Multispecies fishery in South Australia

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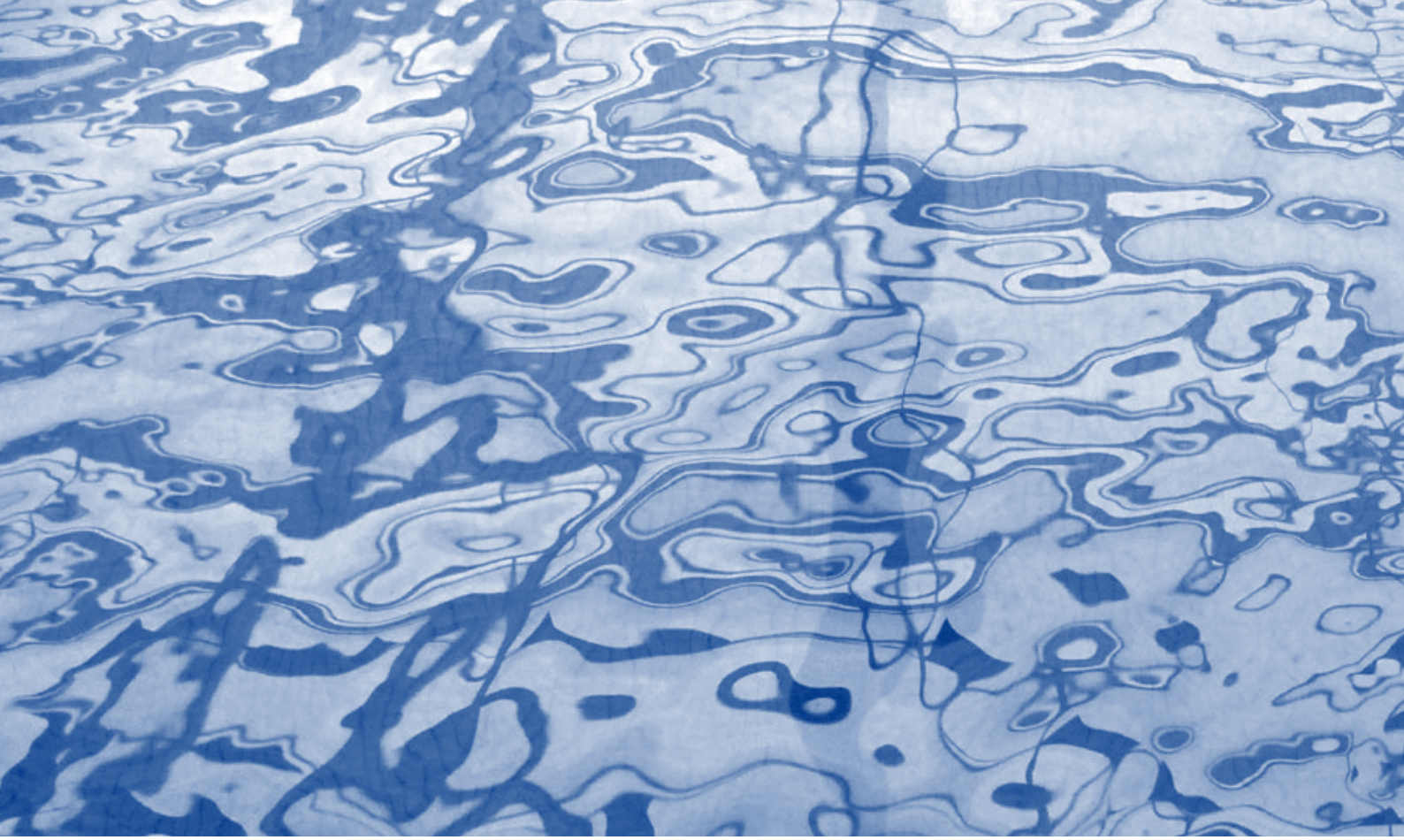

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Maintaining allocation shares in addressing stock sustainability: a case study in a multispecies fishery in south Australia

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Abstract

Scientific assessment of a multispecies marine scalefish fishery indicated that a significant reduction in fishing effort was required to arrest stock decline. A combination of spatial closures, temporal closures, recreational catch reductions and a voluntary buyback in the commercial net sector were used to deliver on the revised management objectives and performance indicators. Gear conflicts, market forces and a need to maintain catch shares between sectors at existing levels created a complex policy environment in developing and implementing the management strategy. Five new spatial closures to commercial net fishing were implemented due to a successful voluntary buyback. The buyback resulted in the removal of 61 net entitlements, which represented 54 percent of the existing net entitlements, equivalent to 44.7 percent of the average annual fishing effort or 3,698 boat days. Minimum size limits for King George whiting, a temporal closure to protect a proportion of the snapper spawning biomass and reductions in recreational bag and boat limits also contribute to reduced fishing effort and the maintenance of resource shares between sectors. The formal regulation of the charter boat sector completed the capture of all fishing mortality sources to ensure the management strategy would result in long-term fishery sustainability.

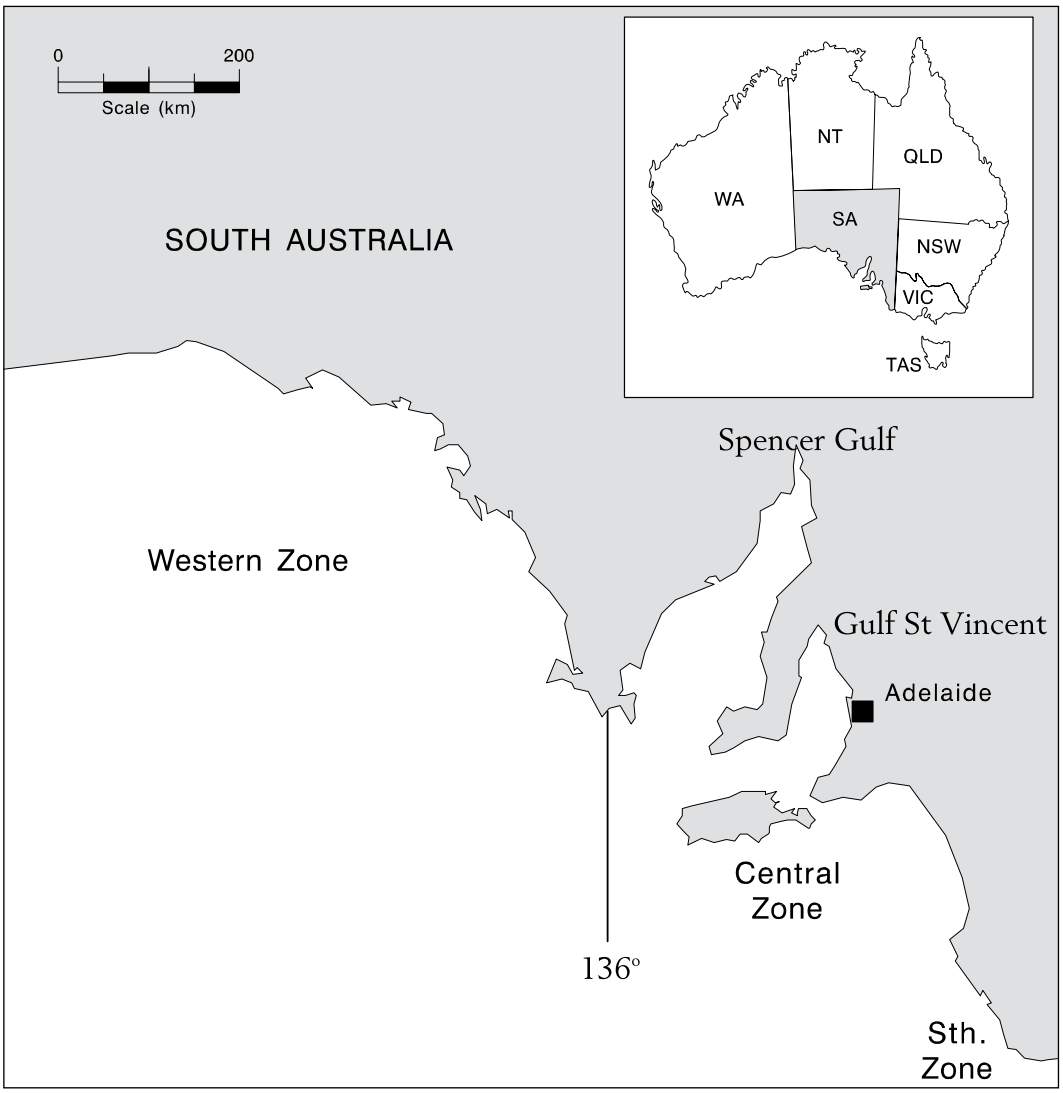
Introduction

The South Australian Marine Scalefish Fishery operates in all coastal waters of the state including gulfs, bays and estuaries (excluding the Coorong estuary) from the Western Australian border (129°E longitude) to the Victorian border (141°E longitude) (Figure 1). The South Australian Government has entered into an Offshore Constitutional Settlement (OCS) agreement with the federal government for the marine scalefish resources from low water mark of the South Australian coastline seaward out to 200 nautical miles. This OCS agreement provides single jurisdiction to South Australia for most scalefish generally found inshore, while offshore species fall under federal jurisdiction. State-managed species taken by federal licence holders are regulated using bycatch trip limits to avoid wastage of fish where incidental interaction can't be avoided.

The fishery is a multispecies, multi-gear fishery. Commercial, recreational, charter and indigenous fishing activities are undertaken targeting a variety of marine species of fish, molluscs, crustaceans, annelid worms and sharks. There are more than 50 species taken by commercial marine scalefish fishers in South Australia.

The majority of the fishery production is comprised of traditional scalefish species, in particular King George whiting (*Sillaginodes punctatus*), snapper (*Chrysophrys auratus*), southern sea garfish (*Hyporhamphus melanochir*) and Australian salmon (*Arripis truttaceus*). Other species such as southern calamary (*Sepioteuthis australis*), gummy shark (*Mustelus antarcticus*), ocean leatherjackets (family Aluteridae), sand crabs (*Ovalipes australiensis*) and mud cockles (suborder Teledonta) also provide an important contribution to the total catch.

Figure 1. Map of South Australian waters showing the boundary selected for changes to the size of King George whiting.



The South Australian recreational fishing sector was surveyed as a part of the 2000/01 National Recreational and Indigenous Fishing Survey (Henry & Lyle 2003). This survey estimated that about 328,000 people (over the age of 5 years) or 24% of the South Australian population and 29% of all South Australian households, contained at least one person who participated in some form of recreational fishing. In terms of the relative harvest and effort levels, the Marine Scalefish Fishery dominates the recreational catch in South Australia. The species managed within the Marine Scalefish Fishery comprised 66% of the total annual recreational harvest (numbers) and approximately 69% of the total annual recreational effort (fishing events) (Jones & Doonan 2005).

King George whiting is the state's most important species from a commercial and recreational fisher perspective, while snapper and garfish come a close second in preference and economic value. Scientific stock assessment reports for these species prepared by the South Australian Research and Development Institute (SARDI) in the late 1990s indicated increases in fishing pressure on these key target species, which led to a range of different management responses to provide for long term sustainable management of these fisheries. A central policy consideration for government in revising management arrangements was to ensure, as best as practicable, that existing resource shares between sectors remained the same after management intervention. This required the use of a mix of fishery management tools to achieve multiple management objectives.

Legislation and policy frameworks

To support sustainable fisheries management in any jurisdiction, there is a requirement for specific fisheries legislation, with objectives, which support and encourage the accepted international principles of ecologically sustainable development (ESD). The South Australian Fisheries Act 1982 has clear objectives relating to resource protection, optimal utilisation and equitable distribution, which have supported an ESD framework approach to fisheries management. This act is currently under review and the explicit key principles of ESD are being written into the act objectives.

Government policy adopted over 40 years ago supported a limited entry regime in all major commercial fisheries and this has provided a sound policy base from which to develop and successfully implement management decisions with the commercial sector, using a co-operative management model. Fishery management committees (FMCs) have been established for all major fisheries and members of these committees include commercial and recreational fishers, fishery managers, marine scientists, an independent chairperson and on some FMCs such as the Marine Scalefish Fishery Management Committee (MSFMC), a community/environment member.

All major fisheries in South Australia also have a specific fishery management plan. These plans outline the development of the fishery to provide some historical context to current management arrangements and include explicit management objectives and performance indicators relating to the biological, economic, social and environmental goals for the fishery. The plans are living documents, which have a life of five years before a major review is undertaken. The current Marine Scalefish Management Plan was developed during this recent period of significant management change in the fishery. This assisted in focusing stakeholders on setting realistic, measurable objectives and performance measures for the fishery (Noell *et al.* 2005).

Case study

King George whiting management

Scientific research reports on the life history and stock assessment of the King George whiting fishery from 1996 provided a solid foundation to inform management on the status of the fishery (Fowler *et al.* 1996,1999, 2000a, 2000b, 2002; McGarvey *et al.* 2002a, 2002b, 2003, 2005). By 2003, it was apparent that some management action was required to reduce the fishing pressure on the whiting stocks, or the fishery was going to continue to decline. The commercial catch had reduced from a peak level of 750 tonnes in 1991/92 to 390 tonnes in 2001/02. Results from the first National Recreational and Indigenous Fishing Survey also showed that the recreational sector was taking approximately 58 percent of the total catch (Henry & Lyle 2003).

The Marine Scalefish FMC established a working group to develop management targets for the whiting fishery to reduce fishing effort. Once agreement was reached on the management targets, options were developed using various management tools to achieve the objectives. The management targets were as follows:

- increase the level of egg production to reach a level of 30% of the virgin spawning stock biomass (average across the fishery); and
- reduce the exploitation rate to less than 28% of the fishable biomass (averaged across the fishery).

Only management options that would achieve these objectives without leading to a change in the current allocation between sectors were to be developed. However, this principle did not stop sectors proposing many management actions, which were clearly aimed at disadvantaging one sector over another. Options were developed using changes to minimum size limits, seasonal closures, area closures, reducing daily recreational bag and boat limits and reducing commercial net fishing effort. After much discussion and

scientific modelling of the options, the following strategy was agreed by the minister for implementation:

- increase the minimum legal size of whiting from 30 cm to 31 cm east of 136 degrees (which raised size limits in the two main gulfs; Spencer Gulf and Gulf St Vincent);
- a reduction in the daily recreational bag and boat limit from 20 and 60 to 12 and 36 fish respectively for all waters; and
- enhancement of a tradable points system in the commercial marine scalefish fishery to encourage further amalgamation of licenses. These changes allowed for non-transferable 'B' class licenses to become transferable, so long as they were amalgamated with an existing transferable 'A' class licence.

This combination of management actions achieved a number of policy and sustainability outcomes. Firstly, the actions recognized the higher fishing impact of recreational angling and the reduction in daily bag and boat limits was appropriate to reduce exploitation across the fishery and assist in maintaining catch shares between the two main sectors. Secondly, a small increase in the minimum size limit will increase the spawning biomass over a five-year period, without impacting significantly on recreational catches from inshore waters and upper gulf waters, where the whiting population is dominated by smaller fish (up to 35 cm).

A greater increase in the minimum size was shown to be better for increasing egg production (from a biological modelling perspective), but due to the skewed distribution of smaller fish inshore and in upper gulf waters, and larger spawning fish offshore in southern waters, a greater increase in the minimum size would have removed access to many recreational anglers in inshore areas and concentrated fishing effort on offshore spawning populations. The overall management outcome from implementing a higher minimum size could have had negative consequences for the stock in the long term. This demonstrates the need for careful assessment and analysis of management options, as sometimes the expected response to an action is not as clear as one would initially forecast. Possible lateral management consequences need to be mapped.

Voluntary commercial net buyback

Following on from the changes to King George whiting, further management action was required in the Marine Scalefish Fishery to address stock concerns with another economically and socially important species, garfish. Scientific assessments indicated that this species was under considerable stress and fishing effort had to be dramatically reduced, to provide for stock recovery. As the commercial catch and effort data and recreational survey results

clearly showed that 80% of the catch was taken by the commercial net sector, it was this sector that was considered in developing a management response. The management target established for garfish was a 40% reduction in annual net fishing effort.

The commercial net sector operates haul nets up to 600 m in length. These nets are either manually or mechanically hauled over shallow beaches and seagrass meadows (<5 m depth) to catch a range of species, mainly garfish, silver whiting (*Sillago bassensis*) and Australian herring (*Arripis georgianus*). As garfish are very fragile fish and the loss of scales through fishing usually results in death, the immediate management action required was to reduce net fishing effort. This could be achieved through seasonal closures, areas closures or a reduction in net fishing effort. Increasing the minimum size limit, similar to the management response for King George whiting, would not have been effective, due to the high discard mortality for garfish.

The commercial and recreational community was divided on the economic and social consequences of implementing seasonal or area closures and the scientific assessments were also being disputed, in an attempt to lessen the necessary management response to over fishing. In this climate of biological uncertainty and stakeholder conflict, the government determined that a voluntary buyback to reduce the number of participants in the net fishing sector would result in the best management outcomes. It was reasoned that this action would address the sustainability requirement to significantly reduce net fishing effort, while at the same time responding to recreational fishing concerns of conflict with net fishers in some major holiday and tourist destinations. There were also many commercial net fishers struggling to make sufficient economic returns and they were likely to accept a financial package and exit the industry.

An attractive financial package was developed for the net sector using data available from economic assessments of the fishery (EconSearch 2004) and recent available market transfer pricing for amalgamated licenses. To encourage licence holders to take up the voluntary buyback, three strategies were adopted by the government. A 30% premium to the estimated market value of licenses was added to the financial package as a positive incentive; licence holders were offered $3,000 up front to assist in seeking some financial advice; and six 'priority areas' were identified on South Australia's coastline where the government was looking to prohibit future net fishing following the buyback. Closure of these priority areas was to depend on the success of the buyback and this was communicated to licence holders.

To avoid problems associated with tenders, issues of equity that can arise through negotiating offers and to ensure that the fishers could make clear financial decisions about their future in the industry, the financial packages for amalgamated and unamalgamated licenses was set by the government.

Applications from licence holders for consideration in the buyback were open for 30 days and another 24 days was provided to those who made application, to consider the financial package and sign a Deed of Surrender for their licenses.

The buyback was very success and removed 61 net entitlements from the 113 eligible licence holders at a total cost of $11.3 million, which represented 54% of haul net entitlements and 44.7% of the average annual net fishing effort across the fishery (3,698 boat days). This result exceeded the management target of a 40% reduction in annual fishing effort and as a consequence, the government closed five of the six priority areas to future net fishing. Four net fishers who traditionally fished in the five priority areas which were closed and who did not take up the buyback were displaced and had to move their operations to adjacent zones. This transfer of fishing effort was of little consequence, due to the huge amount of fishing effort removed through the buyback. However, there was some social discontent from these displaced fishers.

This voluntary buyback demonstrated the need to critically analyze the management options for achieving the desired management response before embarking on strategy implementation. Time spent in analyzing and determining the financial package to attract applications and the linking of negative incentives (in the form of possible net closures) for remaining net fishers were the key factors in the buyback success.

Charter boat fishery

Charter boats have been operating in South Australian waters for 40 years. However, this sector until recently (1996) only had a small number of operators (<50 boats). This sector used to be treated as an extension of the recreational fishing industry, that did not require further management, other than the recreational bag and boat limits. This view of the charter boat sector changed after 1996, as more operators entered the industry and localised impacts of increased charter fishing began to be observed in some popular fishing destinations.

The charter boat sector was also seen as a major part of the Marine Scalefish Fishery, which was not under direct management. There were no formal catch records being kept and the level of understanding of fishery impacts and the industry's links with tourism were poorly understood. A management decision was made in 2003 to bring the sector under more formal management arrangements.

It was an important consideration for the existing commercial and recreational fishing sectors in developing a management plan for the charter boat sector

that there was no reallocation of fish resources. Some charter operators who held commercial fishing licenses, were able to take recreational anglers on charter, without these fishers having to be restricted to daily bag and boat limits required by recreational anglers. The commercial sector was being managed under input controls, which did not restrict daily catch on these boats. This legal uncertainty needed to be removed to place all charter operators on a level playing field and reduce the potential for these boats to create localized depletion problems.

The management response to bring the sector under formal control was to offer all existing charter operators a licence. Licence criteria was established that required an applicant for a charter boat licence to demonstrate:

- a boat in 2C survey (which is required to carry paying passengers);
- that a bone-fide charter boat business was operating as at 28 November 2003; or
- that the intent to establish a charter business could be demonstrated as of 28 November 2003 (e.g. the purchase of a boat).

This criterion has resulted in 97 charter licenses being issued under a three year management plan developed for the fishery. The criteria will remain in effect for the next three years, which effectively means that at some point the fishery becomes a limited entry fishery by default, as no future applicants will be able to meet the criteria. Whether the criterion is changed in future years will depend on government policy and an understanding of the impact of the charter boat sector. Charter boat licenses are transferable.

To ensure that no reallocation of fish resources occurred in establishing the charter boat plan, different charter trip limits for all fish species were negotiated with industry groups, to reflect the perceived current level of access that the sector enjoyed. As the majority of charter fishing targets Marine Scalefish Fishery species and some of the boats have the capacity to carry up to 20 anglers, bag and boat limits were established which are lower than recreational bag and boat limits. Special three-day limits were also introduced to cater for overnight operations.

The introduction of daily logbooks for the charter boat sector will also provide data on the impact of this industry on the Marine Scalefish Fishery and allow for more informed management responses in the future. If impacts on fish stocks are significant or catch data demonstrate that changes in allocation may be occurring, bag and boats limits can be reviewed.

Formal management of the charter boat sector and the introduction of a catch/effort logbook completed the management of all sources of exploitation in the Marine Scalefish Fishery for the first time. Explicit shares of these resources between sectors have also been established. However,

these shares will need to be adjusted over time, as recreational participation is not restricted (in terms of number of fishers) and community values do change over time.

Summary

Managing resources in a multispecies, multi-gear Marine Scalefish Fishery to provide for long term sustainable management outcomes without influencing resource allocation changes requires detailed data analysis and a good practical understanding of the industry. The establishment of systems, which record catch and fishing effort by all user groups, is paramount in being able to effectively manage fishing impacts and understand who is really taking the fish. Stakeholder perceptions often do not reflect reality and data collection and appropriate analysis is the first necessary step in developing sustainable policy and management strategies in a biological, economic, social and environmental context.

Allocation of fish resources is a complex policy and management challenge and the policy levers and management tools available to influence changes in access can have many unpredictable outcomes, if careful assessment of options is not undertaken. Some simple management options, which one could expect to have logical effects, can often result in serious unforeseen consequences. An example in this paper is the setting of minimum size limits for King George whiting. Increasing the minimum size limit greater than the 1 cm may have been positive from model outputs in increasing egg production. However, a likely consequence would have been to transfer recreational fishing effort to offshore populations, which represent the spawning biomass. This could have created a serious future sustainability problem, through a significant change in fisher behaviour, which would have been difficult to reverse.

In understanding resource shares and actions that may change shares, it is necessary to be able to quantify current levels of access and changes over time. A broad range of fishery management tools can be used to affect resources shares, but a management tool does not always give the same effect in every circumstance and careful consideration of the impact is required before, during and after implementation.

An example of a successful restructure of a fishery through a voluntary buyback is described in this paper. A mix of positive and negative incentives was used to reduce the risk of not realizing the management target of a 40% reduction in net fishing effort. Changes to management and the success of the fishery restructure of the net sector were due to the biological, economic and social information available on the fishery.

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