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

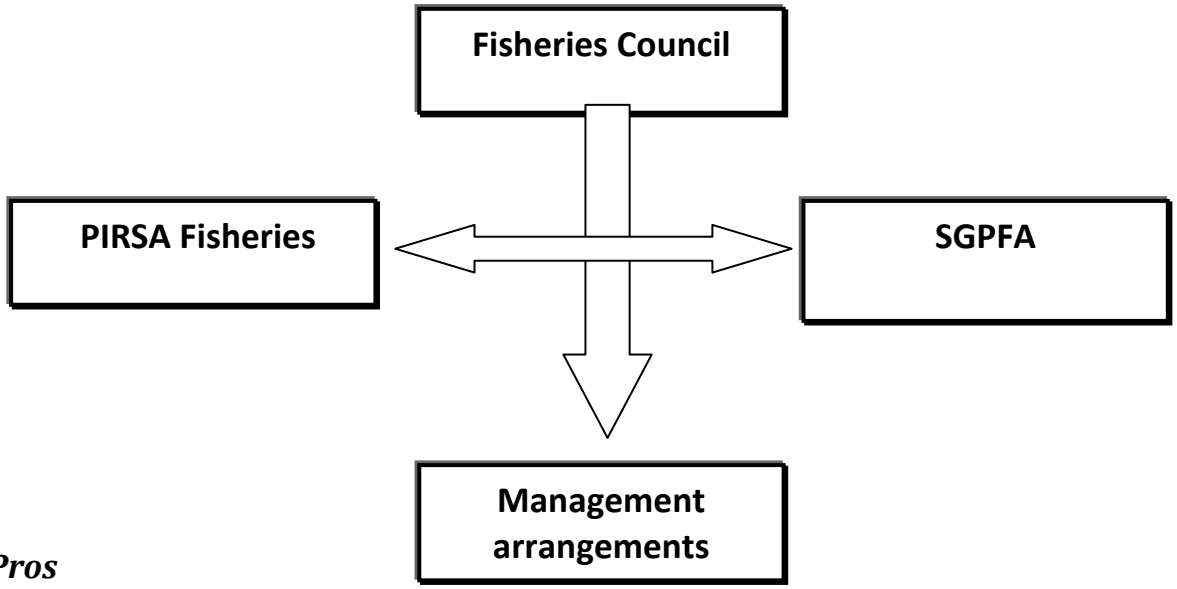
The status quo is a collaborative model in which management arrangements are negotiated between the Spencer Gulf and West Coast Prawn Fishermen's Association and PIRSA Fisheries under oversight of the Fisheries Council. Disputes over cost recovery (and other management arrangements) previously addressed 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

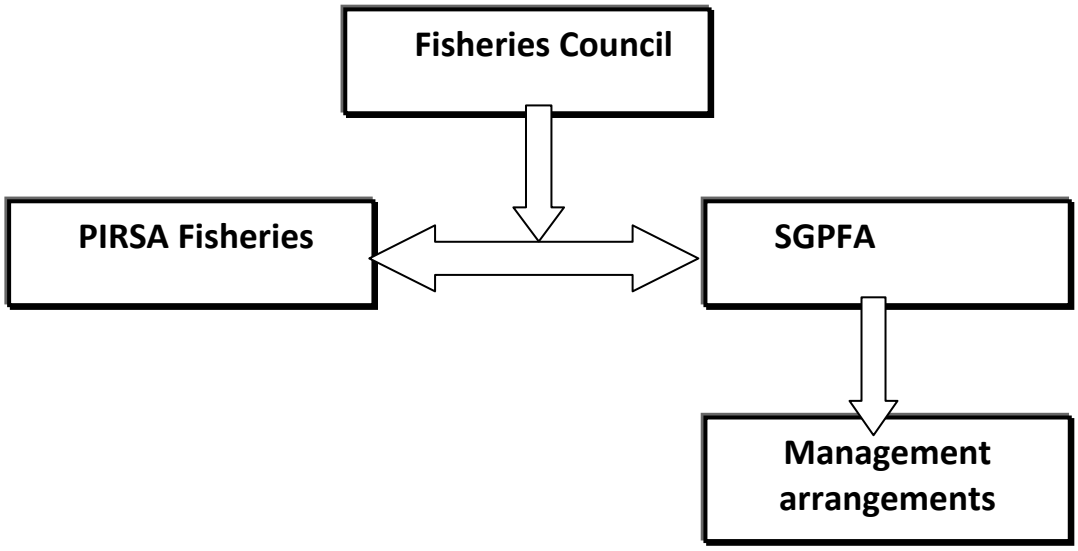
A delegated model provides for principal control of fisheries management arrangements including the management of the Spencer Gulf prawn fishery (harvest strategy development) and conduct and reporting of research by the Association. The Association would be responsible for management of research services 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.

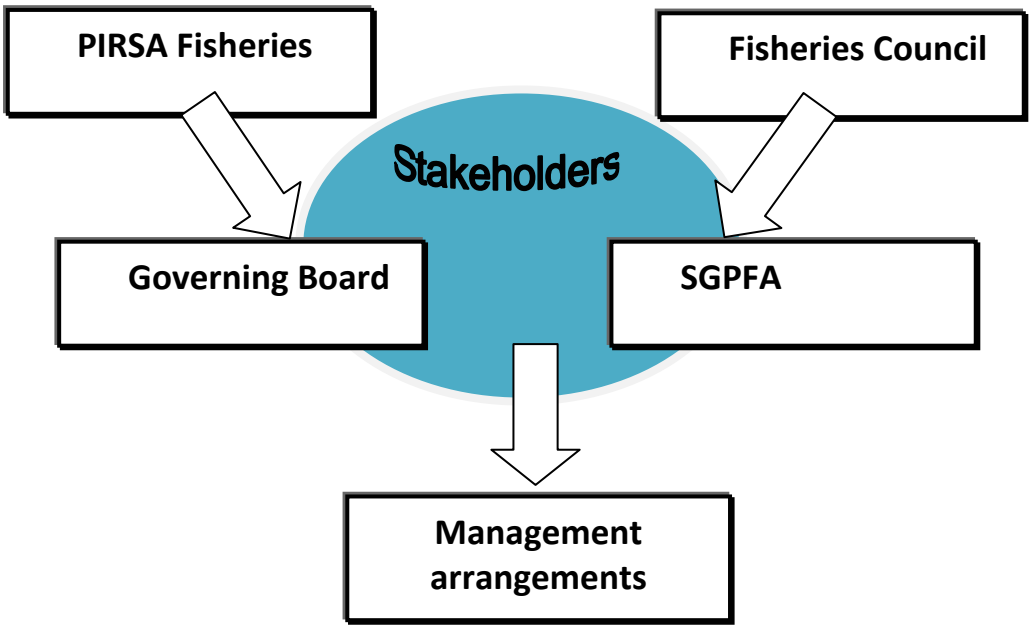
The Board will be responsible for all governance arrangements including establishment of appropriate sub-committees to conduct specific functions (sub-committees would have operational responsibilities), legislative advice, policy making, the conduct of research activities (including facilitation of 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.