisheries body), hosted a workshop for other fishing sector representatives from across Australia and lead co-management personnel from other fishery management bodies. The workshop was structured in two components:

1. To present the preferred model and how it would be applied to the SGPF, as selected during the co-management project. This section included presentations by PIRSA Fisheries, the CCSA and the Association to discuss their respective position of the preferred model.
2. Workshop discussion with the commercial fishing sector to gain feedback and qualitative responses on the preferred co-management model for the Spencer Gulf Prawn Fishery.

The workshop not only produced feedback from commercial fishing representatives and fishery managers, it also provided those industries and government representatives with an understanding of the project the Association is conducting, it has given fishing industries an opportunity to consider co-management arrangements within their sector and has strengthen the industry position for co-management arrangements as they apply to the SGPF. Strengthening industries position is especially important to SA fisheries, as they operate under a fully cost-recovered model and any additional expenses would increase their fishing licence fees. Also, administration of organisations would increase with the shift of management functions under the preferred model. It is important for industry members to be aware how this may impact on their own industry organisation and to implement suitable governance arrangements to accommodate for this shift, as well as for the increased responsibility.

7.1. Presentation of the preferred co-management model

A representative from each Steering Committee (PIRSA, the Association and the CCSA) presented views from their stakeholder groups (as discussed in Sections 5 and 6) and the preferred co-management model was explained. In addition Peter Rogers presented findings from FRDC Funded Project 2008/059 'Co-management strategies for WA State Managed Fisheries using the Exmouth Gulf Prawn (Trawl) Fishery as a case study'. Important points of the Western Australia (WA) prawn co-management project that were presented are as follows:

- A business case developed for delegation of functions should demonstrate an improvement in costs and an efficiency in operations (reducing costs and increasing profits)

- Fisheries ministers must support moving toward co-management arrangements in order to have the minister delegate functions to industry
- Middle management support is vital, particularly within government, as this is the sector that controls / acts on fisheries management functions
- Contracts, memorandums of understanding and other co-management arrangements between government and industry are not transparent
- Fisheries management arrangements and acting under co-management must be consistent with the objectives of the Fisheries Management Act
- Powers of delegation need to be able to be removed (from stakeholder body) in the case that the objectives of the Fisheries Management Act are not being met
- Fisheries management plans could be used as the framework for managing a fishery and then guidelines are developed that are more flexible, without the statutory implementation
- The fisheries minister should appoint the 'management committee' (or other governing stakeholder body)
- Third party stakeholder group participation increases costs, which is too expensive for smaller fisheries
- Smaller fisheries have a strong case to move toward taking on more management responsibilities
- Consultation costs with all stakeholders are very high and is duplicated amongst government and other agency reviews (ie state government requirements, review of fisheries under EPBC Act, Marine Stewardship Council (MSC) certification)
- Co-management arrangements could lead to other commercial benefits including co-marketing, co-fleet arrangements, traceability.

7.2. Comparison between SGPF and WA co-management findings

There are two distinct differences in findings between the SGPF and WA co-management projects, which can be summarised as follows:

- Stakeholder priority has been given to the SGPF co-management arrangements in the preferred model (model 2) and the visionary fully-delegated model (model 3); whereas the WA co-management project has identified stakeholder involvement as cumbersome, expensive and duplicating effort.
- Management plans have been given priority within the SGPF for fisheries management activities; whereas WA management plans would provide the framework for fisheries management and supporting guidelines would direct fisheries activities.

Stakeholder confidence in processes and functions is valued and important for public acceptance of industry taking on more management responsibility within the SGPF. Having conservation sector input into the SGPF project has identified areas where practices / engagement could be improved and brought forward the lack of confidence of the public in existing consultation processes by government. Barriers have been removed in addressing the conservation sector concerns and by involving the conservation sector in the project. It has opened dialogue between the three sectors and there is a genuine interest in engaging and involving the conservation sector in managing the SGPF, particularly through the Association's Research Sub-Committee.

To ensure public confidence and transparency in co-management practices and processes, it has been identified that the Management Plan is the most important document for managing the SGPF. Having a Management Plan, which cannot be altered without public consultation, fisheries management is auditable and industry bodies are responsible based on stringent criteria addressed in public documents. Whilst other fisheries management review activities are consulted upon, there is a level of perceived disassociation between government / other reviewing agencies and stakeholder bodies and a lack of transparency in the review. This in turn does not provide assurances to the public in the way a fishery is managed.

Rogers (2009) describes the WA co-management project as being conducted by developing a case study, through a steering committee consisting of representatives from commercial fishing industries and fishery managers. A conservation representative, from the

Conservation Council of WA, also sat on the steering committee to provide feedback and direction (Rogers, 2009). Given stakeholder presence was stacked in favour of industry and government, the direction of the project would have leaned in favour of these sectors, specifically to improve efficiencies and decrease costs. The motivation of stakeholders may not necessarily have fully taken into consideration other important factors to successful co-management, in particular, the genuine engagement of stakeholders as per Neville's (2008) description of co-management. Additionally, the WA co-management project was conducted on a fishery where many licences are held by one licence holder. This provides for ease of communication between stakeholder parties and permits the licence holder to enact on co-management requirements within the fishery through internal policies. For example, fishers can have action taken against them if there is a breach of obligations by the licence holder as well as government. This removes a layer of complexity between the fisheries manager and industry, as seen in most other commercial fisheries.

The SGPF co-management project had three Steering Committees, one from each stakeholder representative group: industry; government; and the conservation sector. Steering Committee discussions and workshops provided a level of confidentiality where other stakeholder participants were not present: this was purposely done to allow for the open flow of communication and genuine engagement of each stakeholder group. Steering Committee feedback was then made at a higher level, where the three investigators discussed results. This was instrumental in identifying issues at the stakeholder level, and ensuring those issues were dealt with sufficiently in the preferred co-management model. Involvement of stakeholders and transparency of processes, practices and results in the SGPF were crucial components to delivering a preferred co-management model that would meet 'public' expectations in appropriate fisheries management and utilisation of the resource.

Regardless of the differences between co-management arrangements recommended to be adopted in WA for the Exmouth Prawn Fishery or the SGPF there will always be some functions that remain with government, as the principle managing authority. Government is ultimately responsible for managing the public resource within which fisheries operate; therefore key elements that will be retained by government will include auditing of delegated functions, compliance, management plan development, and legislation setting. Different fisheries will have specific needs and management regimes, dependent upon the structure of the fishery and the legislation under which it operates, and of course co-management arrangements will only be put in place for fisheries that can meet criteria and expectations.

7.3. Industry discussion on the preferred co-management model

Industry members had the opportunity to discuss the preferred SGPF co-management model, following presentations, at the workshop. The discussion is presented in this sub-section, as it took place on the day. While every effort has been made to present the discussion and issues raised, it does not necessarily form the full discussion. A number of issues were raised as part of the discussion. This section does not address those issues and there may be a need to further clarify arrangements between stakeholders or pose questions to a stakeholder to explain positions. Findings and conclusions from the discussion follows in sub-section 7.4.

Co-management within fisheries is generally supported across Australia, although there is 'nervousness' amongst stakeholders. The nervousness arises from uncertainties that stakeholders have in regards to the implications of delegating responsibilities to industry: government retaining functions; changes in costs to industry; provision of effective participation in fisheries management; and the risks associated with industry taking on the management role for delegated functions.

An issue that did not appear to be addressed in the co-management model was the transfer of risk with the transfer of responsibility from government to another party managing the fishery. An example was provided of the Newfoundland Cod Fishery, where the collapsed fishery resulted in law suits costing millions of dollars and this could potentially apply to industry with transfer of responsibilities. In the proposed model there is relatively little risk,

with high risk responsibilities remaining with government (ie legislation and management plan review and amendment, compliance, conducting ERA etc). As the fishery has access to a public resource and the Minister is responsible for the use of that resource, the risk remains with the Minister. However, there is still some risk for industry in taking on management responsibilities for the fishery. Risks associated with industry delegated functions can be managed through appropriate processes, procedures, and training (ie loss of quality of data is manageable through training). Additionally, delegating few functions in a phased approach, utilising stakeholder input, will spread the risk and provide for understanding of responsibilities.

The arrangements for staffing within government will need to be clarified. Essentially government departments would have to cut back on staffing numbers through the delegation of functions to industry. Additional expertise, if required, could then be sourced externally to non-government organisations, rather than through the government. However, additional staff may be retained 'just in case' functions needed to be delegated back to government (from industry).

The conservation sector requires industry to have more (independent) observer presence to ensure accurate and correct reporting. The conservation sector is aware that this may not be practical, so having the conservation sector 'in the tent' provides awareness of actions, operations and management of fisheries, which in turn builds conservation sector trust for industry to carry out delegated functions. PIRSA is responsive to open and transparent discussion with the conservation sector and this project has provided the conservation sector with the ability to fund a project officer (contact between stakeholder groups). However, fisheries reporting will need to be improved for the conservation sector to be trustful, particularly surrounding TEPS issues.

The FMC model had everyone 'in the tent', and this did not provide stakeholders with any trust. In some circumstances, fisheries were not meeting the requirements under the EPBC Act. In other circumstances stakeholders unrealistically expected more of fisheries, as they did not understand the fishery or the way it was managed. To build trust industry would need to proactively react to environmental threats and concerns and there would need to be greater transparency of fishing operations and management. Having industry and the conservation sector more closely aligned and allowing greater scrutiny of fisheries would provide for collaboration on other risk issues. There are other risk aspects that are independent of fisheries management (ie land run-off, desalination plants etc) that both industry and the conservation sector where they could work together. Having stakeholders with differing agenda's always poses a risk of conflict. If the issue cannot be addressed, then it will be referred to the Fisheries Council of SA for resolution.

Compliance and enforcement remain with government, but need to evolve with the co-management arrangements. Whilst there is a 'black and white' view of compliance remaining with government there is opportunity for community policing under co-management arrangements. In Tasmania different enforcement strategies are used in fisheries management, to identify why fishers are not compliant. Discussions have indicated that they are mostly social issues, where fishers have always done things that way or where government has made changes that have forced fishers to act in the way they did. There is a need for government to get on the fishers side, which not only encourages compliant fishing practices but also removes reluctance of industry to take on more responsibility for reporting on others in the industry. There is little risk of non-compliance within the SGPF in comparison to some other fisheries because of relatively little interaction with other industries, and the low number of fishing nights.

Cultural change is needed for both industry and government to deal with compliance issues more effectively. Currently there are assumptions that laws are being broken by fishers rather than positive thinking that they are compliant. These assumptions are affecting the way in which Fisheries Officers and fishers interact. Also, industry believes that 'hitting little things' (ie accidentally filling in a logbook form incorrectly) does not achieve much and that compliance activities need to focus on the 'big things' (ie monitoring of closed areas). Stakeholder engagement needs to be conducted appropriately to ensure industry can provide input / direct activities for compliance that matter more to the fishery (than the little things).

Building representative capability within industry would allow compliance activities to be shifted to industry management. This would create a more compliant / self-monitoring system within the industry. Also, Fisheries Officers are generally only on the water a short period of time because of safety risk (ie during bad weather); therefore it would maximise coverage using industry, when they are already 'out there'. Utilising technology in fisheries management could also make things easier and more effective, for example using the Vessel Monitoring System (VMS). However, VMS does not work in self regulated fisheries (peer pressure) as the information is not released to industry, therefore cannot identify where others within the industry are fishing (if they are compliant). There are opportunities for industry to self regulate, outside of legislative bounds, although the legal framework is an important element to governance. Fishery associations / fishers can implement improvements through agreements or contracts. The private company model can invoke benefits that cannot be achieved through an association, using the corporate structure. However, a private company has very different objectives to an association, and there may be conflict of purpose.

Stakeholder involvement would not necessarily be confined to conservation sector input. The recreational sector has the potential for involvement because of access to fisheries. Therefore, there is a need to identify potential stakeholders in a co-management model. Under current arrangements in South Australia (and other jurisdictions) government costs come back through a cost recovery process to industry licence holders. It has not been identified if the cost of involving other stakeholders will be charged to licence holders. Utilising stakeholder input is part of a 'common good' (and not to the benefit of industry) which should be borne by government and not by industry.

Currently government has an arrangement with the South Australian Recreational Fishing Advisory Council Inc (SARFAC), where government provides money for SARFAC involvement in fisheries management. This arrangement is also desirable for the CCSA to be able to provide adequate input into fisheries management, including coordinating input from other conservation stakeholders. The recreational sector has a link into PIRSA and the conservation sector has links into the Department for Environment and Heritage. Therefore, DEH could get involved in providing stakeholder involvement in fisheries management. The FCSA has input into fisheries management and has a member with conservation expertise. Conservation input would be provided through this forum.

Additional layers of cost do not make the preferred co-management model a desirable option, and the status quo may appear to be the best model. However, the preferred co-management model has lots of benefits, although it does not currently include significant stakeholder involvement. Supporting involvement of the conservation sector, through financial assistance, could be coordinated in a phased approach. While there is a compelling argument that community good is achieved through stakeholder involvement, it is recognised that stakeholder input does come at a cost. There is a lot of good-will behind this project that needs to be maintained; to ensure the success of delegating more responsibility to industry, the involvement of stakeholders should be maintained to prevent nervousness, or the result could be that the status quo is the preferred co-management model. Some issues will need to be addressed through a phased approach in implementing co-management to see the progress, evaluate activities and whether to continue. It is better to have effective stakeholder input than 'going it alone'.

Need to look at the bigger picture of stakeholder input, as there are more stakeholders than just the conservation sector. Stakeholders need to operate in a cost effective way to participate in the process. There should be other mechanisms that identify how the fisheries complies (ie realising requirements under the EPBC Act), but still have a forum for stakeholder input that is not overly burdensome. There is potential for an agency that ensures efficient management of all stakeholder parties, because there could be a tendency to become inefficient. This project puts stakeholders in a position where stakeholders want to be involved in high level policy making decisions as well as involved in fisheries management. The preferred model for the SGPF may not necessarily be the best model for other fisheries. There are systemic issues which, if addressed, will provide comfort with how fisheries operate.

The conservation sector does not want involvement in the day to day operations of a fishery, but would like to be involved in policy making and other activities (ie improvements in fisheries management to reduce by-catch / reduced impact on TEPS). The FCSA currently has some stakeholder involvement. However, the FCSA is seen as an expertise body and not a representative body. The involvement that the conservation sector want in fisheries management is to have a liaison person (paid by government) that would add value to identify which people get involved in particular mechanisms / activities; the conservation sector has a large pool of people with expertise in different fields, the liaison person would coordinate the appropriate involvement.

Co-management has evolved over 20 years and now industry wants to now take on more fisheries management activities (spatial management and research). The workshop participants have heard about the experiences and findings within the WA Exmouth Prawn Fishery, which shares some similarities but is quite different. The WA Exmouth Prawn Fishery has the convenience of a single company operated fishery and recognises the corporate approach to governance benefits. There is an opportunity to evaluate the preferred SGPF co-management model as it's implemented in the fishery and there may be further opportunity to evaluate how the model works in comparison with other co-management models adopted across Australia. A comparison of co-management models could include evaluation of stakeholder input, costs (increase / decrease / no-change), and the increased risks of transferring functions. FRDC are looking forward to other fisheries moving along the continuum of co-management.

7.4. Findings and Conclusions

The transfer of responsibilities to a fishery organisation could see the relevant risks also transferred to that agency. Should anything go wrong with a fishery the risk could result in the responsible fishery manager (industry), in addition to government, being sued by the community regardless of what risk remains with the Minister responsible for the fishery. Before any functions are delegated to an industry group, the Minister would need to be satisfied that the arrangements would not pose any threat to a fishery or the ecosystem. To appropriately manage against risks when delegating functions to a fishery organisation, the fishery should not be under any doubt as to its sustainability, the fishery should be managed in an ecosystem based approach, fishery research and reporting should be conducted in a transparent and holistic manner and fisheries management should be conducted in a way that ensures the sustainability of the fishery (conservative / adaptive response measures in place to accommodate the changing environment and stocks of a fishery). In addition, the fishery organisation would need to be credible, have demonstrated a commitment to fisheries management (under an ecosystem based approach) and ensure appropriate systems and processes are in place to continue the sustainability of a fishery.

Fisheries reporting would need to be improved, particularly reporting of TEPS, under co-management arrangements. Improved fisheries reporting would lead to more transparent fisheries management systems, which in turn would provide confidence from the public with industry taking on more management responsibilities. An underlying issue of fisheries management is the way in which a fishery is managed in isolation from the public/ stakeholder input, where the predominant issues relate to by-catch species. In providing adequate reporting on all aspects on the fishery, many concerns would be alleviated. To assist in the provision of adequate reporting, developing suitable benchmarks, performance criteria and operating standards would need to be included in the fishery management plan.

Having conservation sector input is important to the co-management process as it provides an openness and transparency in the management of a fishery. In addition, conservation sector input can provide benefits to a fishery through expertise in species of significance (TEPS) and ecosystem based management. Industry may have a tendency to only focus on issues that affect commercial fisheries rather than look at wider community concerns. Also, fisheries managers and disciplines within fisheries may see a fishery as sustainable and well managed which may be contrary to community perception, where there is a lack of understanding of fisheries management. Having conservation involvement in fisheries management would provide the balance between focusing on industry issues as well as on

broader community concerns. Successful co-management arrangements will not solely rely on expertise base on the FCSA, but will include engagement of stakeholders. The conservation sector is only one stakeholder in fisheries management and other stakeholder, for example the recreational sector, input should also be considered in co-management arrangements. Benefits could be derived from wider stakeholder involvement in fisheries management. Additionally, there are opportunities for collaboration between stakeholders in common issues (ie protecting against threats to the marine environment).

The costs relating to management of a fishery under co-management arrangements was discussed extensively. As fisheries management in South Australia is fully cost recovered, any increase in costs through taking on management responsibilities would be distributed back to industry. While industry is supportive of co-management, any increase in costs are seen as having a negative impact and are generally not supported even though other benefits are recognised as being possible through co-management arrangements. Involvement of stakeholders in the management of a fishery is seen as having potential to increase the cost of fisheries management, therefore as an increase of licence fees to industry members. However, the involvement of stakeholders in co-management arrangements is seen as providing for the 'greater good' of fisheries management and should be paid for by government (and not industry). Arrangements are already in place with other stakeholder(s) in paying for their involvement in fisheries management and this could also be applied to other stakeholders. Additionally, stakeholders have links into government where there is opportunity for funding to be achieved for those stakeholders through existing links.

There is a perception that compliance activities undertaken in South Australia don't reflect industries concerns; activities could be focused more strategically to provide protection of fisheries sustainability rather than on administrative compliance. While perhaps not a co-management initiative, as industry would not be delegated compliance responsibilities, the alignment of compliance activities closer to industries concerns could see benefits through industry taking on more responsibility for fisheries management and compliance with obligations. Industry is in the best position to monitor fishing activities; therefore empowering industry in compliance activities would provide greater stewardship of the fishery by fishers.

Industry and fishery managers have a desire to move toward greater industry responsibility for fisheries management. The conservation sector has not had the opportunity of having close involvement in fisheries management and is therefore cautious about co-management arrangements, particularly given the potential negative impact on the marine ecosystem. Having greater stakeholder input in fisheries management removes barriers to information flow and provides a greater level of transparency. A closer working relationship between government and industry will also improve fisheries outcomes. This would be achieved through greater stewardship by industry taking on more responsibilities. Improved reporting of fisheries management activities would also increase transparency of processes, improving relationships between stakeholders. Costs relating to co-management arrangements with increased stakeholder input require further consideration and clarification between the stakeholder parties to ensure the desired outcomes are met.

Benefits and Adoption

The completion of this project provides each stakeholder, engaged as part of the project, has met each of the objectives identified as part of the project application. Communication has been opened between each stakeholder group and provides each stakeholder with links into the other stakeholder groups; stakeholders have already begun working collaboratively in other areas, which has further improved communication between the stakeholder parties. For example, the Association is trialling CCSA involvement in its Research Sub-Committee on a twelve month basis and PIRSA has assisted in conducting information sessions through CCSA forums in identifying and discussing species of interest.

The preferred co-management model has fed into PIRSA processes for identifying criteria that fishing industries must meet in order to move along the continuum of co-management. A set of broad conditions and processes has been set and provides structure around co-management arrangements that could be developed with other fishing industries. In addition, it has identified areas of work, currently undertaken by PIRSA, that would not be delegated to industry and provides the framework for delegating of functions to other commercial fishing industries. PIRSA is also in the process of developing a co-management policy to ensure that the delegating of functions is undertaken appropriately, allowing for transparency of systems and public confidence.

Including CCSA involvement in this project has provided the CCSA with an opportunity to gain exposure to and understanding of fisheries management in South Australia. Having CCSA has been recognised as providing benefits to fisheries management and would see continued CCSA involvement in co-management arrangements, particularly as fisheries move along the continuum to a more delegated model. The CCSA have the opportunity in being involved in fisheries management and having broader issues met through co-management arrangements (ie ecosystem based fisheries management and TEPS reporting). Also, management plans for fisheries will become more transparent, with better reporting, allowing for greater CCSA scrutiny and assurance in best practice management of fisheries.

The SGPF has had the opportunity of identifying its future in regards to co-management arrangements, tailored specifically to its own needs and aspirations. In doing so, the SGPF has been able to consider co-management arrangements as they apply to existing practices and governance arrangements. Through this work, the SGPF has identified areas where improvements can be made to fisheries management arrangements whereby cost savings or reductions in ‘red tape’ can be made to increase efficiencies. The Association has also increased its leadership in directing co-management arrangements, is being more responsive and proactive in fisheries management through its Research Sub-Committee, and has engendered more professionalism in its fisheries management activities.

Other beneficiaries of this project include other South Australian, Australian and international fishing industry bodies and fisheries managers. This report will provide guidance to other fisheries in how fisheries management can involve government and industry as well as other stakeholders. Fisheries co-management in the SGPF has evolved over time, and in outlining the history, it can be demonstrated to others that it is a complex system that can successfully be implemented for long term management arrangements with appropriate consideration, preparation, and implementation (through a phased approach).

Further Development

This project defines a suitable co-management model specifically for the SGPF. Whilst the model has been handed to the Association's Management Committee for consideration (as required under the project outcomes) but has not yet been evaluated, it is likely that the preferred co-management model will be adopted and implemented for the SGPF. The phased approach incorporates evaluation of the implementation of the preferred co-management model and identification of other possible co-management arrangements following its successful implementation. To support this project, further developments could include:

1. Identifying co-management models for other fisheries
2. Developing business cases for implementing co-management arrangements
3. Review of co-management for the SGPF, and identifying further opportunities for delegating responsibilities following implementation of the preferred co-management model
4. Comparison of co-management arrangements between fisheries across Australia (including benefits, adoption, problems arising, support for co-management, stakeholder engagement, legislation, governance arrangements and lessons learnt)

Planned Outcomes

The planned outcomes and benefits for this project are:

1. Key fishers with skills and understanding to enable them to pursue alternative strategies to implement a new co-management model for the Spencer Gulf Prawn Fishery. The industry participants will receive key skills and expertise in negotiation, problem solving, strategic planning and other social benefits.
2. Broader involvement and understanding within industry, government and the community of what is required for a commercial fishery to move towards a greater level of responsibility under a co-management model, while ensuring long-term sustainability of the resource.
3. Documentation of a preferred management model for the SGPF with discussions of the implications and risks.

Each planned outcome and benefit has successfully been achieved throughout the life of the project. The main output from this project is the documented preferred co-management model for the SGPF. This project report includes discussion of the existing management arrangements, discussion on the ideas and models presented for three co-management models and the rationale for the preferred model. Other outputs include improved communication between the three stakeholder groups through involvement of the CCSA in the Association's Research Sub-Committee and PIRSA involvement in CCSA fisheries forums, strategically planning research activities with a whole of fishery focus (rather than for purely commercial benefits), strategic planning of co-management activities by government for implementation of co-management arrangements with other commercial fisheries, and increased industry awareness of co-management within South Australia.

Conclusion

Co-management arrangements are complex and diverse, with commercial fisheries having specific needs and aspirations as well as the ability to take on management responsibilities. A preferred co-management model would be implemented through a phased approach, to allow for industry to build its capacity to undertake the delegated functions effectively and to allow for performance assessment / audit. It would also allow for the conservation sector to build its capacity to engage with industry and government as well as provide the conservation sector with the ability to identify issues through the transfer of functions under the co-management arrangements and assist with developing solutions. Some functions would be retained by government, including auditing of fisheries performance under co-management arrangements, establishing and amending legislation and subordinate regulations, policies and management plans, and enforcement and compliance activities. Greater industry involvement in these functions will foster a more collaborative approach between stakeholders whilst also engendering a greater responsibility by industry for use of the resource.

PIRSA would only delegate responsibilities to industry where:

- There is high confidence in stock sustainability, demonstrated in the annual stock assessment process
- Historically, industry has demonstrated a willingness to meaningfully engage with government
- The industry association is representative, credible and financially secure;
- The industry association is well resourced, has an independent chairperson and an executive officer
- The industry association has transparent reporting arrangements in place;
- There is a history of constructive working relationships and trust between government and industry
- There is minimal stakeholder conflict associated with the fishery and the industry has a track record of working with stakeholders to address conflict issues
- There is an effective management plan in place
- Industry has had a clear desire and has built its capacity to take on more responsibility
- Industry is developing stronger links with other stakeholder groups such as the conservation sector
- Government has a willingness to collaborate and share responsibility.

The SGPF has met these criteria and as such has evolved from a centralised management regime to a collaborative, partially delegated model. Meeting these criteria has also meant that the SGPF can move toward a more delegated co-management model, as evaluated during the course of this project. Other stakeholders, including the conservation sector, do not have any involvement in such collaborative management processes, due to a number of factors including the design of the co-management arrangements, funding availability, competing priorities and expertise. These issues have been recognised as shortcomings and are being addressed in the preferred co-management model and through existing management arrangements. Progress in co-management, under the current PIRSA Fisheries policy, would involve further delegation of government responsibility to industry through the Association. Other stakeholder organisations, including the conservation sector, will not have any formal delegated functions within the preferred co-management model.

Government (PIRSA) will retain responsibility for cost-recovery through the collection of licence fees that will ensure sufficient funds are collected to cover the annual costs of all core activities necessary for management of the SGPF through the Association. This is particularly important to sectors, where the peak industry body does not have 100% membership and cannot adequately recover costs through existing voluntary structures. Additionally, only those activities that are considered core management functions will be cost recovered to ensure that industry is not unduly paying for complimentary activities (ie marketing and promotion, administration etc) that are not necessarily desired by licence holders. Core fisheries management activities under the preferred co-management model

include scientific surveys, stock assessment and research, Coordinator At Sea services, harvest strategy development / application and real time spatial management.

Stakeholder involvement in fisheries management, particularly involvement of the conservation sector, has been recognised as being integral to the co-management process. As stated in Neville (2008) 'Genuine interaction and partnerships are at the heart of co-management'. The genuine involvement of the conservation sector in co-management is dependent upon the provision of such resources. Therefore, the preferred co-management has conservation sector input into the research planning processes applicable to the SGPF via participation in relevant sub-committees of the Association. The conservation sector will also have more general input into the fisheries management process through input to the development of the fishery management plan for the SGPF and more broadly into other overarching policy and management arrangements. Importantly, in the context of co-management, the conservation sector will also participate in the phased introduction of the preferred model and in consideration of further delegation of management/administration (Model 3). Resources will be required for ongoing participation of the conservation sector in co-management including funding towards a sector facilitator to coordinate the sector's involvement and to build its capacity to do so, and the reimbursement of expenses to attend and participate in the relevant sub-committees. The access to resources will need to be further considered (where resources are to be accessed from) as co-management is progressed, particularly given that industry is fully cost recovered and the benefits of conservation sector involvement can be deemed as important more generically than for just industry specific benefits.

Importantly, industry would retain control over the daily spatial management decisions following spot surveys. This is because such decisions need to be made in real time following spot surveys. The conservation sector (or stakeholders other than industry) would not be involved in daily spatial management decisions. Under the preferred model, industry is primarily responsible for undertaking research and monitoring of the fishery consistent with the performance indicators, and with the research and stock assessment processes specified in the management plan. Thus, research services are contracted by industry under guidelines established by stakeholder's criteria (e.g. experience and qualifications of the research provider, provision for independent quality assurance audit) and who meet the requirements to be placed on the register of service providers.

The FCSA is involved in the co-management process including involvement in the management planning process (under the provisions of the Fisheries Management Act) and, where necessary, formal resolution of stakeholder conflict in co-management. Conflict resolution is seen as important to the successful implementation of co-management, where other stakeholders are involved. Suitable conflict resolution processes will be determined through forums where stakeholder engagement is included in Association activities (through the relevant sub-committees). Only where conflict cannot be resolved through these channels, would it be referred to the FCSA.

Processes and reporting frameworks need to be clearly documented in order to provide transparency as well as long-term sustainability of the resource providing for by-catch mitigation and protection of TEPS. The SGPF Management Plan will encompass all reporting requirements and will include performance criteria to ensure that industry's management of the fishery is being met in accordance with objectives and obligations under legislative controls. It will also ensure that stakeholders have input into management and reporting arrangements of the fishery and can adequately determine if the fishery is being managed appropriately.

The SGPF operates within the broader fisheries policy and legislative environment existing in South Australia, which goes beyond specific SGPF elements (ie Fisheries policies and legislation apply more broadly to all commercial fisheries in South Australia). During the SGPF co-management project the CCSA have identified some broader departmental policy setting (such as observer programs, TEPS data reporting etc) they consider directly affect the overall quality of the SGPF management arrangements.

Moving toward a co-management model needs to demonstrate benefits to stakeholders. Increasing costs and becoming bureaucratically burdensome for an industry association will not foster industry support; it may have the reverse affect and eventuate in 'short-cuts' to ensure cost savings or not be taken up by industry. However, if additional costs means improved service delivery or provides other improvements it may be welcomed. Additionally, having stakeholder involvement will only provide benefits if adequately engaged and input valued. Stakeholders can provide additional expertise that may not necessarily be gained through government fisheries managers or researchers or through industry. While this project has opened the communication channels between the SGPF and the CCSA, it is recognised that there are other stakeholder groups that also have an interest in the SGPF, including other commercial fisheries and the recreational fishing sector. To what extent other stakeholders are involved in co-management arrangements for the SGPF is still to be determined.

References

Agriculture, Food and Fisheries, 2007. 'South Australian Fisheries Resources – Current Status and Recent Trends 2006', South Australian Fisheries Management Series, Paper No. 49.

Currie, D. R., Dixon, C. D., Roberts, S. D., Hooper, G. E., Sorokin, S. J. and Ward, T. M., 2009. 'Fishery-independent by-catch survey to inform risk assessment of the Spencer Gulf Prawn Trawl Fishery: Report to PIRSA Fisheries', SARDI Aquatic Sciences Publication No. F2009/000369-1.

Dixon, C. and Sloan, S., 2007. 'Management Plan for the South Australian Spencer Gulf Prawn Fishery', South Australian Fisheries Management Series, Paper No. 54.

Dixon, C., Svane, I. and Ward, T., 2005. 'Monitoring and assessment of by-catch and by-product species of the Spencer Gulf Prawn Fishery', SARDI Aquatic Sciences Publication No. RD 04/0249.

EconSearch, 2009a. 'Economic Indicators for the Spencer Gulf and West Coast Prawn Fisheries 2007/08', Marryatville SA, Australia.

Gillett, R., 2008. 'Global study of shrimp fisheries', FAO Fisheries Technical Paper 475, Rome, FAO, p 105.

McPhee, D., 2008. 'Fisheries Management in Australia', The Federation Press, Sydney NSW, Australia.

McShane, P. E., 2009. 'Evaluating Co-Management opportunities for the Spencer Gulf prawn fishery', discussion paper presented as part of FRDC project 2008/210.

Neville, P., 2008. 'Co-management: Managing Australia's Fisheries through partnership and delegation', FRDC Project 2006/068.

PIRSA Fisheries, 2009. 'Prawn (Spencer Gulf & West Coast) Fishery', http://www.pir.sa.gov.au/fisheries/commercial_fishing/prawn_spencer_gulf__and__west_coast_fishery [Accessed 16 October 2009]

Zacharin, W., Dixon C., and Smallridge M., 2008. 'Towards self-management for the Western King prawn fishery in Spencer Gulf, South Australia', pp 245–258, in Townsend, R., Shotton, R., and Uchida, H. (eds). *Case studies in fisheries self-governance*. 1–21. FAO Fisheries Technical Paper. No. 504. Rome, FAO, 2008.

Appendix 1 – Intellectual Property

No intellectual property was created as a result of this project.

Appendix 2 – Staff

Principal Investigator	Karen Hollamby	Spencer Gulf and West Coast Prawn Fishermen's Association Inc
Co-Investigator	Sean Sloan	Fisheries Division, Primary Industries and Resources SA
Co-Investigator	James Brook	Conservation Council of SA
Facilitator	Paul McShane	Global Marine Resource Management Pty Ltd
Industry Workshop Coordinator	Gary Morgan	Wildcatch Fisheries SA

Appendix 3 – Discussion Paper identifying co-management models for the Spencer Gulf Prawn Fishery

Evaluating Co-Management opportunities for the Spencer Gulf prawn fishery

Paul McShane
Global Marine Resource Management Pty Ltd
March 2009

Introduction

In a recent review, Neville (2008) defined co-management as "*an arrangement where responsibilities and obligations for sustainable fisheries management are negotiated, shared, and delegated between Government, fishers, other interest groups and stakeholders"*. Power sharing and partnership are important components as are strong governance arrangements and property rights. The fact that individuals are dependent on the outcomes of collective group actions strengthens the need for structuring group outcomes and adopting robust co-management procedures (Neville 2008). South Australia is committed to progressing co-management opportunities in managing commercial fisheries consistent with principles of ecologically sustainable development (ESD) and economic efficiency. Co-management has the potential to reduce transaction costs in fisheries management, encourage and promote a collaborative approach to the sustainable management of natural aquatic resources, and to foster innovative approaches to fisheries management. Inevitably though, conflicts arise among users competing for access to a common property resource. Resource sharing arrangements and conflict resolution mechanisms must be part of effective co-management.

The Spencer Gulf prawn fishery of South Australia has gone further than other commercial fisheries in Australia in progressing co-management where responsibilities for management are shared between commercial fishers and the government (Zacharin et al. 2008). Prawns are relatively short lived species and require a flexible management approach. Year to year variation in recruitment (prawns growing to catchable size) influences catch rates and the size composition of prawns. By targeting areas of Spencer Gulf with high catch rates and favourable size composition of prawns (larger prawns command higher prices) economic returns are optimised. In adopting a conservative approach to management Spencer Gulf has been consistently the most stable and profitable prawn fishery in the nation.

The body representing Spencer Gulf commercial fishers, the Spencer Gulf and West Coast Prawn Fishermen's Association (the Association) and the Fisheries Management Agency (PIRSA) aim to transfer greater responsibility for management to the licence holders (Zacharin et al. 2008). Many of the management tasks undertaken by Government can be more efficiently undertaken by the commercial fishing sector freeing up Government resources for other important functions. There are other benefits including shared stewardship of the resource and collaboration among stakeholders (recreational and commercial fishers) which can depoliticise the management process (Zacharin et al. 2008). However, aspirations of successful co-management require active and collaborative participation among all stakeholders (e.g. including representatives of the conservation sector who present marine protection as a legitimate "use").

Co-management does not imply that total responsibility for management rests with industry or other stakeholders. Core functions, such as enforcement and auditing, will not be delegated, as they remain a core function of government (Zacharin et al. 2008).

The four key management goals for the Spencer Gulf prawn fishery are:

- maintain ecological sustainable stock levels;
- ensure optimum utilisation and equitable distribution;
- minimise impacts on the ecosystem;
- enable effective management with greater industry involvement.

The goal of enabling effective management with greater industry involvement is relevant here. The Spencer Gulf prawn fishery management plan (Dixon and Sloan 2007) states: *Given the demonstrably sustainable harvesting strategies in place and the high level of governance and financial security of the Spencer Gulf and West Coast Prawn Fishermen's Association, PIRSA Fisheries considers that the Spencer Gulf Prawn Fishery is in a strong position to move toward greater industry self-management. The strategies used to achieve this revolve around defining the tasks required for effective management of the fishery, identifying those tasks that industry can manage and developing processes to ensure that management arrangements are transparent and can be fully audited by Government. Other objectives of this goal aim to ensure that management arrangements reflect the concerns of the wider community, are complied with and are fully and equitably funded by stakeholders.*

In this context, co-management opportunities for the Spencer Gulf prawn fishery are evaluated. Co- management models are presented and compared including a discussion of the implications and potential risks of alternative models.

Co management in context of Australian fisheries

Under co-management, the role of Government, traditionally to manage fisheries on behalf of the community, can be largely devolved to stakeholders (or users of the resource). Thus, the primary users of a fisheries resource are allocated significant decision-making capacity. Users of fisheries resources include recreational and commercial fishers. They also include aquaculture (e.g. fish farms in coastal waters), indigenous communities, and conservation (e.g. marine protection, in which the resource is allocated for the primary purpose of habitat protection and conservation of marine biodiversity).

Typically, government involvement in fisheries management follows a continuum from full government control (government makes the decisions with little or no consultation with other stakeholders) to a delegated model where management decisions are made primarily by stakeholders. These decisions include recommending levels and the extent of service delivery (including research) and making decisions on management of fisheries (including output and input controls). In reality, most Australian fisheries are managed under consultative models (where government makes the decisions but consults with other stakeholders), or under collaborative models (where government and other stakeholders co-operate in jointly reaching decisions with some decisions potentially assigned to user groups). The Spencer Gulf Prawn fishery exemplifies a collaborative management model of government and commercial fishers. Until recently, a Fishery Management Committee (FMC) representing stakeholders (primarily commercial fishers) advised the Minister on management arrangements applicable to the fishery. Some management functions were delegated to the commercial fishing sector (including recommending spatial and temporal closures following surveys conducted by commercial fishers). There are other examples of collaborative fisheries management in Australia but, to date, no commercial fisheries are managed under a fully delegated model in which decision making and service delivery are delegated to the commercial fishers (Neville 2008).

Current legislation and consultative arrangements

The *Fisheries (Management Committees) Regulations 1995* outlined a set of co-management principles and established a number of fishery management committees (FMCs) which provided for some stakeholder input into the management process (including negotiating cost recovery of services used in the management of fisheries).

These consultative arrangements have ceased with the application of new legislation the *Fisheries Management Act (SA)* 2007 (the Act). The Objects of the Act includes the following principle "*the participation of the users of the aquatic resources of the State, and of the community more generally, in the management of fisheries is to be encouraged*". A further object of the Act is that "*the aquatic resources of the State are to be managed in an efficient and cost effective manner and the targets set for the recovery of management costs*". Of note is the term "co-management" does not appear in the Interpretation (or definition of terms) of the Act and the manifestation of co-management arrangements applicable to commercial fisheries remains unclear.

Under the new Act, the Fisheries Council of South Australia provides advice to the government on fisheries management matters including *inter alia*: promotion of the co-management of fisheries; and allocation of access to aquatic resources in particular fisheries (Section 16 of the Act). Notably, the Council is an expertise-based advisory group and not a stakeholder representative body. Nonetheless, the Council includes representation from stakeholders including commercial fisheries (Industry), recreational fisheries, conservation and indigenous sectors. All Council members, appointed by the Minister, are required to have expertise in fisheries management.

Importantly, under the Act, *the Crown in right of the State owns all aquatic resources (whether living or dead) of the State* (Section 6), but *Property in aquatic resources of the State passes* to fisheries licence holders. This reinforces the common property nature of fisheries resources while providing for access security in the form of a property right for commercial fishers to harvest fish from State waters. Co-management implicitly recognises that commercial fishers share aquatic resources with other users and that decisions affecting resource utilisation (particularly extraction) require shared involvement.

The Minister can delegate powers under the Act to other bodies. Section 10 (1) states: *The Minister may delegate a function or power of the Minister under this Act ... to ...any other person or body*. Thus, in progressing to a fully delegated model, Ministerial approval must be granted.

Cost recovery and co-management

The Government of South Australia requires that the costs of managing fisheries be recovered through licence fees. There are no resource rents as such. The Act specifies that the Council provides advice to the Minister "*about fees to be paid in connection with fishery authorities*".

Under the objectives of the Spencer Gulf prawn fishery management plan, the annual real costs of management research and compliance are to be determined and costs recovered from commercial licence holders sufficient to cover the attributed costs. Cost recovery has emerged as an alternative to more traditional resource rents for commercial fisheries in Australia and in other countries (Townsend et al. 2008). Cost recovery aims to provide a basis for improved efficiency in delivering fisheries management services thereby reducing transaction costs, improving the profitability of commercial fisheries, redirecting government resources to other community services, and providing incentives for commercial fishers to comply with principles of ecologically sustainable development.

There are three categories of transaction costs affecting fishery management:

- information costs (e.g. research, and data management);
- collective fisheries decision making costs (e.g. management including input and output controls);
- collective operational costs (e.g. enforcement and administration).

Compliance and enforcement are terms often used interchangeably but they have quite different meanings, particularly in co-management. Enforcement is ensuring that licence holders (or other users of the resource) comply with applicable regulations governing the

fishery. Enforcement services are retained by the Government even under a fully delegated co-management model (Neville 2008).

Typically, where compliance is high (i.e. users follow the regulations and obey the law) enforcement activity can be reduced, and vice versa. Thus, the costs of enforcement services (e.g. surveillance) generally reflect compliance. Compliance issues in Spencer Gulf include recognition of spatial boundaries and designated nights for fishing by commercial fishers. Following a risk assessment of by-catch in the Spencer Gulf prawn fishery, there may also be a need to demonstrate compliance with by-catch targets (or limits). These targets or limits are yet to be determined. Although, enforcement services should remain with the Government, input into the setting of enforceable targets or limits should be negotiated with stakeholders under a delegated co-management model.

There are a number of services required for effective management of the Spencer Gulf prawn fishery. These services, their costs for 2008/9 and potential changes under a delegated co-management model, are presented below (Table 1) (see also Table 2 which compares current service delivery with a delegated model). Of note is the relatively high cost of research services (more than half of the total costs recovered). In reality, there is no way of determining whether research services are cost effective under the present single service provider system. There is a need to review costs and scope of research services aligned to efficiency of service delivery. There is also an obvious need for robust, reliable information on which to base management decisions. Outsourced research services, such as applied in New Zealand fisheries management (see below) could form part of co-management consistent with the goals of efficient and cost-effective delivery of management services. In practice, monopoly service provision leads to the perception that fees are set by research agencies to recover the fixed costs of infrastructure and permanent staff rather than the actual costs of undertaking targeted research. In the absence of contestable services for research, it becomes difficult to assess the true costs of delivering research against applicable guidelines (e.g. as specified in the management plan). Contestable research could yield benefits measurable in cost efficiencies and improved transparency in the allocation of services under a cost recovery model. However, contestable research services could incur additional transaction costs including the costs of managing a tender and evaluation process.

Table 1. Comparison of service costs (2008/9) under a delegated co-management model.

Service	**Cost to Industry 2008/9**		**Under co-management**
Research stock assessment	$448328	SARDI	Commissioned
Research by-catch/ecosystem	$56962	SARDI	Commissioned
Research economics	$13355	EconSearch	Commissioned
Management (policy, industry liaison)	$45874	PIRSA	Review given delegation
Management (legislation)	$6986	PIRSA	Review given delegation
Management (enforcement)	$90108	PIRSA	Review in relation to compliance
Co-management (including real time management and committee at sea)	$200000	PIRSA/SGPFA	Review given delegation
FRDC levy	$87,296	PIRSA, Fishery	Review
TOTAL	**$966,898**		**Review**

Table 2. Comparison of current service delivery with a delegated co-management model

Process	Task / Duty		CURRENT Stakeholders*				CO-MANAGEMENT Stakeholders*			
			Government	*SARDI*	Community	SGPF	Government	Research Provider	Community	SGPF
Harvest Strategy	TEPS data collation and assessment		M	I	I	I	I	I		M
	TEPS reporting (interactions)					M				M
	Review of stock assessment survey data for harvest strategies		M	I		D				D
	Review of spot survey data for harvest strategies		M	I		D				D
	Determine spatial harvest strategies (areas open to fishing)		M	I		D				D
	Catch / effort (number of nights) restrictions		M	I		D				D
	Exemption (to allow fishing)		M	I		I				M
	Gazettal / implementation of fishing closure notices		M							M
	Amendments to fishing closure notices		M			I				M
	Coordination of Committee at Sea (to direct fishing operations)					D				D
	Catch and prawn size data collection during fishing					D				D
	Closing original harvest strategy areas during nightly fishing (real-time)					M				M
	Notifying the fleet of changes		M			D				D
	Fishing trip report					M				M
Spot Surveys	Advice to PIRSA			I		D	I			D
	Survey development and design		I	I		D				D
	Survey logistics					D				D
	Survey data collection					D				D
	Survey data collation, verification and analysis					D				D
	Delegate authority to industry to conduct survey		M							M
	Assessment of effectiveness of Harvest Strategies			D			I	I		M
Research *Stock assessment surveys, catch & effort data, and by-catch / by-product research*	External review of stock assessment		M				I	I		M
	Survey data collation			M						M
	Delegate authority to industry to conduct survey		M	I		I	I			M
	Survey development and design		I	M		I				M
	Survey logistics		I	M		M				M
	Survey data collection			M		D				D
	Survey data verification and analysis			M		I		I		M
	Advice to PIRSA			M		I	I	I		M
	Manage fishing logbook program, including validating returns			M			I	I		M
	Logbook data: collate, enter, maintain database (storage)			M						M
	Assessment of fishery against Management Plan		M	I		I	I	I		M
	Assessment of effectiveness of Harvest Strategies		M	D		I	I	I		M
	Collection and storage of other biological data			M			I			M
	Ecosystem assessments (ie by-catch)		M	D	I	I	I	I		M
	Fishery assessment report (X1)	Data collation and analysis		M			I			M
		Report writing		M			I			M
		Peer review	I	M			I	I	I	M
	Stock status report (X1)	Data collation and analysis		M			I			M
		Report brief	I	M			I			M
	Survey interim reports (x3)	Data collation and analysis		M			I			M
		Report writing	I	M			I			M

Process	Task / Duty	CURRENT Stakeholders*				CO-MANAGEMENT Stakeholders*			
		Government	*SARDI*	Community	SGPF	Government	Research Provider	Community	SGPF
Observer Program	Develop observer program	I	I		M	I			M
	Facilitate observer training				M				M
	Maintain observer database	M	I		M	I			M
Other Research	Research priorities	M	I		I	I	I	I	M
	Economic research	M			I	I			M
	Non-target species research	M	I		I	I		I	M
	Biosecurity	M	I		I	I			M
	Ecosystem and habitat research	M				I		I	M
	Broader research	M	M		M	I		I	M
Legislation / Policy	Establishing ecosystem impact benchmarks	M	I	I	I	I	I	I	M
	Development of over-arching policy to guide fisheries management	M	I	I	I	M		I	I
	Regulations development and review	M	I	I	I	M		I	M
	Management Plan development and review	M	I	I	I	I	I	I	M
	Public consultation on above	M				I		I	M
	Act development and review	M	I	I	I	M		I	I
Licensing	Setting conditions	M			I	M			M
	Issue (determining if the licence can be issued)	M				M			I
	Demerit points	M				M			
	Transfer	M				I			M
	Cost Recovery (fee setting) / Invoicing	M	I		I	I			M
	Boat transfers and Master registration	M				I			M
	Management of the Public Register	M				I			M
Communication	With commercial licence holders	M	M		M	I			M
	To the public	M	M			I			M
	With other government departments	M	M	M	M	M			M
	With the media	M	M	M	M				M
Enforcement	Prosecutions	M				M			
	Prior reporting (notifying of departure and return, including changes)	M				I			M
	Vessel and equipment inspections	M				M			M
	Audit of exemptions and prior reporting to data collection	M				M			M
	Audit of fishing reports	M				M			M
	Development and implementation of compliance strategy	M			I	M			I
	Review of risk assessment	M	I		I	M			I
	Promoting compliance within SGPF (code of conduct)				M	I			M
Industry Development	Market research	I			M	I	I	I	M
Human Capital Development	Capacity building	M			M	I	I	I	M

*M = Managing authority; D = Delegated authority; I = Input (contributions made)
TEPS = Threatened, Endangered and Protected Species

Resource rents and cost recovery: the New Zealand experience

The New Zealand government has replaced resource rents with cost recovery in their commercial fisheries (co-incident with the establishment of a quota management system based on individual transferable entitlements). An aim was to encourage greater industry responsibility for sustainable fisheries management because of incentives to reduce costs of enforcement and management (Harte 2007). Typically, where there is uncertainty in relation to sustainability of the resource (particularly if over fishing is perceived to have occurred), research costs increase. In New Zealand, the commercial fishing sector supported cost recovery because they anticipated a greater say in the specification and efficient delivery of fisheries management services under cost recovery.

Some sectors were critical of the abolition of resource rents because the common property nature of the fisheries resource justified a return to the community over and

above the costs of managing the fishery. This is despite the fact that cost recovery usually delivers a greater return to the government than more traditional resource rents (Harte 2007). Further, some stakeholders perceived that cost recovery would give the commercial sector undue influence on the quality and quantity of fisheries services particularly research. Even so, the New Zealand government proceeded with full cost recovery of services under avoidable cost criteria i.e. all expenditure that arise purely as a consequence of the existence of commercial fishing should be recovered from Industry.

The cost recovery system encountered problems including a perceived failure to deliver benefits in efficiency, accountability and transparency. Furthermore, the management or monitoring of services was perceived to be poor (Harte 2007). This prompted changes in management and delivery of the cost recovery regime in New Zealand; in particular providing a clear legislative base to recover legitimate costs. Based on this, Harte (2007) suggested the following pre-requisites for a delegated cost recovery system:

- a general public sector ethos of transparency, efficiency, and accountability;
- a clearly identifiable commercial fishing sector;
- a system of fishing rights that have a high degree of durability and hence form the basis for attributing costs and collecting levies;
- effective stakeholder organizations that represent the Industry and can engage government agencies in constructive dialogue and negotiation over cost recovery;
- government agencies that have strong policy and administrative capabilities.

South Australia meets these pre-requisites for the Spencer Gulf prawn fishery.

Research services

New Zealand introduced contestable research services in 1997 co-incident with devolution of responsibility for fisheries management from Government control (Harte 2001). Directly purchased research was expected to increase economic efficiency due to the lower transaction costs for stakeholder organisation to manage and to fund research (Harte 2001). Development of an Industry stewardship ethic was seen as another benefit, since commercial fishing organisations would be directly involved in the purchase and execution of sustainability research rather than indirectly involved through centralized consultative processes. These benefits have been demonstrated in the case of at least two commercial fisheries: New Zealand Rock Lobster and Challenger Scallops (as discussed below).

With effective monopoly service provision in research, it is difficult to ascertain cost effectiveness. This can lead to conflict between the service provider and stakeholders particularly the commercial fishing sector (as seen in South Australia). An open tender process for research services introduces contestability and is more likely to lead to cost effective service delivery given the need for reliable information to develop ecological sustainable fisheries (Harte 2001). However, a tender process introduces additional transaction costs including those of an assessment process. An alternative is that research is commissioned e.g. the fishing sector employs a stock assessment scientist. Concerns over Industry dominance of the process can be addressed by including an independent peer review process to ensure rigour and quality of research outputs. In New Zealand, the government commissions research services to provide information with which to manage its commercial fisheries.

In 1997 the Rock Lobster Industry Council (RLIC) became an accredited research provider to the Minister of Fisheries, and since then has successfully tendered for, and executed, rock lobster stock assessment contracts. Research contracts are undertaken in collaboration with national science providers (NIWA) and internationally recognized stock assessment consultants contracted to RLIC. RLIC also uses accredited technicians employed by NIWA and by CRAMACs to undertake an extensive stock-monitoring program. This exemplifies a collaborative, robust, and cost-effective approach to research driven by commercial stakeholders. It also parallels the existing situation in

Spencer Gulf in which industry vessels and personnel largely collect the information used to assess the status of stocks (by conducting surveys with Industry vessels).

Typically, research services have concentrated on stock assessment, particularly in measuring stock metrics applicable to prescribed performance indicators (e.g. catch rates, egg production). In the context of ecologically sustainable development (ESD), research could also be commissioned to evaluate economic performance, social impact assessment, and environmental impacts. This is particularly important in an Australian context as the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) requires fisheries to demonstrate benign impacts on by-catch species, threatened and protected species, and the environment more generally. Moreover, under co-management, economic performance and the social consequences of alternative management arrangements should be regularly evaluated. These research tasks could be commissioned similar to proposed arrangements for stock assessment research.

Neville (2008) identifies research and development tasks that could be managed under a delegated co-management model. The establishment of ecosystem benchmarks is suggested by Neville (2008) to be retained by government under co-management. Although not defined as benchmarks, the EPBC Act specifies performance requirements for by-catch, threatened and endangered species (including listed species such as seals, whales, and dolphins), and the environment more generally. Table 2 indicates that performance benchmarks addressing ecosystem impacts could be managed by Industry under a fully delegated co-management model. This is consistent with more efficient delivery of research services in which Industry vessels are used to collect appropriate environmental information (this is already done for SARDI research on by-catch and related environmental research). Industry members have detailed knowledge of the environment of Spencer Gulf (e.g. areas vulnerable to trawling including sea-grass habitats, and hard coral communities). This knowledge and experience could be combined with input from the Conservation sector (e.g. via research subcommittee participation) to coordinate research and develop practical, cost-effective, and robust ecosystem performance benchmarks.

An incentive-based approach to utilising Industry vessels to collect information addressing ecological impacts should encourage compliance to desired standards of data integrity. Thus, the frequency (and therefore cost) of independent observer participation (in Industry surveys) would reflect the quality of data collected by Industry vessels. Where there is a significant difference between data collected by Industry and by independent observers, the frequency of independent observer coverage would increase. Similarly, where data quality is comparable independent participation would decrease. Furthermore, provision for independent review facilitated by PIRSA (as for stock assessment research), could ensure accountability and rigour in assessing fishing impacts on the Spencer Gulf ecosystem. This is an important part of the co-management process as detailed below.

Alternative models

Under the objectives of the Spencer Gulf prawn fishery management plan and consistent with the objectives of the *Fisheries Management Act* (2007), the commercial fishing sector (Industry) can be delegated greater responsibility for management such that Industry:

- manage the resource assessment process and develop harvest strategies;
- manage all at-sea operations of the fleet;
- develop explicit allocation of prawn resources between sectors.

In promoting stakeholder input to the management of the fishery, social and cultural issues are to be considered when management strategies are being developed. Resource allocation issues are tractable because by far the largest user is the commercial fishing sector. Recreational and indigenous use of the Spencer Gulf prawn resource is negligible. Even so, the activities of the Spencer Gulf prawn fleet encroach on resources of interest

to these stakeholder groups and of other stakeholders such as the Conservation sector. Furthermore, in conducting fishing in Spencer Gulf, interaction with other commercial sectors including other commercial fisheries (particularly marine scale and blue crab) and aquaculture operations will occur from time to time. Resolution of potential or actual conflict among users is an important task in co-management. Evaluation of alternative models for co-management of the fishery (below) includes a comparison with other delegated models particularly the Challenger Scallop and Rock Lobster fishery in New Zealand.

Challenger Scallops

The Challenger Scallop fishery harvests scallops in two large embayments on the north of the South Island of New Zealand. The fishery flourished in the 1990s accompanying an enhancement program which involved collection and redistribution of spat (juvenile scallops) on grounds which were then harvested under a rotational spatial management system (Mincher 2008). Like prawns, scallops are relatively short-lived species and the annual yields are heavily influenced by year to year variation in recruitment.

Delegation of functions in fisheries management requires a binding legal instrument so that performance is measurable and auditable. A limited liability public company was formed to co-manage the Challenger Scallop fishery. It has the following elements which are compared with existing arrangements in the Spencer Gulf prawn fishery:

- Shares in the company reflect amount of quota in the fishery and ownership of shares limited to licence holders. For Spencer Gulf, shares would reflect equal holdings among the 39 licensed operators as already exist in the Spencer Gulf and West Coast Prawn Fishermen's Association (the Association).
- Civil contracts are established between the Challenger Scallop company and quota holders to enforce an agreed harvest strategy. Similarly, contractual arrangements apply in Spencer Gulf with agreed spatial and temporal limits to fishing. Each year, the Government issues an authority for the Association to conduct surveys when necessary. Within this authority, the Association must inform the Fisheries Agency of the details of the survey, including details of participating vessels and survey locations. The Association has contractual arrangements with licensed vessels, such that the licensed vessel can conduct surveys on their behalf. Vessels are paid a fixed amount for their services. Survey vessels must process the catch in the manner specified by the Association and all the catch proceeds are administered by the Association.
- For Challenger scallops, development of harvest strategies follows annual surveys. For Spencer Gulf prawns, development of harvest strategies occurs before each fishing trip based on three stock assessment surveys, spot surveys and commercial catch information. A November survey compares the biomass of prawns with previous years. This is useful in forecasting yields to the fishery for the coming year. A February survey provides information on relative recruitment. This is useful for evaluating future trends in the fishery. An April survey provides information on the effects of the previous season's fishing. Spot surveys and commercial catch information provide for real time adjustments to management of the fishery through a committee at sea process.
- The Challenger Scallop fishery gets approval for annual rules at an annual general meeting. In Spencer Gulf, decision rules prescribed in the management plan influence management decisions (primarily spatial and temporal closures). Additional decision rules can be developed for by-catch and other environmental issues (e.g. ecosystem benchmarks).
- For Challenger Scallops, an MOU exists between company and government to establish performance measures for research and the quality of information regulating management, including an audit process. For Spencer Gulf, similar arrangements would apply in outsourcing research services.
- For Challenger Scallops, levies are established as enforceable debts (based pro-rata on production). For the Spencer Gulf fishery, levies are attracted through licence fees reflecting the cost of management services. Under a delegated co-

management model, this could be extended, as is the case for Challenger Scallops, to include costs of marketing or other services required to improve the profitability of the Spencer Gulf prawn fishery. Under the *Primary Industry Funding Schemes Act 1998* an Industry fund can be established for costs applicable to the Spencer Gulf prawn fishery (e.g. marketing and promotion among other tasks associated with researching and managing the fishery). Under this Act all licence holders must pay the fee as prescribed under the Primary Industry fund. However, should individuals choose to do so, individual contributions can be recovered, with interest, (except for a service fee to administer the fund). This provision means that commitments from the Primary Industry fund are not secure and an alternative levy mechanism is required to support a fully delegated co-management model.

- For Challenger Scallops, the New Zealand government confirms that annual research undertaken by contractors is sufficient to inform decision making in the fishery. This is an important quality control and a similar undertaking with the South Australian government would need to apply for any out-sourced research services.
- For Challenger Scallops, harvest strategies are presented for consideration and comment to stakeholders. Consultation informs the final strategy. This is similar to existing arrangements applicable to the Spencer Gulf prawn fishery through consultation of harvest strategy decision rules in the management plan. Consultation on harvest strategy development occurs mainly between the commercial fishing sector (the Association) and the government (PIRSA). The commercial fishing sector and the government must develop a harvest strategy based around the harvest strategy decision rules specified in the management plan.

New Zealand rock lobster

Among the most successful of co-managed fisheries is New Zealand's rock lobster fishery (Harte 2001). The fishery is managed through the multi-stakeholder National Rock Lobster Management Group (NRLMG). Membership of the NRLMG comprises government agencies, commercial, recreational and indigenous fisher representatives, environmental non-governmental representatives and science advisers. A comparable group in South Australia is the Fisheries Council of SA. Recognized as a primary source of advice to Ministers on all matters pertaining to rock lobster fisheries, the NRLMG is resourced by industry by way of provision of an independent chairman, meeting venues, catering, and an administrative support role shared with the Ministry of Fisheries. The marriage of the practical working knowledge of rock lobster fishers, the research and management experience of government agencies, and expectations of other sector groups has been a successful and productive one.

Key to the success of the NRLMG has been a commercial sector committed to the sustainable and inclusive management of the rock lobster resource. The New Zealand Rock Lobster Industry Council (RLIC) is a successful example of the potential that commercial stakeholder organisations have to succeed in a number of fields of fisheries management including research (as described above).

RLIC is an umbrella organization for nine commercial stakeholder organisations operating in each of the rock lobster management areas of New Zealand (Sykes 2000). These organisations have been established as incorporated societies or limited liability companies and are known as CRAMACs. The Spencer Gulf and West Coast Prawn Fishermen's Association is comparable to a CRAMAC and similar co-management arrangements for the New Zealand rock lobster industry could apply in South Australia.

Membership of CRAMACs comprises quota owners, processors, exporters, and fishermen (owner-operators and lease holders) in each region. Governance is based on a two-tiered voting procedure that gives priority to quota ownership on issues affecting total allowable commercial catch decisions, levy setting, and certain government consultation processes. All nine CRAMACs hold a majority mandate of crayfish quota holders in the regions.

CRAMACs are shareholders in RLIC and appoint the nine person board of directors, one from each CRAMAC.

A co-management model for Spencer Gulf

Under a fully delegated co-management model decisions relating to management of the Spencer Gulf fishery will be made by the body representing the stakeholders. This body could be the Association or it could be a stakeholder representative body similar to the NRLMG (as described above). A stakeholder representative body reflects the aspirations of co-management better than a purely commercial fishery representative body. Three models are evaluated below.

Model 1: Status Quo

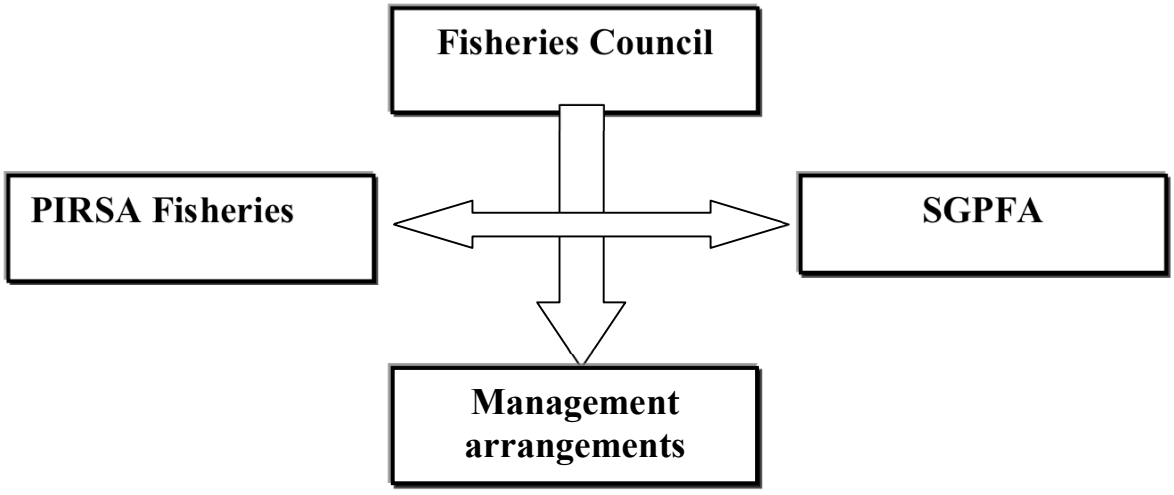
The status quo is a collaborative model in which management arrangements are negotiated between the Spencer Gulf and West Coast Prawn Fishermen's Association and PIRSA Fisheries under oversight of the Fisheries Council. Disputes over cost recovery (and other management arrangements) previously addressed by the FMC are now to be addressed by the Fisheries Council although service delivery is also negotiated between PIRSA, SARDI and the Association (through its cost recovery subcommittee). Some stakeholder input is provided by the Fisheries Council, particularly in the development of management plans and in advising on resource allocation between user groups. Management arrangements, including research services, are provided or administered by the Government (PIRSA).

Current co-management arrangements are identified in Table 2 under the 'Current Stakeholders' column. The responsibilities of the different stakeholders are defined as Managing Authority (M) Delegated authority (D), and Input (I). It is important to note is that some functions are the responsibility of all stakeholder groups and some that occur in any case, e.g. 'Communication'.

Areas of co-management that the Association has specifically taken on include (per Process listed in Table 2):

- Many tasks under 'Harvest Strategy'
- Many tasks under 'Spot Survey'
- A few tasks under 'Research'
- Most tasks under 'Observer Program'

Under existing arrangements, a Management Committee comprising, an independent Chair, seven licence holders and a skipper representative administers management issues on behalf of the Association. Such issues are addressed by sub-committees responsible for cost-recovery, research, and advising on spatial closures (committee at sea). Costs of administration of the Management Committee (e.g. employment of the Independent Chair) and its subcommittees are borne by the Association through member levies. It is important to note, however, that not all licence holders are members of the Association and therefore do not contribute levies.



Pros

- the commercial fishery has a high degree of control over management arrangements including a Committee at Sea which recommends fine scale spatial management and closures under authority of PIRSA Fisheries,
- research input using commercial vessels has a high degree of credibility by Industry.

Cons

- Single service provider as defined by PIRSA Fisheries for research (SARDI for stock assessments and by-catch; EconSearch for economic reports) with relatively high costs of research services imposed on Industry or lack of clear benefits of work,
- No direct representation of stakeholder representatives (including conservation sector),
- Free riders in non-Association members capturing the benefits paid for by the Association (e.g. Committee administration costs).

Model 2. Delegated model SGPFA

A delegated model provides for principal control of fisheries management arrangements including the management of the Spencer Gulf prawn fishery (harvest strategy development) and conduct and reporting of research by the Association. The Association would be responsible for management of research services through employment of an appropriately qualified scientist. Independent audit of research services would be facilitated by PIRSA. In this model, the Association's management activities are increased although PIRSA still provides an advisory role particularly with legislative advice, policy making, setting of regulations applicable to the fishery, and audit of research services managed by Industry. Equitable recovery of costs from all licence holders for services required to manage the fishery (including the cost of all outsourced services such as research and of administrative costs for the Management Committee and its subcommittees) will be the responsibility of PIRSA. A key difference between this model and Model 1 is that the Association assumes responsibility for management of the fishery on behalf of all licence holders. Thus, free riders are removed by ensuring that costs are attributed and paid equitably.

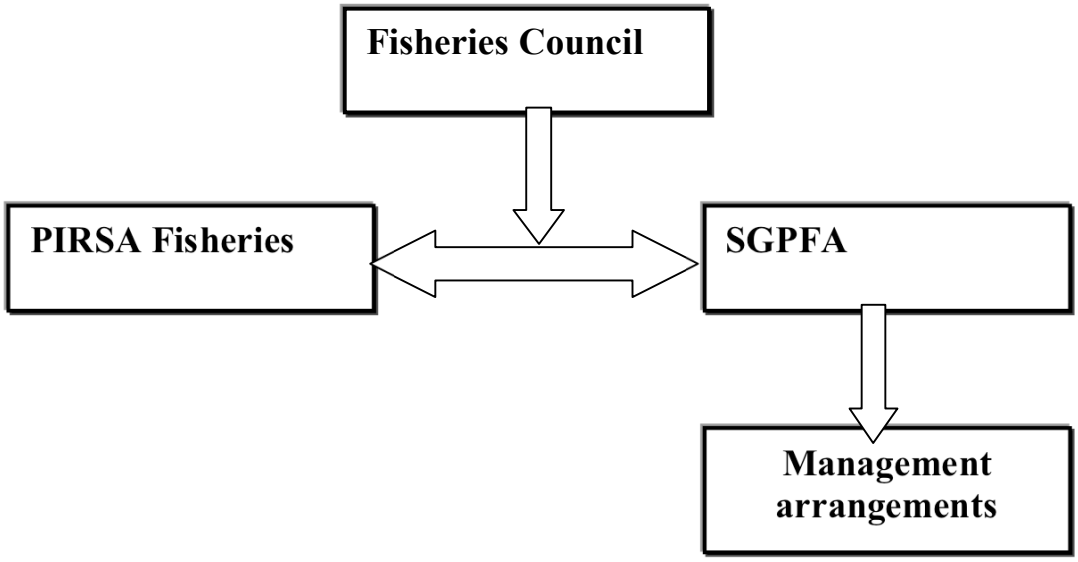
To gain greater stakeholder input and partnership, it is anticipated that the Association's management arrangements will include increased participation by key stakeholders in appropriate forums. The Association's constitution provides for stakeholder involvement in research and management of the Spencer Gulf prawn fishery. For example, positions can be made available on the Association's sub-committees to assist in research and management of the fishery. This is important in providing transparency and shared responsibility for management decisions particularly in relation to ecosystem

impacts of fishing. In any case, the Association would be responsive to independent audit of services managed by Industry e.g. peer review of research services.

Under this model, responsibilities that the Industry would adopt as part of co-management arrangements include (per Process listed in Table 2):

- All tasks under 'Harvest Strategy', 'Spot Survey', 'Research', 'Observer Program' and 'Other Research'

These tasks would be overseen by the Association's Management Committee with input from its subcommittees. Importantly, under this model, annual costs of delegated tasks would be struck by the Association and passed onto all licence holders. For example, costs of employment of a scientist, operating costs associated with research tasks addressing stock assessment, ecosystem performance, and economic performance would be managed by Industry but collected, on behalf of Industry, by PIRSA. PIRSA would continue to collect licence fees (including recovery of costs associated with delegated and non-delegated tasks). For delegated tasks such as research services, there would be costs applied to independently audit performance. These costs, as for those incurred in the provision of other services, would be reflected in licence fees.



Pros

- greater control by Industry of the nature and costs of service delivery,
- greater stakeholder involvement (including the conservation sector),
- minimal change in existing management arrangements for industry and PIRSA,
- provides a step between existing arrangements and a fully delegated model,
- government management of cost recovery/ legislative / policy / auditing processes,
- removal of free rider issue with non Association members avoiding management costs.

Cons

- stakeholder conflict including perceptions of poor quality control of research services,
- inability to securely collect levies to fund Industry development programs (e.g. marketing).

Model 3. Fully delegated model: stakeholder governance

The principal difference between this model and model 2 above is that management arrangements for the Spencer Gulf prawn fishery are managed by the Association under an augmented governing board (the Board) including stakeholder representatives. Furthermore, the Board would be responsible for strategic management and for the collection of annual levies/fees. Responsive to the Board, the Association would retain day to day operational management responsibilities including the spatial management of the fishery. Thus, under this fully delegated co-management model, formal management arrangements overseen by the Fisheries Council are delegated by the Minister (under provision of the *Fisheries* Act) from PIRSA Fisheries to the Board.

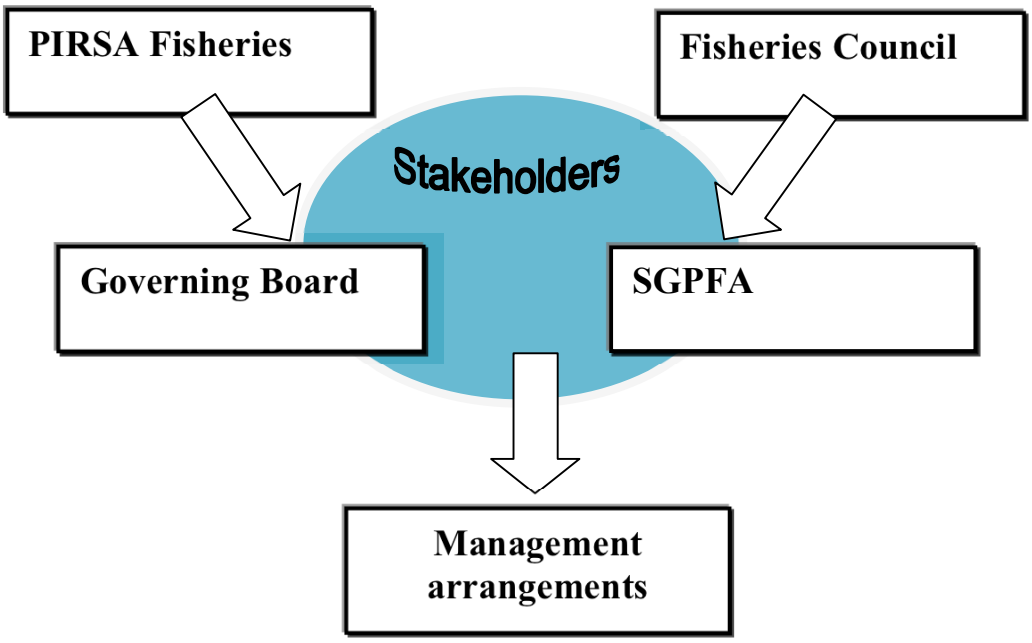
The Board will be responsible for all governance arrangements including establishment of appropriate sub-committees to conduct specific functions (sub-committees would have operational responsibilities), legislative advice, policy making, the conduct of research activities (including facilitation of contestable services), and annual reporting to stakeholders (including government). The Government through PIRSA would retain responsibility for enforcement and for auditing management services.

The Board would utilise the current governance arrangements for the Association, under its current Constitution, including an independent chair but would add stakeholder representatives through a transparent and consistent process, including one each from:

- Government;
- Recreational fishery;
- Commercial fishery;
- Conservation;
- Indigenous;
- Aquaculture.

The Industry considers that the fully delegated model is visionary for the Association, possibly to be achieved over a longer time frame than that for Model 2. Industry responsibilities that could be considered as part of co-management arrangements include (per Process listed in Table 2):

- Some tasks under 'Legislation / Policy'
- Most tasks under 'Licensing'
- Tasks under 'Communication'
- Many tasks under 'Compliance'



Pros

- stakeholder representation reflecting true co-management;
- outsourced delivery of management services (including research) to improve cost effectiveness and transparency of service delivery;
- ability to collect levies from all licence holders for additional services (e.g. marketing).

Cons

- additional Association resources required for management;
- re-development of the Fisheries Management Committee (FMC) model;
- reliance on voluntary stakeholder participation in management;
- additional management layer to govern the fishery.

References

Dixon, C. and Sloan, S. (2007). Management plan for the South Australian Spencer Gulf prawn fishery. South Australian Fisheries Management Series. Paper No. 54

Harte, M. (2001). Opportunities and barriers for Industry-led research. *Marine Policy* **25**, 159–167.

Harte, M. (2007). Funding commercial fisheries management: lessons from New Zealand. *Marine Policy* **31**, 379–389.

Mincher, R. (2008). New Zealand's Challenger Scallop enhancement company: from reseeding to self-governance. 307–322. In Townsend, R.; Shotton, R.; Uchida, H. (eds). *Case studies in fisheries self-governance*. 1–21. FAO Fisheries Technical Paper. No. 504. Rome, FAO, 2008. 451 pp.

Neville, P. (2008). A framework for fisheries co-management in Australia. Report from the National working group on fisheries co-management initiative. FRDC.

Sykes, D. (2000). Are you ready for this? *Seafood New Zealand* **8** (2), 12–17.

Townsend, R. and R. Shotton (2008). Fisheries self-governance: new directions in fisheries management. In Townsend, R.; Shotton, R.; Uchida, H. (eds). *Case studies in fisheries self-governance*. 1–21. FAO Fisheries Technical Paper. No. 504. Rome, FAO, 2008. 451 pp.

Zacharin, W., C. Dixon, and M. Smallridge (2008). Towards self-management for the Western King prawn fishery in Spencer Gulf, South Australia. 245–258. In Townsend, R.; Shotton, R.; Uchida, H. (eds). *Case studies in fisheries self-governance*. 1–21. FAO Fisheries Technical Paper. No. 504. Rome, FAO, 2008. 451 pp.

Appendix 4 – Paper on the preferred co-management model for the Spencer Gulf Prawn Fishery

A preferred co-management model for the Spencer Gulf prawn fishery

Paul McShane[1], Karen Hollamby[2], Sean Sloan[3] and James Brook[4]

1. Global Marine Resource Management Pty Ltd
2. Spencer Gulf and West Coast Prawn Fishermen's Association Inc
3. PIRSA Fisheries, South Australia
4. On behalf of the Conservation Council of SA

December 2009

Executive Summary

This paper has been produced as a result of the FRDC project 2007/025 *Competition to Collaboration: exploring co-management models for the Spencer Gulf Prawn Fishery*. The objectives of the project were to: (i) build working relationships between stakeholders; (ii) explore and evaluate different co-management models; and (iii) develop a preferred management model for the Spencer Gulf Prawn Fishery. This paper delivers the project outcomes required under objective 3.

Three co-management models were evaluated by Spencer Gulf Prawn Fishery stakeholders: status quo, a partially delegated model, and a fully delegated model. Stakeholders were: industry (represented by the Spencer Gulf and West Coast Prawn Fisherman's Association Inc (the Association)), government (represented by the Department of Primary Industries and Resources South Australia (PIRSA)) and the conservation sector (represented by Conservation Council of SA (CCSA)).

There were a number of drivers and incentives identified by stakeholders for progressing towards greater co-management, including:

- Greater industry stewardship of the resource;
- Improved environmental performance (habitat protection and reduced impact on threatened, endangered and protected species);
- Depoliticising fisheries management;
- Reducing unnecessary administration ('red tape') and improving management flexibility;
- Sharing responsibility among stakeholders for management of the resource;
- Improved communication among stakeholders;
- Improved efficiency and reduced costs;
- Increased transparency of fishery operations and fisheries management processes.

The partially delegated model was assessed as best suiting the needs of stakeholders given the potential administrative complexities of a fully delegated model.

The status quo, which already involves a high level of collaboration (between industry and the government), was considered to be inefficient given that there was significant involvement of industry stakeholders in stock assessment surveys, and in development and application of harvest strategies. Replication of these functions by government was considered to be inefficient. It was recognised that efficiencies and cost savings could be gained by formally delegating these functions to industry under a partially delegated model.

The fully delegated model was considered to be too risky (legally and financially) for all stakeholders given that many core processes of management and administration of the

fishery, particularly cost recovery, were not well suited to industry given its present capacity. Stakeholders considered that, pending audit performance and evaluation of the preferred model implemented over a phased period, further delegation may be undertaken.

Under the preferred co-management model, the following responsibilities would be formally delegated to industry:

- developing, implementing and managing harvest strategies;
- contracting research and stock assessment services, including stock assessment surveys, subject to audit/oversight of research performance by a research sub-committee (including stakeholders) and the government (PIRSA);
- further delegation of management/administration services may be considered based on performance audit and assessment and willingness by Government, industry and other stakeholders.

Under the preferred co-management model, the following responsibilities would be retained by PIRSA Fisheries:

- full independent audit process of all delegated functions;
- enforcement and compliance functions;
- conducting ecological risk assessment;
- leading development of the next management plan in consultation with the Fisheries Council, the Association, its research sub-committee and other stakeholders;
- establishing ecosystem benchmarks in consultation with the Association and with the conservation sector;
- collating logbook data and providing this to the research provider under confidentiality agreements;
- cost recovery of core management processes delegated to the Association.

The preferred co-management model would involve the following roles and responsibilities for the conservation sector:

- the conservation sector to be formally involved in co-management through active participation with the Association and with the government, but also more generally in the consideration of future management initiatives among stakeholders;
- active participation on any relevant Association sub-committees (involving stakeholder representatives);
- greater involvement in management planning;
- proactive input into environmental management issues including:
    - participation in the ecological risk assessment process;
    - evaluation of ecosystem benchmarks;
    - development of strategies to manage impacts on threatened, endangered, and protected species (TEPS);
    - assisting in a shared approach to habitat protection (e.g. threats to the Spencer Gulf ecosystem more generally);
- participation in conflict resolution (formally through the Fisheries Council of South Australia, and informally through improved communication among stakeholders).

Other key features of the preferred co-management model include:

- A phased approach to delivery of the preferred model is considered necessary to facilitate a smooth transition to greater co-management of the fishery, to provide additional security to all stakeholders, to ensure audit requirements are being met and to allow for industry capacity building;
- a formal conflict resolution process will involve the Fisheries Council of South Australia (empowered under the Act to advise the responsible Minister) in the event that conflict cannot be resolved through informal processes.

Introduction

The South Australian government through the Fisheries Division of Primary Industries and Resources, South Australia (PIRSA) encourages co-management of fisheries as a policy tool to improve management outcomes, through greater stakeholder stewardship and responsibility. The *Fisheries Management Act 2007* (the Act) establishes the Fisheries Council of South Australia (FCSA) as the independent peak advisory body for the Minister on fisheries management issues. The FCSA is expertise based, incorporating expertise in fisheries management, commercial, recreational and traditional fishing, fish processing, conservation, research, business, law and economics.

PIRSA Fisheries has well established consultative co-management arrangements in place with all major fisheries, through partnership arrangements with industry associations, and has collaborative arrangements established with some fisheries, including the Spencer Gulf Prawn Fishery. Both PIRSA Fisheries and the Spencer Gulf Prawn Fishing industry have recognised the importance of broader stakeholder involvement, including the conservation sector, in future co-management arrangements. PIRSA Fisheries is developing an over-arching co-management policy to apply across all South Australian fisheries. The learning outcomes emerging from the evaluation of co-management options for the Spencer Gulf Prawn Fishery will form the basis of the broader South Australian co-management policy and more generally to evaluation of opportunities for co-management of other Australian fisheries.

In a recent Australian review, Neville (2008) defined co-management as "*an arrangement where responsibilities and obligations for sustainable fisheries management are negotiated, shared, and delegated between Government, fishers, other interest groups and stakeholders".* He outlined some essential pre-conditions deemed necessary to progress a co-management model for a fishery. These pre-conditions are presented in the context of progressing co-management arrangements for the Spencer Gulf Prawn Fishery.

- *a willingness by governments to consider alternative management models involving greater shared responsibility*. South Australia is committed to progressing co-management opportunities in managing commercial fisheries, consistent with principles of ecologically sustainable development (ESD) as required by the Act. The Act permits the Minister to delegate functions prescribed under the Act, allowing the sharing of responsibilities among stakeholder groups. Industry already has shared responsibilities with the government for some aspects of the management of the fishery.
- *Fishers groups with a significant proportion of members wanting to move to co-management.* The body representing industry, the Spencer Gulf and West Coast Prawn Fishermen's Association Inc (the Association) is committed to take on greater shared responsibility for management of the fishery.
- *Identified "champion/s" who can negotiate effectively with governments and build organisational ownership.* For some time the Spencer Gulf Prawn Fishery, through the Association, has had a close working relationship with the government. The Association employs a full time Executive Officer and has a governing Management Committee, which is leading the industry's involvement in co-management. The Management Committee also has responsibility for developing harvest strategies for the fishery. The Association has contractual arrangements with the government for a Coordinator At Sea to provide a link from industry through to government and its fishery managers. Further to this, the Association's Committee At Sea works to implement and manage harvest strategies in close consultation with the government. More recently, the Association has been working closely with Conservation Council of SA (CCSA). CCSA has a nominated representative who is working closely with the Association and with PIRSA Fisheries to evaluate co-management options for the fishery. This multi-lateral relationship has improved communication and understanding of the needs of major stakeholders in the fishery (including the conservation sector).

- *An effective fisher organisation structure with good governance and an ability to communicate with all fishers and other stakeholders.* The Association is an incorporated body with membership comprising most of the licence holders. It has a management committee with an independent chair and a number of sub-committees (including a committee at sea responsible for making daily spatial management decisions, and a research sub-committee for advising on research matters).
- *A fisher organisation with sufficient resources and skills to implement and deliver services, or an ability to negotiate and attract such resources.* The Association collects fees from its members for day to day operation on behalf of its members. Under the preferred model the Association will take a greater role in managing the fishery. This will require a capacity building strategy and additional resources including support for the Executive Officer and the Coordinator At Sea to undertake the formal liaison with government given the functions delegated. PIRSA Fisheries has confirmed that the government cost recovery process, used to set annual licence fees to fund management services, will be utilised to ensure that any 'core' management processes are securely funded before any functions being formally delegated from government to industry. Core management processes are those processes that are integral to fishery management involving all licence holders, and which would be delegated to the Association, e.g. scientific surveys, stock assessment and research, Coordinator At Sea services, harvest strategy development/application, and real time spatial management. The core management processes do not include other administration functions or other initiatives such as marketing, promotions, or provision of an Executive Officer) of the Association.
- *Existence of a legislative basis to delegate powers.* The Minister can delegate powers under the *Fisheries Management Act (SA)* 2007 (the Act) to other bodies. Section 10 (1) states: *The Minister may delegate a function or power of the Minister under this Act ... to ...any other person or body*.
- *Ability to generate, and commit to, legally binding undertakings through an MOU, contract or other form of agreement between the parties.* The Act provides for such legally binding undertakings consistent with the SA government's policy of encouraging co-management of fisheries. It is envisaged that the delegation of management responsibilities under section 10 of the *Fisheries Management Act 2007* would require the development of a Memorandum of Understanding (MOU) between the Minister and the Association.
- *Ability for the fisher's organisation to legally enforce agreements through civil, contractual or company law.* The Association currently has contracts with survey vessels and operates under a constitution, management committee code of conduct and Committee at Sea charter. Further agreements and contracts could be developed as necessary.
- *Existence of conflict resolution mechanisms.* Conflict resolution is an essential pre-requisite to co-management. In the first instance, the aim is to resolve conflict through open and constructive communication among stakeholders. Participation by stakeholders on the relevant Association sub-committees will play an important role for communication and discussion of shared interests in the Spencer Gulf Prawn Fishery. In the event that conflict is unable to be resolved informally or through a process determined by stakeholders, the conflict would be escalated to a formal process. This process would include the FCSA, which has a formal channel for advising the responsible minister if the conflict cannot be resolved through other mechanisms.

Neville (2008) described co-management as an evolving process where management arrangements vary from a centralised model to a delegated model (Figure 1). A centralised model is one where Government makes the decisions with little or no consultation with

other stakeholders, while a delegated model is where agreed and negotiated management decisions are made by stakeholders (including Government) within a broad framework and agreed functions are undertaken, or services delivered, by fisher groups under a formal agreement.

The Spencer Gulf Prawn Fishery has evolved from a centralised (government controlled) management regime to collaborative management (between industry and government). Other stakeholders, including the conservation sector, do not have any involvement in such collaborative management processes, due to a number of factors including the design of the co-management arrangements, funding availability, competing priorities and expertise. These issues have been recognised as shortcomings and are being addressed in the proposed co-management model and through existing management arrangements. Progress in co-management, under the current Fisheries policy, would involve further delegation of government responsibility to industry through the Association. Other stakeholder organisations, including the conservation sector, will not necessarily have any formal delegated functions within this proposed model. However, greater stakeholder input (including from the conservation sector) in fisheries management processes has been identified as being important to achieve effective delegated co-management regimes. This applies not only to involvement in some delegated industry functions but also those functions remaining with government.

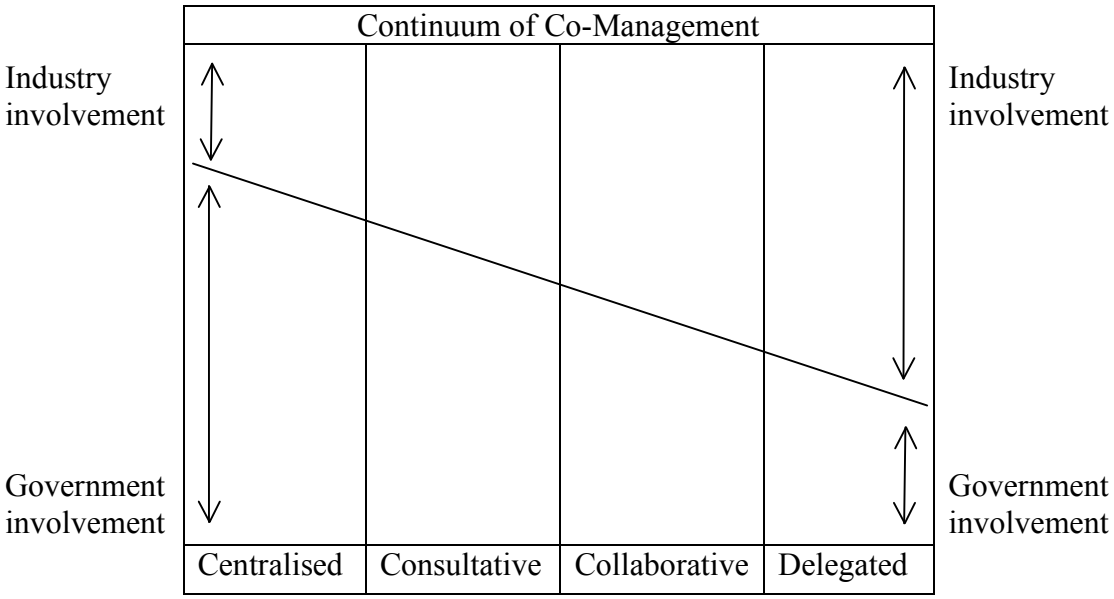


Figure 1. The four broad fisheries management models and the level of Government involvement in decision making at each level (Neville 2008).

In considering any further delegation of responsibilities to stakeholders, PIRSA Fisheries would take the following steps, in consultation with stakeholders:

1. *Establish Pre-conditions*: A set of broad government pre-conditions will be developed, using the national co-management framework as a guide. These pre-conditions clarify the government's policy position and the requirements that need to be met by stakeholder groups before delegation of fisheries management functions.
2. *Establish Operational Standards*: A set of operating standards will be developed to ensure each pre-condition is met. The operating standards provide details of the 'on the ground' activities necessary to meet the pre-conditions. For example, a set of operating standards were developed for the scientific survey and stock assessment processes in the Spencer Gulf Prawn Fishery, during workshop discussions.

3. Determine Resource Requirements: The resource levels required by each stakeholder group to implement the operating standards will be determined. This step will be further investigated during an evaluation of changed management arrangements planned for the 2009/10 fishing period.
4. *Establish Performance Audit Process*: Auditable performance measures will be developed for each delegated function.

Current Co-management of the Spencer Gulf Prawn Fishery

The co-management framework in South Australia has evolved over time. Consultative co-management was first promoted under the *Fisheries Act 1982* through the formation of Fisheries Management Committees (FMCs) for all South Australian fisheries. The *Fisheries (Management Committees) Regulations 1995* outlined a set of co-management principles that underpinned the formation of the Prawn FMC.

The *Fisheries Management Act 2007* (the Act) facilitates co-management in a number of ways, including through the formation of the FCSA and through providing scope for fishery associations to be delegated functions under the Act. Under the Fisheries policy, formal delegations are proposed to be made to a central body such as an industry Association. This approach will provide a forum for consultation and engagement particularly between government and industry. However, successful co-management will be dependent on how well the structure of fisheries management involves all stakeholders (including government, fishers and other interest groups) in a participatory regime (Neville 2008). Section 10 of the Act sets out provisions for the delegation of functions or powers of the Minister to a person or a body to facilitate shared responsibility in fisheries management, where this is considered appropriate. The Act recognises stakeholder importance by having expertise on the FCSA in a number of stakeholder sectors and having requirements for consultation on important planning processes.

Historically, the South Australian recreational sector has been directly involved in fisheries co-management through the Fisheries Management Committee (FMC) process. Other stakeholder groups have been engaged from time to time in more of an *ad hoc* fashion through workshops, public meetings and consultative processes, run by PIRSA Fisheries or by the Association. The conservation sector, however, has had limited involvement in fisheries management. This has been due to a combination of a lack of resources and a lack of fisheries management expertise within the sector, rather than a lack of interest or commitment. CCSA's activities are dependent on project funding (ie through Commonwealth and State Government natural resource management funding programs), which has traditionally precluded fishery management projects.

The engagement of the conservation sector in this instance represents a shift towards improved stakeholder engagement in the fisheries management process. It should be noted that this has only been possible as a result of the funding through FRDC to enable effective CCSA participation. The conservation sector will require ongoing access to resources to build its capacity to effectively engage with the fishery.

Using Figure 1 as a guide, the majority of South Australian fisheries have historically been, and currently are, managed using 'consultative' co-management arrangements, particularly between government and industry. In terms of industry involvement, the Spencer Gulf Prawn Fishery has moved further along the co-management continuum to a more collaborative and partially delegated co-management arrangement (referred to in this paper as the status quo) for the following reasons:

- High confidence in stock sustainability, demonstrated in the annual stock assessment process;
- Historically, industry has demonstrated a willingness to meaningfully engage with government;

- The industry association is representative, credible and financially secure;
- The industry association is well resourced, has an independent chairperson and an executive officer;
- The industry association has transparent reporting arrangements in place;
- There is a history of constructive working relationships and trust between government and industry;
- There is minimal stakeholder conflict associated with the fishery and the industry has a track record of working with stakeholders to address conflict issues;
- There is an effective management plan in place;
- Industry has had a clear desire and has built its capacity to take on more responsibility
- Industry is developing stronger links with other stakeholder groups such as the conservation sector;
- Government has a willingness to collaborate and share responsibility.

Responsibility for the management functions are delegated to industry under the current 'status quo' model, as follows:

- Coordinating and managing stock assessment and spot survey activities, including contracting vessels to conduct surveys, organising survey logistics and industry based observers. This activity is conducted under an exemption issued under Section 115 of the Act, which is provided to the Association annually;
- Development of harvest strategies following industry-coordinated spot surveys and stock assessment surveys. The harvest strategies developed under this arrangement require government approval and are implemented by government using Section 79 of the Act through published notices in the gazette;
- Management of harvest strategies during fishing through the Association's Committee-At-Sea, primarily by spatially managing harvests to avoid the capture of small prawns;
- Fleet management, including dissemination of fishing notices, area closures and other information.

Under the current 'status quo' model responsibility for the following management functions remain with PIRSA Fisheries:

- Government policy development;
- Legislative development and enactment;
- Licensing functions;
- Development of the management plan, including establishing sustainability benchmarks, in consultation with the Association and other stakeholders;
- Addressing fisheries access and allocation issues;
- Participating in development of harvest strategies;
- Formalising and implementing all harvest strategy decisions made by the Association's management committee;
- Conducting ecological risk assessment and establishing ecosystem benchmarks;
- The cost recovery process, including determining service levels required and licence fee setting;
- Compliance, enforcement, monitoring and prosecution; and
- Formal communication with licence holders.

Under the current 'status quo' model, responsibilities for the following management functions remain with government through its research body, South Australian Research and Development Institute (SARDI) Aquatic Sciences:

- Stock assessment, including analysis of survey data;
- Assistance with stock assessment surveys;
- Provision of fishery independent observers for stock assessment surveys;
- Provision of scientific advice for harvest strategy development;
- Auditing of harvest strategy development, through annual stock assessment;
- Collate and manage all commercial fishery logbook data collected by the fishery;
- Conduct most other biological research underpinning stock assessment in the fishery including non-target species research, assessment and monitoring;

- Communicating scientific information to licence holders.

In considering further delegation of responsibilities under the preferred co-management model, the following are evaluated:

1. management function (e.g. research);
2. operational details (e.g. stock assessment);
3. resources required (e.g. surveys, data analysis);
4. quality assurance and audit (e.g. peer review).

A meeting of stakeholders was held to evaluate proposed co-management arrangements under the broad headings above.

Evaluation of Different Co-management Models

McShane (2009) presented three co-management models: status quo, a partially delegated model and a fully delegated model. The status quo model (Model 1) reflects the current operation of the fishery and provides some management responsibilities for the industry. The current co-management arrangements in place for the Spencer Gulf Prawn Fishery already reflect a high degree of collaboration between PIRSA Fisheries and the Association. Shared responsibility under this model includes advice on spatial management of Spencer Gulf following industry coordinated surveys; subsequent management decisions are formalised via the government (PIRSA).

A partially delegated model (Model 2) provided greater responsibility for industry including the conduct of research necessary to evaluate the status of the fishery (stock assessment). This differs from Model 1 which engaged government, via its research agency SARDI, as the mandatory research provider. In Model 2, responsibility for stock assessment and spatial management of the fishery is formally delegated to industry by removing the requirement for PIRSA endorsement of harvest strategies and the mandatory engagement of SARDI as the research provider. Additional stakeholder input (including the conservation sector) is proposed through active participation in a sub-committee of the Association.

A fully delegated model (Model 3) transfers all major management responsibilities, except audit and compliance, to industry. It was recognised by project stakeholders that a fully delegated model would require some activities to remain with government. Under this model, responsibility for management and administration would be delegated to stakeholders with an augmented governing body (the Association's Management Committee incorporating broader stakeholder representatives).

The attributes of the three models were evaluated and discussed at a stakeholder workshop (government, industry, and the conservation sector) in April 2009. At the workshop, a number of incentives were identified by stakeholders for considering co-management. These include:

- greater industry stewardship of the resource;
- improved environmental performance (habitat protection and reduced impact on threatened, endangered and protected species);
- depoliticising fisheries management;
- reducing unnecessary administration ("red tape");
- improving management flexibility;
- a shared responsibility among stakeholders for management of the fishery;
- improved communication among stakeholders;
- improved efficiency and reduced costs;
- increased transparency of fishery operations and fisheries management processes.

The status quo (Model 1) was considered to be inefficient given that there was already a high degree of involvement of industry stakeholders in stock assessment surveys, and in development and application of harvest strategies. Replication of these management and

stock assessment functions by government was considered to be inefficient. Efficiencies and cost savings could be gained by formally delegating these functions to industry under a partially delegated model. The partially delegated model (Model 2) was the preferred model. The fully delegated model (Model 3) was considered to be too risky (legally and financially) given that many core functions of management and administration of the fishery were not well suited to industry given its present capacity. Stakeholders considered that, pending the outcomes of performance audit and evaluation of the preferred model, further delegation may be undertaken.

Stakeholder participation

Stakeholders met again in July 2009 to evaluate the preferred model (Model 2). A synopsis of the main issues for each stakeholder group is presented below.

Government

PIRSA Fisheries is supportive of the preferred co-management model, which involves partial delegation of management functions from government to industry, based on adoption of the following broad conditions and processes:

- **Phased Approach:** Implementation of the preferred model will be through a phased approach that allows industry to build its capacity over time and allows for a government audit process to measure performance and success;
- **Audit process:** Development of full independent audit processes for all delegated functions, to be managed by PIRSA Fisheries (funded by industry);
- **Management Plan:** Refinement of the existing management plan to improve audit capacity, including establishing sustainability criteria. PIRSA Fisheries to lead this process in association with the Fisheries Council of South Australia, the Association and other stakeholders;
- **Scientific Services:** Development of criteria and process for contracting scientific services;
- **Stock Assessment:** Development of criteria for stock assessment, including surveys, data analysis and reporting;
- **Data Collection:** Maintaining a mix of fishery dependent and independent data collection, including provisions for independent scientific observers during surveys;
- **Data Storage:** Development of criteria and process for quality assurance of data verification, storage and security;
- **Scientific Observers:** A strategy developed to build capacity for industry based scientific observers, including a training program. Fishery-independent scientific observers would be used during stock assessment surveys;
- **Industry Capacity:** Development of an Association capacity building strategy;
- **Monitoring:** Prior reporting by licence holders before catch is landed;
- **Stakeholder Involvement**: Appropriate levels of stakeholder input and engagement in the co-management process.
- **Conflict Resolution:** A conflict resolution process to be facilitated by the Fisheries Council of South Australia.

A change from the status quo model to the partially delegated model would involve PIRSA Fisheries retaining the following functions:

- Full independent audit;
- Management plan development;
- enforcement and compliance functions;
- conducting ecological risk assessment;
- establishing ecosystem benchmarks in association with industry and other key stakeholder groups;
- collating logbook data and providing this to the research provider under confidentiality agreements;

- cost recovery of core management processes that are to be delegated to industry.

The conditions outlined above provide a guide to the industry for implementation of the preferred co-management model. Details on delegated tasks will be outlined as follows:

- Management function: A description of the management or administration function delegated;
- Operation: The business practices and processes that will be required to implement the delegated arrangements (i.e., what practical activities will be required to implement the proposed co-management);
- Resources: The resources required to implement the preferred co-management model;
- Quality assurance and audit: The accountability mechanisms that will be used to assess overall performance of the preferred model after each phase of implementation.

Under the requirements of the Act, there is a requirement to undertake an ecological risk assessment accompanying a management plan for the fishery. The management plan and the associated ecological risk assessment are fundamental inputs to the co-management process because they will underpin the future independent Government audit process for the fishery (under co-management). The ecological risk assessment process involves stakeholder workshops to ensure transparency and accountability in the determination of risks and risk management for each fishery.

Conservation

The conservation sector is represented by Conservation Council of SA (CCSA), which is the peak body for non-government conservation groups in SA. With more than 50 member groups it represents over 60,000 South Australians. The conservation sector Steering Committee comprises CCSA staff and representatives from the following member groups: Wilderness Society (SA Branch); Marine Life Society of SA; Whale and Dolphin Conservation Society; and Fishers for Conservation.

Involvement of the conservation sector in fisheries management is seen as beneficial in facilitating greater communication and understanding of issues of mutual concern (e.g. habitat protection) among all sectors. Conservation sector involvement could also provide industry with additional expertise in conservation issues, including managing impacts on threatened, endangered and protected species and by-catch mitigation.

Support from the conservation sector for moving towards the preferred co-management model is dependent upon:

- Audit, compliance and ecosystem related responsibilities remaining with PIRSA Fisheries (as per Table 1); and
- Independent observer coverage being maintained at an effective level.

It is also based on the sector having:

- Active involvement in the implementation of the model;
- Membership on relevant Association sub-committees;
- Active involvement throughout the development of management plans;
- Active input into environmental management issues including :
    - participation in the ecological risk assessment process;
    - evaluation of ecosystem benchmarks;
    - development of strategies to manage impact on threatened, endangered, and protected species (TEPS);
    - assisting in a shared approach to habitat protection (e.g. threats to the Spencer Gulf ecosystem more generally);
- Involvement in the scientific observer program, including development and delivery of the training program, as appropriate.

All of the above are in turn dependent upon the sector being adequately resourced to do so.

Industry

Industry, represented by the Spencer Gulf and West Coast Prawn Fishermen's Association Inc (the Association) is reluctant to accept delegation of all functions of fisheries management currently undertaken by the government (Model 3). This reluctance reflects the diversity and complexity of current fisheries management and administration (McShane 2009).

A partially delegated model (Model 2) was seen as more consistent with industry's aspirations in the short term. Importantly, adoption of Model 2 in a phased approach provides an opportunity for evaluation of those functions which could be considered for future delegation before progressing to a fully delegated model (Model 3). Any further delegation to industry must yield improved efficiencies and reduced costs consistent with industry's desire for sustainable profitability. Thus, the active involvement of stakeholders under the preferred models must be consistent with industry's desire to improve efficiency of management, reduce costs (financial and time) and present a demonstrable improvement on the status quo. This is also important in presenting the benefits (and costs) of co-management to other participants (in other fisheries) examining the Spencer Gulf Prawn Fishery as an example.

A preferred co-management model

The Spencer Gulf Prawn Fishery has moved further along the co-management continuum to a more collaborative and partially delegated co-management arrangement (between industry and government), referred to in this paper as the status quo. The reasons for this are also recognised for the fishery to continue to move along the continuum to a more delegated co-management arrangement with government. Again, the reasons are as follows:

- High confidence in stock sustainability, demonstrated in the annual stock assessment process;
- Historically, industry has demonstrated a willingness to meaningfully engage with government;
- The industry association is representative, credible and financially secure;
- The industry association is well resourced, has an independent chairperson and an executive officer;
- The industry association has transparent reporting arrangements in place;
- There is a history of constructive working relationships and trust between government and industry;
- There is minimal stakeholder conflict associated with the fishery and the industry has a track record of working with stakeholders to address conflict issues;
- There is an effective management plan in place;
- Industry has had a clear desire and has built capacity to take on more responsibility;
- Industry is developing stronger links with other stakeholder groups such as the conservation sector;
- Government has a willingness to collaborate and share responsibility.

The preferred co-management model is Model 2 (McShane 2009) represented schematically below.

Important points to note:

- The preferred co-management model would be implemented through a phased approach, to allow for the industry to build its capacity to undertake the delegated functions effectively and to allow for performance assessment/audit;
- Government (PIRSA) retains responsibility for cost-recovery through collection of licence fees sufficient to fund annual costs of all core activities

necessary for management of the Spencer Gulf Prawn Fishery through the Association;

- The conservation sector has input into the research planning processes applicable to the Spencer Gulf Prawn Fishery via participation in relevant sub-committees of the Association. The conservation sector will also have more general input into the fisheries management process through input to the development of the fishery management plan for the Spencer Gulf Prawn Fishery. Importantly, in the context of co-management, the conservation sector will also participate in the phased introduction of the preferred model and in consideration of further delegation of management/administration (Model 3);
- Importantly, industry would retain control over the daily spatial management decisions following spot surveys. This is because such decisions need to be made in real time following nightly "spot surveys". The conservation sector (or stakeholders other than industry) would not be involved in daily spatial management decisions;
- Resources will be required for ongoing participation of the conservation sector in co-management including funding towards a sector facilitator to coordinate the sector's involvement and to build its capacity to do so, and the reimbursement of expenses to attend and participate in the relevant sub-committees. As stated in Neville (2008) '*Genuine interaction and partnerships are at the heart of co-management'*. The genuine involvement of the conservation sector in co-management is dependent upon the provision of such resources;
- Under the preferred model, industry is primarily responsible for undertaking research and monitoring of the fishery consistent with the performance indicators, and with the research and stock assessment processes specified in the management plan. Thus, research services are contracted by industry under guidelines established by stakeholder's criteria (e.g. experience and qualifications of the research provider, provision for independent quality assurance audit) and who meet the requirements to be placed on the register of service providers;
- The Fisheries Council oversees the co-management process including oversight of the management planning process (under the provisions of the Act) and, where necessary, formal resolution of stakeholder conflict in co-management.

Table 1 below compares the current management model (Model 1) with the preferred model (Model 2).

Model 2 The preferred co-management model showing the delegation of management from government (blue) to industry/stakeholders (green).

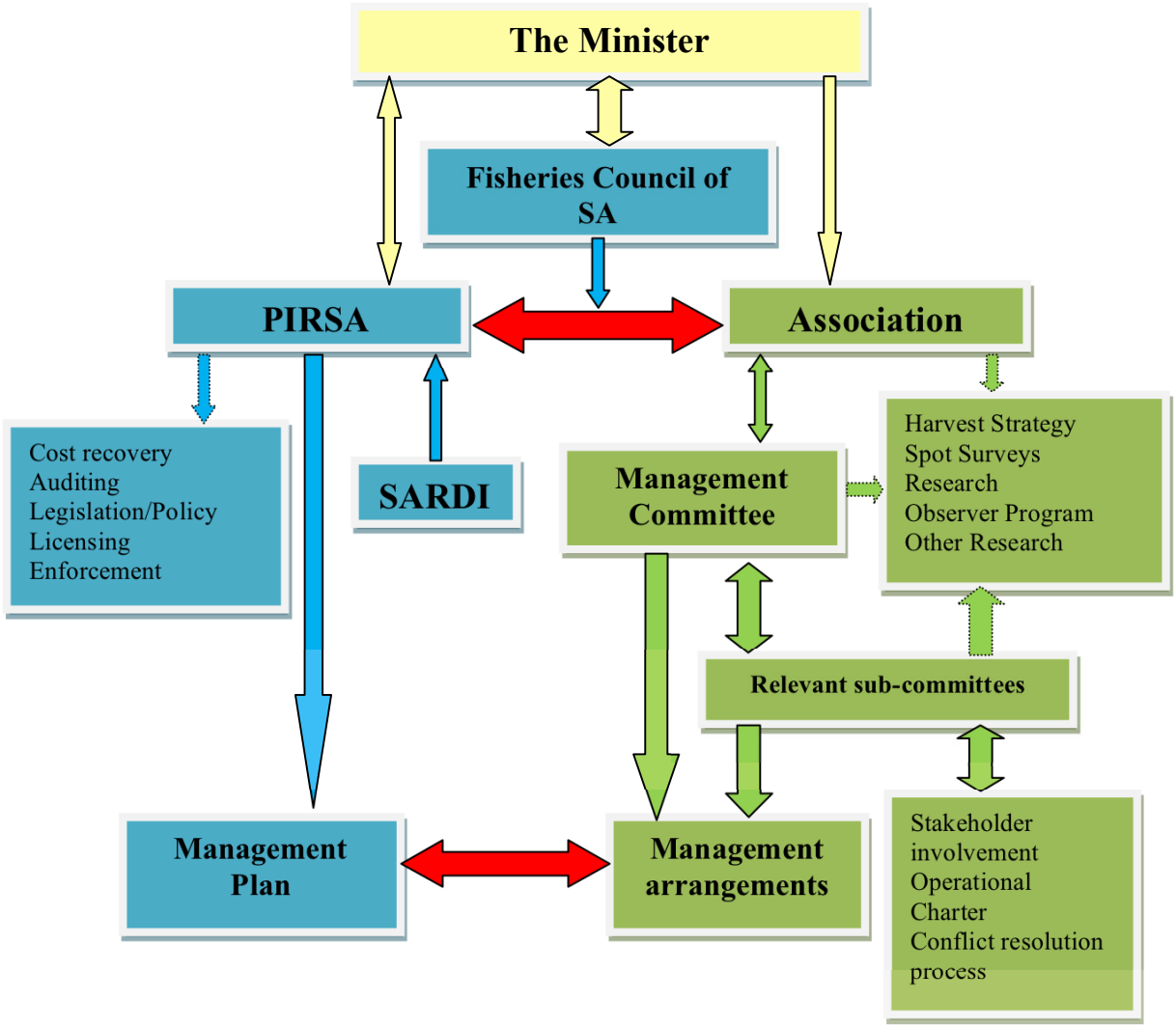


Table 1. Comparison of current service delivery with a delegated co-management model. All delegated functions will be audited by government.

Process	Task / Duty		Model 1				Model 2			
			PIRSA Fisheries	SARDI	Conservation sector	Association	PIRSA Fisheries	SARDI	Conservation sector	Association
Harvest Strategies	TEPS reporting (interactions)					M			I	M
	TEPS impact assessment		M	I			M	I	I	I
	Review of stock assessment survey data for harvest strategies		M	I		D				D
	Review of spot survey data for harvest strategies		M	I		D				D
	Determine spatial harvest strategies (areas open to fishing)		M	I		D				D
	Catch / effort (number of nights) restrictions		M	I		D				D
	Gazettal / implementation of fishing notices		M	I		I				D
	Amendments to fishing notices		M			I				D
	Coordination of Committee at Sea (to direct fishing operations)					D				D
	Catch and prawn size data collection during fishing (logbook)					M				M
	Closing original harvest strategy areas nightly (RTM)		M			M				M
	Notifying the fleet of changes		M			D				D
	Fishing trip report					M				M
Spot Surveys	Survey development and design		I	I		D	I			D
	Survey coordination and logistics					D				D
	Survey data collection					D				D
	Survey data collation, verification and analysis			M		D				D
	Survey authorisation		M							D
	Assessment of effectiveness of Harvest Strategies		M	M			I			D
Research *Stock assessment surveys, catch & effort data, and by-catch / by-product research*	External review of stock assessment		M				M			
	Survey data collation			M						D
	Coordinate and manage the survey		M	M		I				D
	Survey development and design		I	M		I	M			I
	Survey logistics		I	I		D				D
	Survey data collection			I		D				D
	Survey data verification and analysis			M		I		I		D
	Manage fishing logbook program, including validating returns			M			I	M		I
	Logbook data: collate, enter, maintain database (storage)			M				M		I
	Assessment of fishery against Management Plan		M	I		I	I	I	I	D
	Assessment of effectiveness of Harvest Strategies		M	D		I	I			D
	Collection and storage of other biological data			M			I			D
	Fishery assessment report (X1)	Data collation and analysis		M			I	I		D
		Report writing		M			I			D
		Peer review	I	M			M	I	I	I
	Stock status report (X1)	Data collation and analysis		M			I			D
		Report brief	I	M			I			D
	Survey interim reports (x3)	Data collation and analysis		M			I			D
		Report writing	I	M			I			D

*M = Managing authority; D = Delegated authority; I = Input

Process	Task / Duty	Model 1				Model 2			
		PIRSA Fisheries	SARDI	Conservation sector	Association	PIRSA Fisheries	SARDI	Conservation sector	Association
Observer Program	Develop observer program	I	M	I	D	I	M	I	D
	Facilitate observer training	I	M		D	I	M		D
	Maintain observer database	I	M		D	I	I		D
Other Research	Research priorities	M	I		I	M	I		I
	Economic research	M			I	M			I
	Non-target species research	M	I		I	M	I		I
	Biosecurity	M	I		I	M	I		I
	Ecosystem and habitat research	M				M			
	Broader research	M	M	M	M	M	M	M	M
Legislation / Policy	Establishing ecosystem impact benchmarks	M	I	I	I	M	I	I	I
	Development of over-arching policy to guide fisheries management	M	I	I	I	M	I	I	I
	Regulations development and review	M	I	I	I	M	I	I	I
	Management Plan development and review	M	I	I	I	M	I	I	I
	Public consultation on above	M				M			
	Act development and review	M	I	I	I	M	I	I	I
Licensing	Setting conditions	M			I	M			I
	Issue (determining if the licence can be issued)	M				M			
	Demerit points	M				M			
	Transfer	M				M			
	Cost Recovery (fee setting) / Invoicing	M	I		I	M	I		I
	Boat transfers and Master registration	M				M			
	Management of the Public Register	M				M			
Communication	With commercial licence holders	M	M		M	M	M		M
	To the public	M	M			M	M		
	With other government departments	M	M	M	M	M	M	M	M
	With the media	M	M	M	M	M	M	M	M
Enforcement	Prosecutions	M				M			
	Prior reporting (notifying of departure and return, including changes)	M				M			
	Vessel and equipment inspections	M				M			
	Audit of exemptions and prior reporting to data collection	M				M			
	Audit of fishing reports	M				M			
	Development and implementation of compliance strategy	M			I	M			I
	Review of risk assessment	M	I		I	M	I		I
	Promoting compliance within the Spencer Gulf Prawn Fishery (ie code of conduct, on boat management system)	M			M				M
Industry Development	Market research	I			M	I			M
Human Capital Development	Capacity building	M			M	M			M

*M = Managing authority; D = Delegated authority; I = Input

Research services

Under the proposed co-management arrangements, responsibility for coordinating and undertaking research for the Spencer Gulf Prawn Fishery will be delegated to industry and audited by government. A set of operating standards for the stock assessment survey will ensure the robustness of processes and reporting of industry. Here, research functions, operational details, resources required and performance audits are presented.

The management plan for the Spencer Gulf Prawn Fishery (Dixon and Sloan 2007) sets objectives and strategies to maintain ecologically viable stock levels in the Spencer Gulf

prawn fisheries consistent with the principles of ecologically sustainable development. Accordingly, the four key management goals are:

- maintain ecologically sustainable stock levels;
- ensure optimum utilisation and equitable distribution;
- minimise impacts on the ecosystem;
- enable effective management with greater industry involvement.

There are a number of permanent controls used to manage the fishery. These include limited entry, limits on vessel size and power, limits on gear (rig, headline length and mesh size), limits on fishing areas (i.e. greater than 10m depth) and limits on fishing times (i.e. only at night). Controls on the day to day management of the fishery are primarily based on closures (spatial and temporal). Some of these closures are permanent, some are voluntary and some are seasonal. Under status-quo management arrangements, spatial and temporal closures are determined in real time on the basis of survey research conducted by industry in partnership with government research agency (SARDI).

Three fishery independent "stock assessment surveys" are conducted each year in November, February and April. Closures are also influenced by the results of "spot surveys" conducted during each fishing period that stock assessment surveys are not conducted. The surveys, coordinated by industry, are proposed to continue under co-management, with formal delegation to industry. There are performance indicators (and reference points) which are derived from data collected from the research program (Dixon et al. 2007, Dixon and Sloan 2007). The current management plan for the fishery specifies information requirements for surveys. These requirements inform the operational details of the delegated research function under the proposed co-management arrangements, although they were not developed in the context of formally delegated co-management arrangements. The survey requirements are detailed as follows:

- collect fishery-dependent information through commercial logbooks;
- maintain the fishery-independent prawn survey program;
- assess the status of the stock through quantitative stock assessment;
- collect appropriate environmental data to aid assessment;
- review and update the strategic research and monitoring plan.

In addition to these research requirements, the Act requires that an ecological risk assessment (ERA) is undertaken prior to development of a management plan, which includes stakeholder workshops. The next revision of the management plan for the fishery will include a response to the high priority risks identified during the ERA process including strategies to manage impacts on threatened, endangered and protected species. Operational details for any additional environmental research following the ERA will be formulated with stakeholder input (under the proposed co-management arrangements). For example, strategies to address interactions with threatened, endangered, and protected species (TEPs) will be developed with input from the conservation sector. Operational details, including identifying those resources necessary to monitor interactions (consistent with provisions in the management plan) will emerge from such input.

The next revision of the management plan will need to provide clearer direction to the stock assessment process, to facilitate the independent audit process (of delegated research functions). Under the proposed co-management arrangements, government will retain control of the performance audit function.

Fishery dependent information

Data for commercial fishing and spot surveys are collected in commercial fishing log books (completed by skippers in the Spencer Gulf Prawn Fishery). It is compulsory for licence holders to complete the logbook on a daily basis and submit the information monthly to SARDI Aquatic Sciences for fishery assessment. Data collected include catch rates (weight of prawns per minute trawled), size composition (weight of prawns in various size grades), mean size (number of prawns per 7 kg), depth, average trawl speed, and start/finish times. More recent changes include specific location data (GPS position) for at least 3 trawl shots per night fished, and retained by product information (squid and bugs). Fishery dependent data are used to assess the status of the stock against reference

points (total catch, numbers per 7 kg, and weights per 20+ grade) specified in the management plan (Dixon and Sloan 2007). Under the preferred model such fishery dependent information will continue to be collected and used to assess the status of the Spencer Gulf Prawn Fishery. Commercial fishers are also required by law to complete a wildlife interaction logbook to record any wildlife interactions, particularly with threatened, endangered and protected species.

Fishery independent surveys

Three fishery independent surveys (stock assessment surveys) are currently undertaken each year with commercial vessels (i.e. fishing vessels owned and operated by Spencer Gulf prawn licence holders). Surveys are undertaken at each of about 200 fixed survey sites in Spencer Gulf by trawling for 30 mins and recording the catch including catch rates, reproductive state and size composition. Commercial vessels are used to ensure data consistency with commercial fishing information. The actual number of sites surveyed varies slightly within and among years, depending on conditions and time available. Fishery independent surveys provide information on prawn stock abundance and recruitment. The information collected during the survey process is central to the real time management of the fishery. Under current arrangements, the Association coordinates the stock assessment survey through a formal contractual agreement with PIRSA Fisheries. The Association will use the scientific survey design identified in the management plan for the fishery. Following the survey process, the data are provided to SARDI Aquatic Sciences for analysis.

During the life of the co-management project, a number of industry based observers have been trained by SARDI scientists to collect prawn survey information. In addition to the industry based observers, SARDI scientists continue to participate in fishery independent surveys. Future surveys will also include evaluation of by-catch/by-product and environmental impact (including impacts on TEPs). Under the proposed arrangements, such surveys will be delegated to industry with a research provider commissioned to collect and analyse the survey data.

Under the preferred co-management model, some independent observers will be retained. An auditable certified training program will be established for all observers to complement the independent survey process. The Association has begun work to develop a certified observer training program. An audit program, coordinated by the government, will evaluate the results of industry coordinated surveys, including the results of the observer program.

Research providers

A significant difference between Model 1 (Status Quo) and the preferred model (Model 2) is the delegation of responsibility for undertaking stock assessment and research services to industry. Under the preferred model, industry would contract research from a register of appropriately qualified and experienced providers. Such a register could be developed by government, industry and other relevant stakeholders and maintained by PIRSA. The preferred approach is to present a minimum set of criteria (e.g. job and person specifications) to guide the process of identifying which research providers could be placed on the research provider register, for engagement of a research provider by industry. Selection would be undertaken by the research sub-committee of the Association. This would provide an opportunity for stakeholder input into the selection process and also provide for transparency in the process. Furthermore, provision for audit and independent review facilitated by PIRSA Fisheries will ensure accountability and rigour in assessing fishing impacts on the Spencer Gulf ecosystem.

It is important to note the role of SARDI, the government research provider. Purchase of research services from organisations other than SARDI potentially diminishes capability and relevant expertise in that organisation with consequent negative impact on local research capacity. Under the preferred model, SARDI may be a contracted research provider, or it may be involved in audit of contracted research services (as proposed in the phased introduction of the preferred model).

Observers

Observers will be required to undergo a certified auditable training program, provided by a Recognised Training Organisation, to ensure the effectiveness of service provided by observer coverage. Under the current co-management arrangements the Association is working, in consultation with PIRSA Fisheries, SARDI and CCSA to develop a suitable program. Observers who have successfully completed the training (and who can demonstrate at-sea training) will enter into an agreement with the Association to provide accurate and correct information. Qualified observers will be placed on a register kept by the Association. Observers can be sourced from credible observer service providers, including industry, government, independent service providers, or other stakeholders with an interest in the fishery (external to industry).

Legitimate concerns in relation to research quality, rigour, and potential conflicts of interest need to be addressed to the satisfaction of the government and other stakeholders. Thus, as stated in the section on 'fishery independent surveys', the preferred model will include provision of independent observers to evaluate the efficacy of Industry research services (including out-sourced research services). The process will allow for the ongoing maintenance of independent (of industry) observer coverage.

An incentive-based approach to utilising industry vessels to collect information addressing ecological impacts should encourage compliance to desired standards of data integrity. Thus, the frequency (and therefore cost) of independent observer coverage (in stock assessment surveys, spot surveys and in environmental impact assessment) would reflect the quality of data collected by trained industry based observers. Where there is a significant difference between data collected by industry based observers and by independent observers, the frequency of independent observer coverage would increase. Similarly, where data quality is comparable, independent participation in research services (and therefore cost) would decrease. In any case, the extent (and therefore cost) of independent observer coverage will reflect the phased approach to co-management as presented below. Government will maintain its capacity to place independent observers on fishing vessels through the powers established under the Act.

Development of a certified auditable training program for observers is considered to be a key component of the observer program and necessary for quality assurance.

Cost Recovery

The Association currently provides a range of services to licence holders, through voluntary payment of membership fees. All but one of the Spencer Gulf Prawn Fishery licence holders are members of the Association. Therefore not all licence holders currently pay for Association services. However, core management processes, necessary for real time management of the fishery, that are undertaken by the Association are cost recovered from licence holders through PIRSA Fisheries licence fees. These fees are then paid to the Association under contractual agreements between PIRSA Fisheries and the Association. It is recognised that, for delegated co-management arrangements to be effective, the industry association must have a secure source of funding for core management services. It is acknowledged that costs must be recovered from all licence holders to deliver existing or new core management processes under the proposed co-management arrangements.

Under the preferred model, PIRSA Fisheries will continue to collect licence fees from all Spencer Gulf Prawn Fishery licence holders for core management processes. Funding for these activities could be provided to the Association under contracts, for core management processes. Core management processes currently not delegated to the Association would need to be adequately defined but would include:

- stock assessment and related research to address performance indicators as specified in the management plan;
- coordinating the observer program (including arranging training to the required standard);
- coordinating the survey program (including spot surveys);
- analysis and reporting of data (from survey and stock assessment);

- managing the relevant sub-committees where stakeholder involvement is necessary;
- developing and applying the harvest strategy (including managing the committee-at-sea process);
- liaison with government (including SARDI for access to log-book data and to respond to performance audits of delegated stock assessment, survey, and environmental research undertaken by industry);
- operational capability specific to core fishery management activities.

Conflict resolution

Conflict resolution will initially be addressed through the Association's sub-committees. If the conflict cannot be resolved through this forum, the matter will be referred to representatives of each stakeholder on the sub-committee for discussion and any resolution of these stakeholder representatives will be forwarded to the Management Committee for evaluation and determination. Should the determination not satisfy each stakeholder party and the matter remains unresolved, the matter will then be referred to the Fisheries Council of SA for determination, where one stakeholder representative from each stakeholder group will be able to lay out its argument for consideration. Stakeholders may not further influence the Fisheries Council. Any determination of the Fisheries Council will not be entered into debate. The Fisheries Council will be involved only when conflict is unable to be resolved through existing communication channels.

Phased introduction

A phased introduction is considered necessary to ensure a smooth transition to delegated functions and to allow for industry to incrementally build its capacity to undertake the delegated functions and enable stakeholders to build capacity to be effectively engaged. Three phases are suggested during which an evaluation of the performance of industry-delegated functions is undertaken. This process is also useful to assess the potential for co-management of other fisheries (consistent with the aim of the present project). At this stage, a timeframe for phasing in of the co-management model has not been determined. The trajectory of the phased introduction will be determined by evaluation of the preferred co-management model by the Association, the progress of the co-management model once implemented and the government audit process.

A suggested phased approach for the preferred co-management model is outlined below.

Phase 1

The following functions/tasks will be delegated to the Association:

- harvest strategy development, implementation and communication;
- stock assessment survey and spot survey coordination;
- data collection;
- reporting (harvest strategy and stock surveys).

Prerequisites to move through this phase include:

- appropriate stakeholder representation on the Association's sub-committees;
- defined roles and responsibilities of the Association's sub-committees;
- direct engagement of the conservation sector and other stakeholders in key aspects of management of the fishery (i.e. ERA, management planning etc);
- operating standards developed for each responsibility to be taken on by industry;
- resource arrangements in place for adequate stakeholder representation;
- stakeholder approved criteria developed for Association selection of suitable staff/consultant;
- appropriate confidentiality agreement to enable survey data to be submitted to the Association.

During this phase the following quality assurance protocols will apply:

- PIRSA Fisheries audits each fishing period against a set of agreed operating standards;

- PIRSA Fisheries and SARDI will provide support to industry as necessary, to assist the transition to the delegated co-management model;
- survey data are verified by SARDI;
- the observer program is assessed by relevant stakeholders;
- at least three independent observers are provided for each stock assessment survey (independent of industry);
- the conflict resolution process is reviewed by relevant stakeholders.

Development of protocols and a training program for industry observers will proceed during this phase.

A formal assessment of delegated functions in relation to the aims of co-management will be completed during this phase. Such an assessment could be managed through the Fisheries Council (SA) consistent with its aim of encouraging co-management of South Australian fisheries.

Phase 2

The following functions/tasks will be delegated to the Association:

- analysis, verification and reporting of scientific data collected through stock assessment and spot surveys (transferred from SARDI);

Prerequisites to move through this phase include:

- development of a certified auditable observer training program;
- creation of an observer database listing all observers trained under the certified program (use of certified observers only).

During this phase the following quality assurance protocols will apply:

- logbooks submitted to SARDI after data are collected;
- PIRSA Fisheries conducts annual audit of delegated functions;
- PIRSA Fisheries and SARDI will provide support to industry, as necessary, to assist the transition to the preferred co-management model.

A formal assessment of delegated functions in relation to the aims of co-management will be completed during this phase, as conducted during phase 1.

Phase 3

During this final phase the following functions/tasks will be delegated to the Association:

- stock assessment (linking surveys, observer program, data collection/analysis and reporting);

The following quality assurance protocols will apply:

- independent review/audit of all delegated functions, including stock assessment process;
- logbook data made available by industry to independent auditor (for audit purposes);
- enforcement and prosecution activities by PIRSA.

An evaluation of the potential to progress to a fully delegated model (Model 3) will be undertaken following the conclusion of the phased introduction of the preferred model (Model 2). The evaluation will include assessment of the effectiveness of stakeholder involvement.

References

Dixon, C. and Sloan, S. (2007). Management plan for the South Australian Spencer Gulf prawn fishery. South Australian Fisheries Management Series. Paper No. 54.

McShane, P. E. (2009). Evaluating Co-Management opportunities for the Spencer Gulf prawn fishery. Discussion paper presented as part of FRDC project 2008/210. 16 pp.

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.

Zacharin, W., C. Dixon, and M. Smallridge (2008). Towards self-management for the Western King prawn fishery in Spencer Gulf, South Australia. 245–258. In Townsend, R.; Shotton, R.; Uchida, H. (eds). Case studies in fisheries self-governance. 1–21. FAO Fisheries Technical Paper. No. 504. Rome, FAO, 2008. 451 pp.