FISHERIES ECONOMICS RESEARCH & MANAGEMENT

OPTIONS FOR IMPROVING MANAGEMENT OF THE COMMERCIAL SCALLOP RESOURCE IN SOUTH-EAST AUSTRALIA

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December 2011

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1. Introduction

1.1 Background

At a meeting of Government and industry representatives from Victoria, Tasmania and the Commonwealth in Melbourne on 11 May 2011 it was agreed that substantial and achievable opportunities exist to improve the effectiveness and cost-efficiency of management arrangements for the southeastern Australia scallop resource.

The meeting considered that improvements in management might be achieved through a more coordinated approach to research, policy, compliance and management. This would bring substantial benefits to the scallop industry and the community.

The meeting agreed to commission a review of current management arrangements and identify options for improvements in each jurisdiction, including the potential to integrate management activities across jurisdictions whilst ensuring that the current fishing rights holders and governments in each jurisdiction would realise a net advantage from that change.

A Steering Committee to oversee the project was formed. The Steering Committee membership includes a senior member of each of the three fisheries management agencies, an industry representative from each jurisdiction (Commonwealth - member of the Scallop MAC; Victoria – SIV nominee; Tasmania – member of the Scallop Fishery Advisory Committee), a member of the Tasmanian Scallop Fishermen's Association and the chairs of the `Commonwealth Scallop Resource Assessment Group and the Tasmanian Scallop Fisheries Advisory Committee. The last mentioned act as co-chairs of the Steering Committee. The Terms of Reference of the review are attached as Appendix 1.

1.2 Approach

The review was be carried out in two stages to best meet the above objectives, taking into account four overarching objectives as identified in the Terms of Reference:

(1) Improving the efficiency and cost-effectiveness of managing the south-east Australian scallop resource.

(2) Ensuring sustainability of harvesting the scallop resource.

(3) Optimising overall industry economic performance.

(4) Pursuing ecosystem based management of the south-east Australia scallop resource.

This first stage was a draft report providing a comprehensive review of the southeastern commercial scallop fishery in the three jurisdictions, advice on the current value of entitlements and identification of options as having potential for moving towards single and coherent management to best meet the above objectives. To assist in the preparation of the draft report, discussions were held with Fisheries Victoria, AFMA and DPIPWE Tasmania, together with active operators, one processor and the

representatives of Tasmanian Scallop Fisherman's Association (TSFA), Institute for Marine and Antarctic Studies (IMAS) and Seafood Industry Victoria (SIV).

The draft report including five possible options for future rationalisation/integration of management arrangements was presented and discussed at the project Steering Committee in early November 2011. The Steering Committee selected three of five options to progress further and a set of actions to be completed by agencies in the three jurisdictions was agreed. This report is the final report of the consultancy taking into account comments raised at the November Steering Committee meeting.

2. A Naturally Highly Variable Resource

The most characteristic feature of scallop populations is the high natural variability in abundance, growth, mortality, meat yield and condition. This, coupled with a poor understanding of the stock recruitment relationship, means that the applicability of standard concepts of fisheries management have to be carefully considered with regard to the management of scallop fisheries.

2.1 The South-eastern commercial scallop fishery is a single species with some genetic distinctiveness

The South-eastern Australian commercial scallop, *Pecten fumatus*, occurs in coastal waters from the southeastern Queensland coast (Hervey Bay), around Tasmania in the south, and westward beyond the border between South Australia and Western Australia (Young et al., 1990, Young et al., 1999). Recent research[1] indicates that it is a mosaic of genetic stocks. For the Bass Strait stock , there is genetic evidence of a 'north' (Commonwealth, Flinders and Banks Strait) and 'south' (White Rock, Eddystone and Babel Island) group, but the distinctiveness of these groups is not pronounced enough to be regarded as stocks. In this area, it is believed that genetic exchange is limited when distances are above 300km

Commercial scallops are frequently found aggregated in dense beds, the orientation of which is influenced by the strength and direction of tidal current flows. Scallops are light sensitive and can react to the approach of divers and dredges (Young et al., 1989).

The species can occur within sheltered inshore areas (i.e. Port Phillip Bay, D'Entrecasteaux Channel) and exposed, offshore regions (e.g. Commonwealth Central Bass Strait beds, Banks Strait) in depths ranging from 5 to 90 meters, on substrates ranging from mud to coarse sand.

2.2 Sporadic, intermittent recruitment and a poorly understood stock–recruitment relationship

Pecten fumatus is a functional hermaphrodite (i.e. individuals mature as both male and female in second year of life), with individuals generally becoming mature in their second year of life (Young and Martin 1989). Fecundity increases with age. Once maturity has been reached, spawning occurs from winter to spring (June to November)

[1] Pers. comm. (Jayson Semmens, IMAS)

with periods when spawning may be at a peak. The timing of these peaks may vary according to location and also according to environmental conditions, but in the past has been in spring (August to October) in Tasmania and Victoria (Young et al, 1999; Sause et al 1987a). More recent research[2] suggests that spawning occurs late into the summer, sometimes as late as early February and is more synchronised in denser beds and that genetic exchange appears to be limited when distances exceed 300km with the finest scale of genetic subdivision at around 100km[3].

Larvae are planktonic and go through a number of larval changes before eventual settlement and metamorphosis to the adult form. The duration of the planktonic phase is influenced by environmental factors but is generally around 30 days (Dix and Sjardin 1975).

Commercial scallop settlement has also been shown to be highly variable both temporally and spatially. (Young et al, 1988; Fuentes, 1994). In general, major settlement periods occur between September and December in southern Tasmania (Fuentes, 1994) and between November and December in eastern Bass Strait (Young et al., 1989; Young et al., 1990).

Trends in scallop settlement times and abundances have previously been determined using spat collectors, but results are not conclusive. For example, over a four year period in Port Phillip Bay (Victoria), there was an indication of a consistent positive relationship between the abundance of *P. fumatus* spat in collectors and subsequent year class strength of juveniles (Young et al., 1989). On the other hand, studies conducted in Bass Strait indicated that the number of juveniles settling on the bottom show no association with the numbers of spat that had settled on nearby collectors, or the catch-per-unit effort of adult scallops within the same region (Young et al., 1990). Simulation studies of Bass Strait scallop larval dispersal (Hammond et al., 1994) found that as the number of beds becomes reduced, self-seeding becomes more important as a means of maintaining the viability of beds. If high fishing-induced mortality occurs on a scallop bed once it is fished, the future viability of that bed is in doubt since it cannot be assumed that it will be replenished by settlement of spat from elsewhere. More recent research confirms these findings, suggesting that cross seeding of scallop beds is rare and that recovery of depleted scallop beds in the short term will be heavily influenced by recruitment from adjacent scallop beds rather than from distant beds (FRDC, 2008/22).

This research suggests that as well as controls on the production and survival of larvae to metamorphosis, there are additional controls on the settlement and survival of recently settled juveniles on the sea bed, such as adverse small-scale hydrodynamic processes, the absence of suitable settlement substrata, and predation on settled juveniles (Young et al., 1990). There are also indications that the distribution of larvae is greatly affected by the strength and direction of winds. In calm summers, beds may be largely self-recruiting but during windy summers, settling larvae may originate from beds some distance away. (Young et al. 1992).

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[2] FRDC: 2008/022: Establishing fine-scale industry based spatial management and harvest strategies for the commercial scallop fishery in South East Australia.

[3] Pers. comm. Jayson Semmens, IMAS

In summary, recruitment is sporadic and intermittent, and more significantly, the stock recruitment relationship, of scallops is poorly understood.

2.3 Post-Settlement Growth is variable

Scallop growth is highly variable (Young et al., 1989). In their first year of growth, commercial scallops have been shown to reach a shell height of around 60 mm (approximately 70 mm shell length) (Dix, 1981, Sause et al., 1987).

Aging studies using growth rings within the shell have indicated that scallops with a shell height of 78 mm (88 mm shell length) varied in age from 2.5 to 6 years, depending upon the region from which they were collected (Fairbridge, 1953). Such variation in growth has been attributed to food availability and density-dependent restraints on growth (Young et al, 1989).

2.4 Scallops have highly variable levels of natural mortality

Scallops are known to have highly variable levels of natural mortality attributable to density dependent food shortages, seabed bottom type, disease environmental conditions and predation but also to inexplicable causes. Estimates for the European scallop *(Pecten fumata maximus)* suggest a combined natural and indirect fishing mortality of 10 – 50% per year on fished bed while mortality on unfished beds may be as low as 15% for newly recruited scallops. (DPI, 2005). There is only one study that has specifically investigated natural mortality in populations of *Pecten fumatus*. Based on tagging experiments in Port Phillip Bay, Gwyther and McShane (1988) reported an annual instantaneous natural mortality rate of 0.52, which is equivalent to an annual mortality rate of approximately 40 %.

Some scallop beds that were never fished commercially have also experienced unexplained die-offs e.g. Deal Island in 1990. More recently, extensive die-offs in the Commonwealth zone of Bass Strait have been attributed by industry to extensive seismic surveys. Following strong representations from industry, in 2010, AFMA commissioned research into shorter term effects of seismic surveying on adult commercial scallops. The research concluded that no short-term (< 2months) impacts on the survival or health of adult scallops were detected post theseismic survey but that potential longer term effects would need to be tested in a separate study (Harrington et al, 2010). Subsequent CSIRO testing also found no evidence of parasites or a biological cause of decline (AFMA, 2011).

2.5 Meat yield is variable

Scallops also show seasonal, geographical and annual fluctuations in meat yield. The south east Australian commercial scallop fishery is a roe-on fishery and therefore meat yield varies considerably in relation to the reproductive cycle and environmental factors including the location of the scallop beds. In general, meat yield is highest immediately prior to spawning (Haddon et al, 2006). Condition can also change quickly, requiring frequent surveys to monitor when scallops reach commercial conditions (AFMA, 1998).

3. A History of Reactive Management and Discord

The recent management history of the south eastern commercial scallop fishery reflects both the natural variability in the fishery and the complexities of managing one a stock under three jurisdictions, each with their own management objectives and arrangements.

Scallop fishing in south-east Australia began in the inshore waters of Tasmania and Victoria. Prior to 1963 the fishery was based in Tasmania where scallops were fished in the D'Entrecasteaux Channel and along the east coast. From 1963, a scallop fishery became established in Victoria with the start of the Port Phillip Bay scallop industry. Each state issued scallop licences for their respective 3 nm territorial waters and had control over the management regulations within their jurisdiction. There was no limited entry in either jurisdiction.

The fishery moved into Commonwealth waters of Bass Strait during the mid to late 1970s because new beds were discovered around Flinders Island and catches coastal grounds (i.e. within 3 nautical miles of the coast) around Tasmania and Lakes Entrance in eastern Victoria had declined.

As a result, there was a substantial transfer of fishing effort as most Victorian and Tasmanian boats were granted licences and started to fish in Commonwealth waters. High catch rates attracted large investments in the industry. The number of boats fishing in Commonwealth waters tripled, and because of the greater distance of the central Bass Strait grounds from Victorian and Tasmanian ports there was massive investment in expanding and upgrading the fleet, particularly through the Allied Fisheries Company, headquartered in Tasmania[4]. Thus a virtually unlimited expansion of the scallop fishery occurred. Scallop fishing became a year-round activity. In 1983 the Bass Strait Interim Management Regime was introduced. Under the Interim Regime, 97 Victorian and 134 Tasmanian based vessels were given access to the whole Bass Strait fishery (i.e. their respective State waters and Commonwealth proclaimed waters). By 1983, landings reached a record high of 2,856 mt meat weight (Sahlqvist, 2005) and the number of vessels in the fishery totaled 237 (AFMA, 2002). By the mid 1980's catch rates had declined and the Bass Strait scallop fishery in all jurisdictions had essentially collapsed. The rapid decline of catches continued as major beds were depleted and Banks Strait, the last major bed in Bass Strait was fished out during the 1986 season (McLoughlin 1991; Gwyther 1997). By 1987, Tasmanian vessels landed less than 61 mt in meat weight (a drop of 95% in 6 years) and Victorian vessels landed 207 mt, a drop of 90% over the same period (Sahlqvist, 2005). There were no catches in 1988 and 1989 and the Central Zone was closed to fishing in 1990. The Tasmanian fishery was closed for 8 years from the end of 1987 until 1995 to promote the rebuilding of the scallop stock.

The result was an industry with few short term prospects and a "legacy of excess fishing capacity that will ensure the rapid depletion of any new beds that may be found in the

[4] Allied Fisheries was a company set up as a tax minimization scheme which subsequently collapsed. The company built 46 scallop dredgers which were sold to syndicates of high-income individuals such as doctors and lawyers, and leased them back for fishing in Bass Strait. The company collapsed two years later but the vessels remained. http://www.smh.com.au/articles/2003/11/23/1069522472884.html?from=storyrhs and http://www.benhills.com/articles/scams-and-scoundrels/item/118-dark-side-of-the-aged-care-tsar

future" (Young, 1989). Against this background, attempts were made to rationalize management arrangements through jurisdictional integration.

3.1 1986: First attempt at jurisdictional integration fails: three jurisdictions remain under an Offshore Constitutional Settlement

In 1984, the Federal Government established a joint industry-government working group; the Bass Strait Scallop Fishery Task Force (BSSFTF). The main role of the BSSFTF was to provide advice on the long term management arrangements of the Bass Strait scallop fishery.

At this time, the position of the Australian Fisheries Service (which AFMA replaced in 1992) was that it would also be preferable for the Commonwealth to hand over control of scallop fishing to the States under an Offshore Constitutional Settlement (OCS) arrangement. It was argued that one less management agency would lead to more efficient management and administration, and lower costs. (Haddon et al, 2006).

Although the two State Governments agreed in principle, the differing histories and management objectives for each respective fishery made it difficult to reach agreement on common management arrangements for the Commonwealth fishery.

As a result, when the June 1986 the OCS agreement was finalised, three scallop fishing zones were recognised; a 20 nm zone adjacent to each State, to be managed by the respective States, and a Commonwealth-managed Central zone. This agreement was seen as a *first stage* in handing over responsibility for management of the Commonwealth Bass Strait scallop fishery to Victoria and Tasmania (Revill and Johnson, 2004). Under the agreement, access to the Central Zone was restricted to scallop vessels that qualified for either a Tasmanian or a Victorian state licence and had a Commonwealth Fishing Boat Licence. Ninety-seven Victorian and 134 Tasmanian-based vessels thus gained access to the Commonwealth Bass Strait scallop fishery. The OCS was effectively the first restriction placed on Tasmanian vessels participating in scallop fishing with each vessel licensed to operate in Tasmanian waters granted a unit per trip quota (calculated as six units per metre vessel length, with a maximum of 140 units.)

3.2 1994: Second attempt at jurisdictional integration fails: the OCS remains

At the end of 1994, the Victorian, Tasmanian and Commonwealth Ministers agreed to try and finalise a new scallop OCS as part of a review of all OCS arrangements in southern States, noting that there had been a long standing agreement that the Commonwealth would withdraw when the two States reached arrangement on joint management of the Central Zone. Despite extensive consultation between the respective Ministers, no agreement was reached, the reason given being 'historic differences between Victoria and Tasmania'. These differences have been attributed to the different economic motivations of scallop fishers in each State; fishers in Victoria were more specialised deriving their main income from scallops whilst in Tasmania, the fishery was seasonal, with many participants deriving a considerable proportion of their income from the rock lobster fishery. Consequently, the two main differences related to

minimum sizes[5] and the rationale behind the opening and closing of the season. As an alternative to joint management, Victoria suggested that AFMA take on responsibility for managing the whole fishery. However, no agreement was reached on revisions to the existing arrangements. (Revill and Johnson, 2004).

3.3 2004: Third attempt at jurisdictional integration fails: States unable to agree

In 2004, another attempt was made to rationalise the management arrangements in the fishery. A discussion paper, developed by the three management agencies and endorsed by industry members of the three scallop fishery advisory groups, explored options for rationalisation which included three possible options: single jurisdiction (Commonwealth), dual jurisdiction (Victoria and Tasmania) and a Joint Authority. Following the release of the paper, and a consultation process with industry, no consensus between Victorian and Tasmanian industry and management organisations could be reached. In particular, the Tasmanian stakeholders commented that they were satisfied with current Tasmanian management arrangements and did not want any increase in effort in Tasmanian waters or the Commonwealth managing scallops in Tasmanian waters. Victorian fishers also had concerns about the transition to a new management framework. The lack of support for rationalization resulted in no change to existing jurisdictional arrangements. The status quo remained and the three jurisdictions continued to manage the stock under their own fisheries management legislation.

[5] Measuring the minimum size of scallops has been a matter of some confusion in the past. In this report, minimum size refers to the distance measured in a straight line at the widest point across the shell.

4. Management Arrangements in the Three Jurisdictions

4.1 Key difference in legislative objectives

Current management arrangements obviously reflect the legislative objectives in each of the three jurisdictions. Table 1 summarises the overarching legislative objectives under the following acts:

1. The *Living Marine Resources Management Act 1995*, Tasmania
2. The *Fisheries Act 1995*, Victoria
3. The *Fisheries Management Act 1991*, Commonwealth of Australia

Whilst there are consistencies of general objectives particularly to ensure resource sustainability, Table 1 highlights where there are differences which contributed to the evolution of different management arrangements in the three jurisdictions; notably the absence of clearly specified:

- social ("community") objectives (Commonwealth)[6];
- maximisation of economic return objectives (Tasmania[7] and Victoria); cost effectiveness objectives (Tasmania), and;
- accountability objectives (Victoria).

[6] With the exception of the definition of the principles of ecologically sustainable development under section 3A (a) of the *Fisheries Administration Act 1991* which states that "decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equity considerations."

[7] However maximisation of economic return and cost effective management are policy objectives in Tasmania under the February 2010 Draft DPIWE policy document "The Management of the Tasmanian Scallop Fishery-Policy and Decision Making Guidelines."

Table 1 Comparison of Legislative Objectives

Category of Objective	Tasmania	Victoria	Commonwealth
Sustainability	(a) increase the community's understanding of the integrity of the ecosystem upon which fisheries depend; and	(a) to provide for the management, development and use of Victoria's fisheries, aquaculture industries and associated aquatic biological resources in an efficient, effective and ecologically sustainable manner;	(b) ensuring that the exploitation of fisheries resources and the carrying on of any related activities are conducted in a manner consistent with the principles of ecologically sustainable development and the exercise of the precautionary principle, in particular, the need to have regard to the impact of fishing activities on non-target species and the long-term sustainability of the marine environment;
	(b) provide and maintain sustainability of living marine resources; and	(b) to protect and conserve fisheries resources, habitats and ecosystems including the maintenance of aquatic ecological processes and genetic diversity;	
Maximising economic returns		(d) to facilitate access to fisheries resources for commercial, recreational, traditional and non-consumptive uses;	(c) maximising the net economic returns to the Australian community from the management of Australian fisheries;
Community	(c)take account of the community's needs in respect of living marine resources; and	(c) to promote sustainable commercial fishing and viable aquaculture industries and quality recreational fishing opportunities for the benefit of present and future generations; (e) to promote the commercial fishing industry and to facilitate the rationalisation and restructuring of the industry	
	(d)take account of the community's interests in living marine resources	(e) to promote the commercial fishing industry and to facilitate the rationalisation and restructuring of the industry;	
Cost effective management		(a) to provide for the management, development and use of Victoria's fisheries, aquaculture industries and associated aquatic biological resources in an efficient, effective and ecologically sustainablemanner;	(a) implementing efficient and cost-effective fisheries managem ent on behalf of the Commonwealth; (e) achieving government targets in relation to the recovery of the costs of AFMA
Accountability			(d) ensuring accountability to the fishing industry and to the Australian community in AFMA's management of fisheries resources

4.2 Management in the Tasmanian Zone: Spatial Management

Tasmania is considered by active operators, to have been more successful in developing co-management approaches which gives priority to maintaining a sustainable fishery and increasing the chances of having an open season every year to maintain processing capacity and markets. These arrangements have evolved in response to the difficulties in managing a highly variable stock in combination with excess fishing capacity resulting in multiple year fishery closures in 1987-1994, 2000-2002 and 2008-2010 as well as short season openings 1995-1996 and 1998-1999 and 2000-2002.

In 2000, a scallop management plan introduced transferable units and provisions for spatial management. In addition, to meet the objectives of the *Living Marine Resources Management Act 1995,* minimum and maximum quota holdings were also introduced. A total of 10,730[8] scallop units were issued to 109 operators based on the length of the vessel. Each scallop unit was valued at 400 kg effectively giving a TAC of 4258 tonnes.

Following the reopening of the fishery in 2003, a spatial management strategy was developed and has continually been refined since then. The main idea behind spatial management was to protect areas of scallops by closing them to fishing, such that they would provide a spawning biomass to replenish fished areas, and provide undisturbed habitat for the settlement of juveniles (Haddon et al, 2006). The management plan introduced a "most closed, little open" approach where most scallop beds were closed and only small area(s) open. It also included flexible maximum catch allocation per quota unit within the fishery, size and discard rate limits.

In 2005 a five year management plan introduced a permanent and season transferable scallop unit system to allow fishers to adjust their level of investment in the fishery to suit their individual operations and to encourage the restructure the fishery. The plan also enabled the Minister to alter the scallop unit value enabling a flexible TAC to be set. The determination of scallop unit value is based on relative abundance surveys and estimates as well as processing and market absorption capacity by taking into account TACs set in Commonwealth and Victorian jurisdictions. Setting a flexible TAC in this way recognised that accurate biomass estimates for the fishery were not only expensive but also problematic in a naturally variable fishery such as scallop. Whilst the kg/scallop unit is fixed at 400kg, the Minister determines the percentage of units that can participate in a season's fishery. For example, if there was a low estimate of abundance (and taking into account economic factors) only 40% of the units are allowed to be fished whilst a high estimate of abundance would allow 80% to be fished. In 2011, the TAC was set at 2552 mt.; equivalent to a scallop unit value of 240 kg (this is equal to a moderate estimate of abundance).

At times of low abundance, low unit values potentially make it difficult for small operations to operate, as these operators would need to lease in additional quota to maintain a viable operation. When the lease price is high, support among these operators for a conservative approach to TAC setting is weakened unless they decide to lease out, rather than fish, their quota. Conversely, those operators that have

[8] The number of units in the fishery in 2011 is 10,633.

traded/invested in shares and have significant shareholdings consider that conservative TACs, in line with biological and market conditions, are essential.

Both pre-season and in-season surveys determine which areas are open and an industry committee manages rotational harvesting once an area is open. Although not a formal harvest strategy, Tasmania has a de facto one described in its 2010 Draft Policy and Decision Making guidelines. In summary, current Tasmanian arrangements are as follows:

- Pre-season and in-season surveys under the direction of IMAS, focus on areas known to contain historically fished beds, results are then used to determine relative abundance. Exploratory and opportunistic surveys are also permitted in other areas to allow the discovery of new beds.
- To open an area, the minimum biological criteria are:
    - At least 80% of scallops must be greater than 90mm shell width or aged 3+ years having had at least 2 major spawning opportunities.[9]
    - A maximum 20% discard threshold (20% of catch below the minimum size).
- In addition economic criteria are taken into consideration:
    - Candidate areas meeting minimum biological criteria can be ranked after considering commercial viability (largely determined by ScFAC members)
    - A meat recovery guideline of less than 85 scallops/kg
    - If there are more than 30 active vessels then ScFAC will assess and recommend the minimum number of units to activate a licence, which would then require legislative change.
- Harvest plans are developed in collaboration with industry setting season dates, TAC and initial open areas for the season. As the season progresses the harvest plan is further refined/amended after considering updated information from surveys, commercial fishing information and if appropriate, candidate areas can be gradually released.

While it was hoped that the 'paddock fishing' and associated management arrangements would 'smooth' fluctuations in catches and assist with market supply, the fishery closed again between 2008 and 2010, and while expectations for the 2011 season were high, these have been severely curtailed due to a mass mortality on the White Rock beds.

4.3 Management in the Victorian Zone: Maintaining an open fishery each year

Since the OCS agreement in 1986, the scallop fishery in Victoria has been managed by a combination of input controls and output controls with an aim to the fishery open each year[10]. In 2000, a trial period of commercial fishing at the start of each season was

[9] This was first implemented by the Commonwealth and was from a recommendation of a 1985 CSIRO research project.

[10] ScallopMac 1, 2001;Pers comm. Mark Edwards, Fisheries Victoria.

introduced to enable decisions to be made within this period about whether to continue fishing. Catch rates and size and condition of scallops are monitored and if considered poor, then the fishery is reviewed and closures of the entire fishery considered. This is a decision taken jointly with industry. No decision rules have been documented as to what level of catch rates constitute "good" or "poor." In addition to a minimum shell size (80mm shell width) and a voluntarily agreed 20% discard rate, a condition criterion is also voluntarily agreed - the number of scallop meats per kilogram must not exceed 100 meats/kg.

The TAC is based on historical average catches. A conservative TAC is set for the first three months of the fishery to monitor catch rates and scallop size. If the results are positive then, the Department, in consultation with industry, keeps the fishery open for the rest of the season. Since 2003⁄4 the TAC has been set at 1504 mt. but it has never been binding. Catches have ranged from 14% to 60% of the TAC, with a median of 30% of the TAC. The TAC is distributed equally amongst the 91 current licence holders giving an allocation of 16.5 mt. /licence.

In 2009, a survey was carried out to assess the relative abundance of scallops, utilising the same methodology and researchers (IMAS) used in Tasmanian and Commonwealth waters. The survey showed low scallop abundance and a subsequent stakeholder workshop held in December 2009 voluntarily agreed to close the fishery for 2010 and another stakeholder workshop agreed to close the fishery in 2011[11]. The TACC was set at zero. At both these meetings, agreement on a set of criteria for re-opening the fishery was unsuccessful. At the 2011 meeting, Fisheries Victoria indicated the intention to conduct a survey of the fishery in late 2011 or early 2012 covering the same/similar fishing grounds as the 2009 survey to determine population abundance scallop condition. These results will again be presented to a stakeholder workshop to determine the TACC for 2012.

4.4 Management in the Commonwealth Zone: the ascendancy of the Harvest Strategy

Limited entry and closures of juvenile beds were introduced in 1986. In 1991, the Bass Strait Scallop Consultative Committee was formed to develop a preliminary management plan for the Commonwealth fishery (ABARE Fisheries Surveys Report 1998). Management restrictions adopted included no further entry to the fishery and restrictions on the transferability of licences.

This preliminary management plan introduced individual bag limit quotas, catch per trip limits, a '20% discard rate' requirement, minimum shell width size of 80mm, the 'two major spawnings' criterion and the closure of beds. The 20% discard rate was designed as a yield optimization strategy, through limiting the capture of, and minimizing incidental mortality to, small scallops. The 'two major spawning' criterion was a parallel management requirement, designed to allow scallops two major spawnings prior to their being fished, without regard to size. Two major spawnings from adults was considered essential if sufficient reproductive output to the fishery was to occur. Seasonal closures were also adopted, which closed the scallop season during the

[11] These workshops, although open to all licence holders, were attended (or written submissions received) by less than 8 out of the 91 licence holders in Victoria.

summer months in order to minimize the impact of scallop dredging during the highest spatfall (settlement) period, and stop the landing of scallops in poor condition. [12]

However the fishery collapsed again in the late 1990s and was closed for the years 2000-2003.

In 2003, it was determined that the scallop stocks within the Commonwealth managed areas were showing signs of recovery and a commercial scallop season was opened. Spatial management was implemented, where known beds were closed to protect the adult biomass and the rest of the fishery was opened. This type of management has been described as "most open, little closed" (Haddon et al, 2006).

In 2005 the BSCZSF Management Plan came into effect implementing transferable quota, Statutory Fishing Rights (SFRs), Boat SFRs and increasing the minimum shell length size from 80mm to 90mm. Each of the 103 SFR holders were allocated 3500 SFRs of commercial and doughboy scallops.[13]

At the end of 2005, the then Minister for Fisheries, Forestry and Conservation issued a Ministerial Direction to AFMA under section 91 of the Fisheries Administration Act 1991. The Direction ordered AFMA to implement a zero TAC for three years (due to its overfished status) and required the development of a harvest strategy. In 2007, the Commonwealth Department of Agriculture, Fisheries and Forestry (DAFF) released a framework policy document to guide the development of harvest strategies for key commercial species managed by AFMA.[14] This contained default settings for key elements of a harvest strategy.

In the same year, the draft harvest strategy for BSCZSF was released. The harvest strategy introduced spatial management, which became more closely aligned to Tasmania, with the replacement of the "most open, little closed" approach to the "most closed, little open" approach. In drafting the harvest strategy, the authors emphasized that, "... this fishery does not conform well to the biological assumptions underlying the [Harvest] Policy reference points... [because it has] naturally sporadic and fluctuating availability and intermittent recruitment..."

The key elements of the current harvest strategy (HS), first implemented when the fishery reopened in 2009, are:

- End of season and pre-season surveys focused on areas known to contain historically fished beds, used to estimate the biomass and determine areas of high density that have the potential to be fished ('viable' areas). Exploratory fishing may be permitted in other areas to allow the discovery of new beds.

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[12] The two-spawning criterion is not without problems. In 1997, the AFMA Fisheries Assessment Report observed that this criteria, despite being "a fundamentally sound principle was not without problems as it was seldom possible to determine accurately the age of a particular size class of scallops. Also, as scallops are sold roe-on product, scallops having completed a second spawning do not reach marketable condition until they are 3+ to 4 years old. Given the variation in mortality, this means that some beds would not be fished.

[13] In 2007, boat SFRs ceased to exist; participants only needed quota SFRS to participate in the fishery.

[14] DAFF, 2007. Commonwealth Fisheries Harvest Strategy: Policy and Guidelines

- A TAC set for the whole fishery which is the estimated biomass in the areas to be opened to fishing.
- Areas opened to fishing are fished progressively (paddock method) guided by a Bass Strait Industry Management Committee applying criteria from *Guidelines for the movement of voluntary industry boundaries in the BSCZSF developed in March 2010*.
- A default fishing season is 1 June to 31 December, subject to review on the basis of survey results.
- The maintenance of the 20% discard rate (20% of catch below the minimum size).
- Closure of the fishery unless the surveys indicate that the following conditions can be met:
- At least two viable areas (5 × 5 nm) are available; 'viable' is defined in terms of scallop size, discard rate and density.
- At least 40% of viable areas, containing a total biomass of at least 500 t, remain closed to fishing at all times.
- When multiple viable areas are available, they will be opened on a rotational or staged basis.
- The Harvest Strategy rules apply separately to the eastern and western regions of the fishery except for TAC which applies to the fishery as a whole.

On the basis of this harvest strategy, the TAC is set through identifying viable scallop beds and then calculating the biomass of those beds. According to the decision rule in the harvest strategy, the TAC equates to the estimated biomass of the areas to be opened. The selected TAC is influenced by economic criteria, in particular the capacity of processors and the ability of the market to absorb product. For example, in 2009, despite higher biomass estimates, the Commonwealth TAC was set at 3000 mt. based on advice provided by industry members that there would be no export market and the processing capacity would not be able to handle a larger TAC (ScallopRAG 17 and Scallop MAC 19 2010).

4.5 AFMA's current harvest strategy insufficiently adaptive

Application of the AFMA harvest strategy in 2009 and 2010 revealed that certain operational aspects of the strategy were difficult to apply in the context of a highly variable scallop fishery. In 2010 ScallopRAG and ScallopMAC explored options regarding the inclusion of scallop condition, removing minimum size requirements in season, the ability to move between areas in-season and the need for market maintenance so markets have a consistent flow of quality product. Concern was expressed about the appropriateness/adequacy of the 500 metric tonnes, the limit reference point, the use of conventional target reference points and effectiveness of current definitions of viable areas. There was also concern about the slowness of decision-making processes when

new areas needed to be identified/open in-season and the benefits of end of season surveys when pre-season surveys were also found to be necessary.[15]

The review was scheduled for completion in August 2010 but has been delayed according to AFMA, in order to incorporate research becoming available in late 2011 and early 2012.[16] This has created a considerable amount of frustration for active operators in the fishery.[17] At the February 2011 ScallopMAC, AFMA tabled a Harvest Strategy Options paper (dated December 2010) which has tried to address the issues raised in 2010 and introduce the idea of "meta-rules" to over-ride the harvest strategy where there are exceptional circumstances. The question remains however, whether these circumstances are the rule rather than exception.

For operators fishing in both Tasmania and Commonwealth waters, the differences between the more adaptive Tasmanian management arrangements and the less flexible/adaptive Commonwealth harvest strategy have been noticeable and a cause of some antagonism towards AFMA.

In particular, the main issues[18] where the Commonwealth arrangements are considered less flexible/workable than Tasmanian arrangements are the:

(1) exclusion of non-viable beds in biomass estimates;

(2) requirement of biomass estimates and the related high survey costs to obtain these estimates, and;

(3) timing of and incentives for industry surveys.

The exclusion of non-viable beds in biomass estimates and in the pool of viable beds. A "non-viable" bed in the Commonwealth HS is a bed where more than 20% of scallops are less then 90mm or if the bed has been monitored to show that there have been at least two major spawning events. Nonviable beds are not taken into consideration when estimating TAC, which only looks at the biomass of the beds to be opened. To open a viable bed, the HS requires that there must be at least one other viable bed (or bed that will become viable within 12 months) with greater than 500 tonnes biomass to be closed to fishing. Thus non viable beds that are close to becoming viable are excluded from the pool. In Tasmania, known areas of juvenile scallops, maturing scallops and harvestable scallops are all taken into account when deciding on annual harvest and areas to fish thus allowing flexibility in the selection of harvestable areas.

The requirement for biomass estimates. The Commonwealth HS requires an estimate of biomass which is information hungry and therefore relatively expensive. There is also some doubt as to the accuracy of these biomass estimates. Tasmania does not undertake biomass estimates because of the extensive resources required to obtain reliable data. Instead, Tasmanian undertakes less costly/data hungry surveys to determine relative abundance.[19]

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[15] Pers. comm. industry stakeholders

[16] ABARES led project Reducing Uncertainty in Stock Status (RUSS) and IMAS project Establishing fine-scale industry based spatial management and harvest strategies for the commercial scallop fishery in Australia

[17] Pers. comm. industry stakeholders

[18] Pers. comm. industry stakeholders

[19] DPIPWE, (DRAFT). The Management of the Tasmanian Scallop Fishery- Policy and Decision Making

Timing and incentives for industry surveys. The requirement to have data to inform the Commonwealth TAC setting process has meant that biomass surveys are necessary at the end the fishing season when operators are usually preparing to fish in other fisheries. This has meant that there are few operators willing to nominate to carry out surveys. In addition, the incentive to help cover the costs of these surveys, research quota, is not able to be carried over into the next season contribution to a greater reluctance to undertake surveys. In Tasmania, research quota is also allocated to cover targeted survey costs but can be carried over into the following if there is a season or until there is a season.

There have also been difficulties with the AFMA process to issue scientific permits to undertake exploratory/opportunistic surveys. Although AFMA has recently improved the timing of the approval process, permits have been known to take up to a month to issue and thus the surveys are no longer "opportunistic". This has resulted in operators losing interest in undertaking them and feeling antagonistic towards AFMA. In Tasmania, opportunistic survey permits can be issued within 24 hours and provide sufficient flexibility to operators to whilst they are in transit to and from a port or participating in another fishery. In response to these difficulties, AFMA is currently considering a revised permit approval process to allow opportunistic surveys to be undertaken without lengthy approvals processes.

4.6 Management arrangements across jurisdictions have more similarities than differences

Despite the evolution of different management arrangements, there are more similarities than differences, as Table 2 shows. Similarity does not mean the management arrangements are identical. Table 2 shows that actual management measures are already aligned for much of the fishery. Victoria has been considering a harvest strategy and is in the initial stages of developing one (ScallopRAG 17 2010, Scallop Status Report, Victoria 2010).

Guidelines. February 2010.

Table 2: Similarities and differences of management arrangements in the three jurisdictions

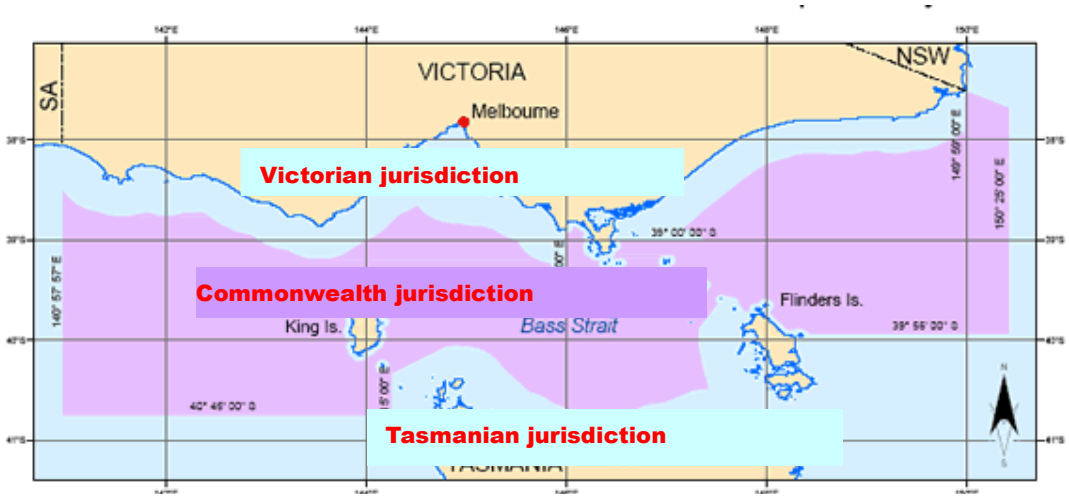
	Tasmania	Victoria	Commonwealth
Similarities	✔ 90 mm or two spawnings	✔ 80 mm	✔ 90 mm or two spawnings
20% Discard rate	✔	✔	✔
Relative abundance estimates	✔	✔	✔
Targeted surveys	✔	✔	✔
Closure of juvenile beds	✔	✔	✔
TAC	✔	✔	✔
Transferable quota units	✔	✔	✔
Targeted surveys	✔	✔	✔
Quota decrementation	✔ Weighed at wharf	✔ Weighed within 20 minutes of landing	✔ Weighed at wharf and then at fish receiver premises (this weight decremented
Logbooks	✔	✔	✔
Catch Disposal Records	✔	✔	✔
Fish Receiver Records	✔	✔	✔
EPBC export accreditation	✔	✔	✔
Differences			
Harvest Rules/Strategy	✔		✔
Biomass estimates required			✔
Condition criterion	✔ < 85 scallops/kg	✔ <100 scallops/kg	
Closed season fishing season	✔		✔
Quota unders and overs		?	
Minimum and maximum holdings	✔		✔
Requirement to deploy observers[20]			✔
Prior reporting	✔	✔	

[20] In Tasmania, there are no statutory rules governing the requirements for observers to be carried onboard scallop vessels during normal fishing operations or while undertaking surveys. However the issuing of permits to undertake surveys often stipulate that data must be collected in accordance with the instructions provided by either the IMAS survey coordinator or the Department's Scallop Fisheries Manager, either of which could be present on the vessel. Additionally, permit conditions can stipulate the carrying of, or access of observers, if deemed warranted. Commonwealth observer requirements are included in conditions and recommendations from SEWPAC's assessment of the BSCZSF. These priorities are reflected in the Bycatch and Discarding Work Plan for the BSCZSF, currently under review. Observer days are included in the contract for stock assessment being undertaken by IMAS (three year contract).

5. The Current Fisheries

The area of the fisheries in the three jurisdictions is shown in Figure 1. Although the area is large, actual fishing occurs in exceptionally small areas.

Figure 1: Area of the fishery (Source: AFMA)



Tasmanian jurisdiction extends between 3 and 20 nautical miles into Bass Strait and 200 nautical miles out from the remainder of the State's coast. The historical fishing area for the commercial fishery has included waters in the far northwest, north eastern Tasmania, around Flinders Island including Banks Strait, and waters on the east coast from Eddystone Point to Marion Bay. The commercial fishery last harvested in the D'Entrecasteaux Channel in the early 1980s.

Victorian jurisdiction is 20 nautical miles out to sea from the high water mark of the coast of Victoria. In this zone, scallops are found in two broad zones from the border with South Australia generally to the longitude 146° East (which intersects with the Victorian coastline west of Wilson's Promontory); and from the latitude 39° South, off the eastern shore of Wilson's Promontory generally to a point off the border with New South Wales. The majority of the commercial fishery is conducted from the ports of Lakes Entrance and Port Welshpool.

Commonwealth jurisdiction, the Bass Strait Central Zone Scallop fishery comprises the area between the two state zones, indicated by the purple shading in Figure 1.

Despite the area of a fishery being large, research using VMS data in the Tasmanian and Commonwealth managed fisheries show that, fishers fish in discrete beds because scallop beds / areas of higher scallop abundances occur in relatively small discrete patches within the open areas (Haddon 2006). Within the Tasmanian zone, larger areas are fished more intensively, relative to the Commonwealth-managed fishery. For example, Tasmanian east coast scallop beds had a higher proportion of fished areas impacted at high intensities (approximately 30 – 40% of total area fished) compared to areas of more sparse scallops north-east of Flinders Island, in the Commonwealth-managed area, where less than 5% of total area is fished. This has been attributed to habitat differences, settlement patterns, and/or environmental differences and the increased successful settlement within areas to the East of Tasmania within more recent

years. Such 'good' scallop beds lead to higher catch rates and greater economic efficiency than lower density, more patchily distributed scallop beds.

5.1 Historical catch and effort reflects the natural high variability in the fishery

Historical catch and effort data for the southeastern Australian scallop fishery was compiled in 2005 (Sahlqvist) for an AFMA Research fund project. For reasons detailed in the report, catch data prior to 1990 is subject to considerable uncertainty and therefore has been excluded in this report. Using data compiled in the Sahlqvist project up until 1993 and published catch data from the three jurisdictions up until 2009, Figure 2 shows total catches and Figure 3 the breakdown of catch by jurisdiction. Both these figures highlight the variability in total catches which in turn reflects both the inherent natural variability of the resource as well as the extent to which the market can absorb product. Figure 3 also shows the variability of catches by jurisdiction showing that since the closure of Port Philip Bay in 1996, Victoria has maintained a relatively steady low catch until 2010 when the fishery was closed, whilst catches and Tasmania and the Commonwealth catches reflecting multi-annual closures in each of these jurisdictions.

Figure 2: Total Scallop catches in the BSCZSF, Tasmania and Victoria 1991-2010

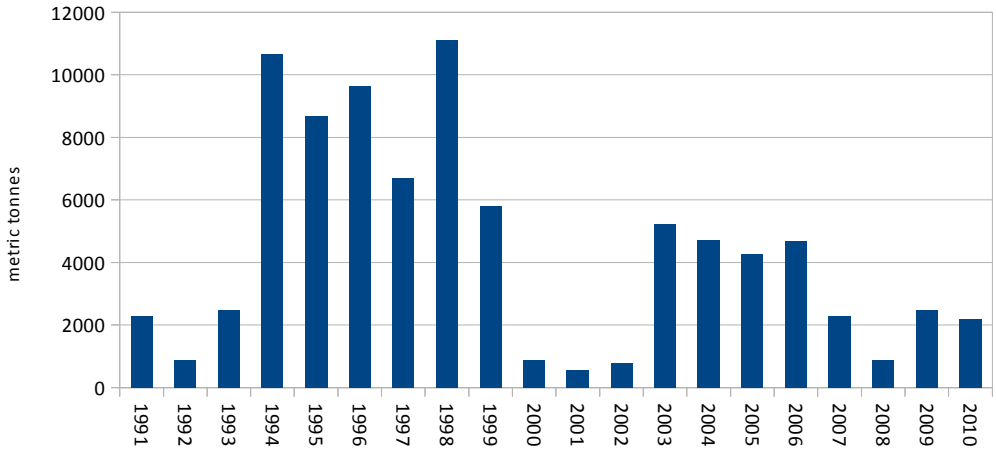
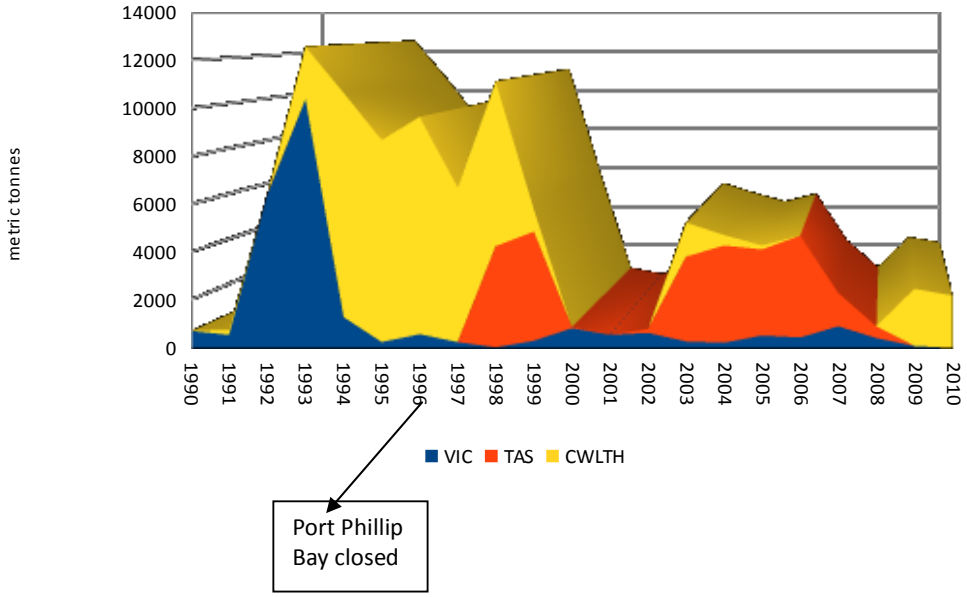


Figure 3 Scallop catches by jurisdiction 1991-2010



5.2 Combined TACs not binding

Figure 4 shows catch as a percentage of the TAC for the three jurisdictions over the period 2004-2010. Combined TACs have not been binding (i.e. catches are lower than TACs) and since 2007 have not exceeded 50%. However comparison of within jurisdiction TACs/catches show differences as shown in Figure 5. For example, in Victoria, with the exception of 2007 (when the Commonwealth fishery was closed), catches in Victoria have rarely exceeded 30% of the TAC suggesting that significant latent effort exists in this jurisdiction. In Tasmania and the Commonwealth, catches as a percentage of the TAC have fluctuated. The extent to which this is an indicator of latent effort, or driven by price and processing capacity would require further investigation.

Figure 4: Percentage of TAC caught all jurisdictions combined 2003-2010

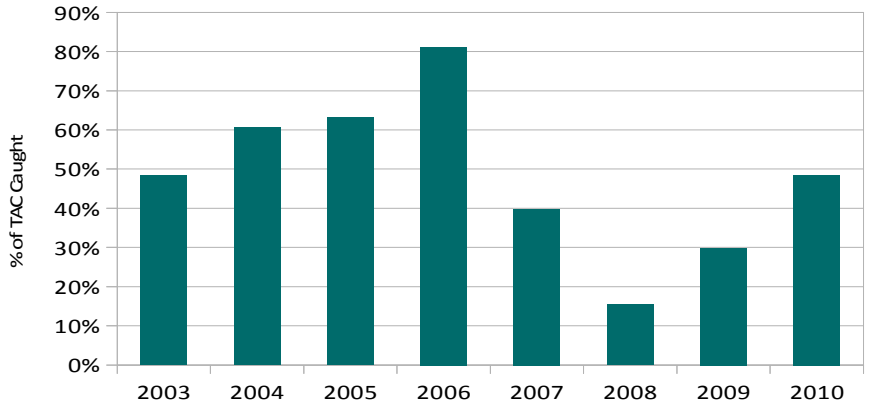
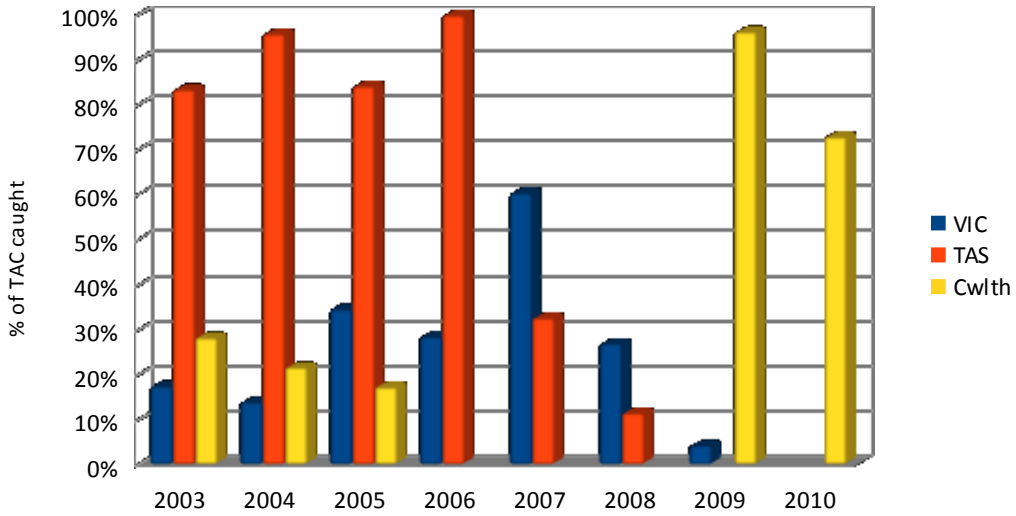


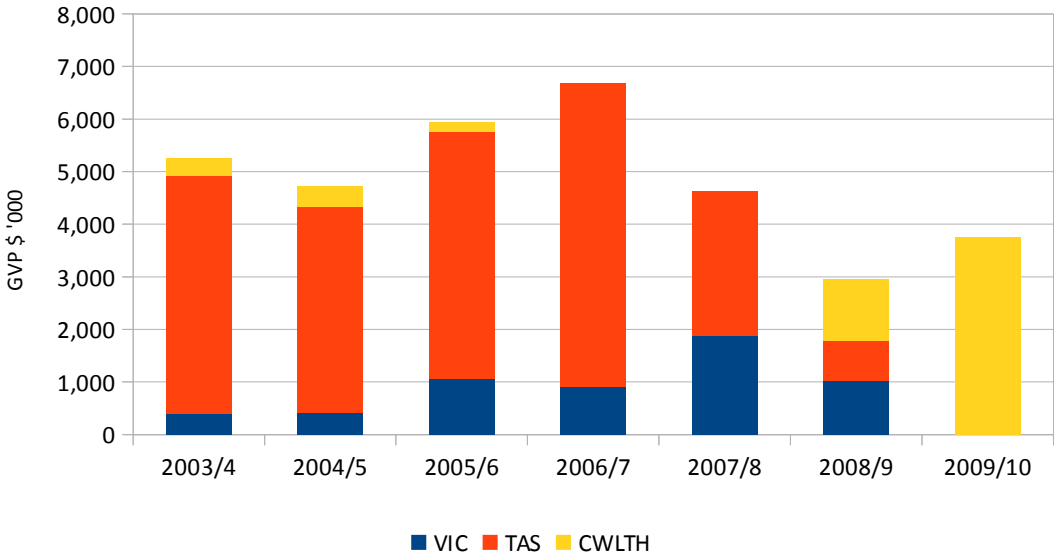
Figure 5: Percentage of jurisdictional TAC caught 2003- 2010



5.3 GVP has not exceeded $ 7 million since 2003/4

As Figure 6 shows, over the period 2003/4-2009/10, GVP of the whole fishery has not exceeded $7 million, representing around 0.2% to 0.3% of the total GVP of Australian wild caught fisheries. Until the closure of the fishery in 2009 and 2010, Tasmania has accounted for the greatest proportion of GVP (and catch), superseded by the Commonwealth in 2009/10 when the fisheries in Tasmania and Victoria were closed.

Figure 6: Estimated GVP in the southeastern Australian scallop fisheries



5.4 Economics of fishing

The economics of fishing is obviously highly dependent on the proximity of the vessel to the fishing grounds as the major component of variable cost is fuel. It is also highly dependent on size of the operation; whether quota is owned or leased; whether the operator has full equity in his vessel and gear and; whether the operator has endorsements more than one jurisdiction or in other fisheries. Despite the variability, minimum catch rates are used as a criterion to determine whether to open a successive rotational zone e.g. 400 kg/hour in the BSCZSF (AFMA 2011b), White Rock in Tasmania (Harrington et al, 2008). This has caused some tension between smaller and larger operators.[21] In a 2006 survey of fishers involved in the industry initiated rolling opening harvest regime in Tasmania, operators were asked about their minimum economically viable catch rates. The answer varied between 2 – 6 tonnes per day. Four fishers suggested a range of 2 – 3 tonnes per night (i.e. during darkness as these were night fishers), while three fishers suggested 4 – 5 tonnes per night. One fisher commented that they needed to catch a full load of fish (i.e. 5 – 6 tonnes per day) in two days in order to fill a truck to send to Victoria (Harrington et al, 2008). Whilst costs may change according to the size of operation and the domestic prices of fuel, beach prices have been relatively steady over the last few years.[22]

5.5 Scallop fishing is a part of a more diversified fishing business

Active operators in the Southeastern scallop fishery also participate in other fisheries. In addition, as many scallop entitlement holders hold entitlements for other fisheries, they may choose not to participate in the scallop fishery. In Tasmania, operators have

[21] Pers. comm. Ian Cartwright; Bob Lister
[22] Pers. comm. Alan Barnett, Andy Watts

entitlements predominantly in the rock lobster fishery.[23] In Victoria, which was formally mostly a single species fishery, operators also fish in the Victorian inshore trawl, Commonwealth Shark Fishery, and the Southern Squid Fishery[24]. In the Commonwealth, approximately 45% of the Scallop clients hold SESS concessions; approximately 25% hold squid concessions and 18% hold other concessions such as tuna concessions.[25] Currently there are estimated 15-24 active operators in the whole fishery (comprising all three jurisdictions); most of whom have consolidated or lease in quota, hold entitlements across jurisdictions as well as hold concessions in other fisheries.

5.6 Processing capacity and domestic demand has been affected by supply fluctuations

Scallops are landed either in Victoria or Tasmanian for processing and are generally sold fresh to domestic markets. Scallops are processed in Victoria and Tasmania and sold roe-on, with the bulk of processing occurring in Victoria. Currently, the total estimated processing capacity in Tasmania and Victoria is around 3,000 to 4,000 tonnes. Once processed, approximately 80% of southeastern Australian scallops are sold in Tasmania. (Scallop RAG 16, December 2009)

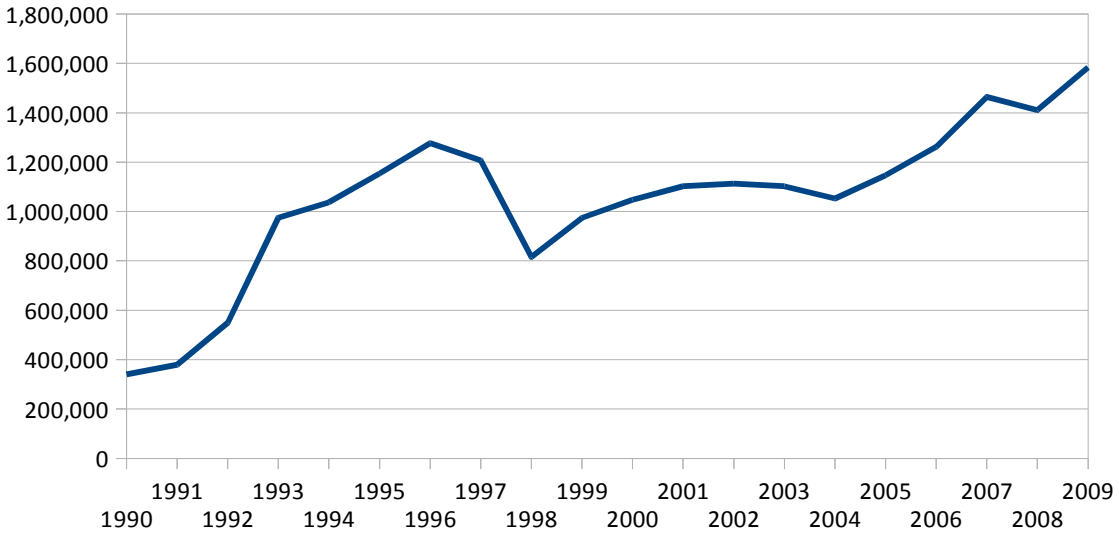
Processing capacity has fallen in recent years due to historical fluctuations in supply and closures in all the jurisdictions. There is general agreement amongst managers and industry that management arrangements should contribute to a regular supply of scallops to maintain limited processing capacity and maintain markets through regular and predictable supply.

Fishers are mostly only catching scallops for which they already have a buyer (processor). This agreement between the fishing and processing sectors of industry therefore made trip/ period limits a redundant regulation within the current Tasmanian and Commonwealth scallop fisheries structure (Haddon et al, 2006).

Currently, there are no export markets. This has been attributed to the growth in the availability of relatively low price of imported farmed scallops (see Figure 7), irregularity of supply of south eastern Australian scallops and the high Australian dollar. In the past, France was the predominant export market for block frozen or IQF scallop meat from south eastern Australia and some frozen in the shell whole scallops were also sold to Southeast Asia.

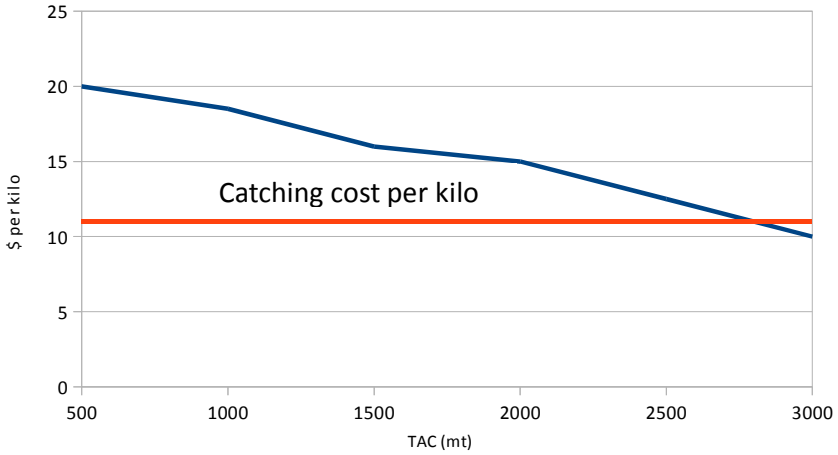
[23] Pers. comm. Steve Withers, DPIPWE
[24] Pers comm. John Vaytauer, Fisheries Victoria
[25] Pers. comm. Anne Shepherd, AFMA

Figure 7: World Production of Farmed Pectinadae



A simple analysis carried out by the Commonwealth Bass Strait Scallop Management Advisory Committee[26] noted that both processing capacity and limited market demand are an important constraint on profitability. The analysis, graphically illustrated in Figure 8, assumed an $11 cost per kilo to catch scallops irrespective of the size of the TAC which is also assumed to be fully caught. As catches increase, limited processing capacity combined with saturation of the market leads to a break-even beach price ($11/kilo) at around 2750 mt. This is a relatively simplistic analysis as it assumes that all operators incur the same costs but it does demonstrate that both the cost structure of operators as well as the demand for southeastern commercial scallops constrains catches. As described in section 5.4 cost structures amongst operators vary and consequently individual's break even prices may be higher or lower than the $11 presented in the analysis.

Figure 8: Relationship between price and volume south east scallop fishery based on ScallopRAG estimates (assumes 10% recovery)

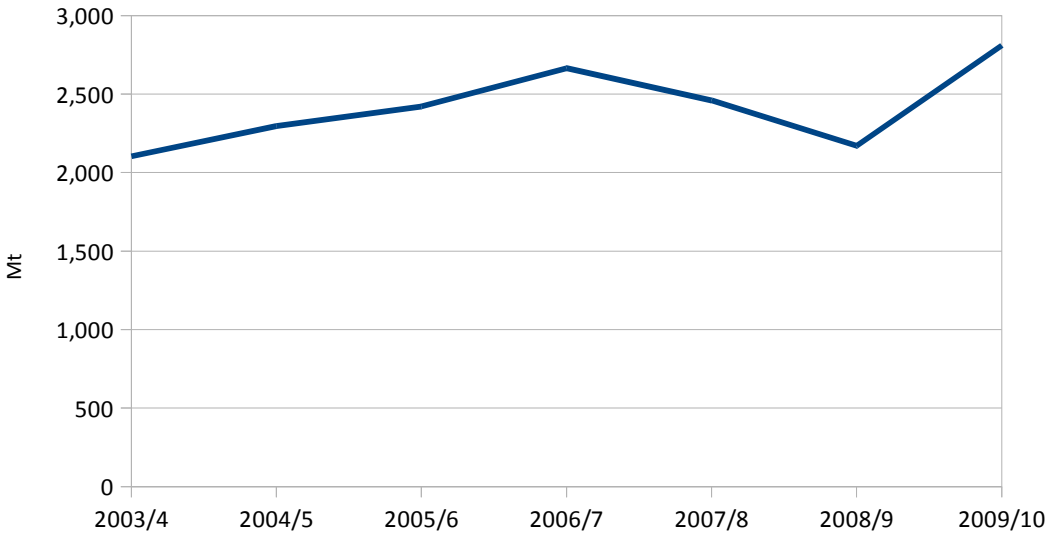


[26] ScallopMAC 18. http://www.afma.gov.au/wp-content/uploads/2010/07/chair_summary_scallopmac18.pdf

5.7 Imports of scallops are growing slowly

Southeastern Australian commercial scallops compete in domestic mainland markets with often cheaper, imported product, farmed in China and Chile. The current benefits of imported product are regularity of supply and lower prices. Figure 9 shows the trend in imports since 2003, which is generally upwards.

Figure 9: Imports of fresh and frozen scallops 2003-2010 (ABARE)



6. Fishing Entitlements

In the Southeastern scallop fishery as a whole, there are therefore 229 entitlements to fish divided between the three jurisdictions.

In Victoria, a Scallop (Ocean) Fishery Access Licence is required to participate in the commercial fishery. The number of licences is capped at 91. Licences and quota units, allocated to each licence holder can be permanently transferred (sold) or leased annually. The characteristics of the Victorian fishing entitlements are summarized in Table 3.

Table 3 Characteristics of Victorian entitlements

Characteristics	Victoria
Licences	**Licences**
Eligibility	'Fit and proper person' to hold (*Scallop (Ocean) Fishery Access Licence*). Capped at 91.
Duration	*"…continues in force for the period specified in the licence of a particular class to a person."*Generally, for one year, unless otherwise specified by the Secretary for longer duration, up to a maximum of 5 years. However, the Secretary has an obligation on application by the licence holder, to renew licences in perpetuity. The Secretary has the power to cancel or suspend a licence if certain circumstances are met.
Conditions on permanent transferability (sales)	Classification of Scallop (Ocean) Fishery Access Licence as 'transferable.' Application to be made to the Secretary to transfer with approval subject to a 'Fit and proper person' test together with other relevant eligibility criteria apply, including licence not being subject to action, transfer must have approval by any registered financial interests.
Conditions on temporary transfers (leasing)	No conditions. Licence holders are able to nominate another boat to operate their licence. The nomination is subject to Secretary approval and remains in force until a new nomination is approved.
Quota units	**Quota units**
Eligibility	Holder of relevant licence (*Scallop (Ocean) Fishery Access Licence*)
Minimum and maximum holdings	The Minister may set minimum and maximum holdings when issuing an Initial Quota Order, which may be amended by order at any time. Currently there are no minimum and maximum holdings for the scallop fishery.
Conditions on permanent transferability (sales)	The distinction between 'permanent' and 'temporary' transferability cannot be made. TAC is set each season and each licence holder is granted quota representing an equal share of the TAC. Once an open fishery is declared and TAC and quota unit values set, licence holders may transfer their quota units to other licence holders. Transfer applies within that TAC period only and will not carry over to subsequent seasons. Transfer is subject to Secretary approval and the transferee must hold licence for scallop fishery. The levy on licence must be paid by transferor: Reg 28
Conditions on temporary transfers (leasing)	See above.
Third party register of rights	None.

In Tasmania, a fishing licence (scallop) is required to participate in the commercial fishery. The number of licences is capped at 73. These entitlements cannot be transferred or sold separately but only as part of a licence package. However, quota units (scallop units) owned by the licence holder can be sold or leased subject to minimum and maximum holding limitations. They are the asset of value in the fishery. Table 4 summarises the characteristics of Tasmanian entitlements,

Table 4 Characteristics of Tasmanian entitlements

Characteristics	Tasmania
Licences	**Licences**
Eligibility	• must hold a personal fishing licence (scallop) with a minimum 50 scallop quota units held on it; vessel must have vessel fishing licence (vessel). Capped at 73. • Fishing licence (scallop) needs to be part of a 'package' i.e. generally held in conjunction with another fishing licence (e.g. rock lobster). • If a person holding a fishing licence (scallop) allows the licence to expire and does not within 12 months of expiry apply for the granting of a subsequent licence, the person is not eligible to be granted a further fishing licence (scallop)
Duration	12 months renewable
Conditions on permanent transferability (sales)	• Minister may refuse to transfer fishing licence (scallop) unless the other person holds a fishing licence (vessel) and a transferable commercial fishing licence R29 (1)(a); or the licence is transferred together with the associated fishing licence (vessel) R29(1)(b) • Minister is not to transfer a fishing licence (scallop) so that 2 or more fishing licences (scallop) are specified in one relevant fishing certificate R29(2)(a); or so that a person may take scallops using a fishing vessel greater in length then the length specified on the fishing licence (vessel) R29(2)(b)
Conditions on temporary transfers (leasing)	Holder of a fishing licence (scallop) may only lease (or other agreement) that licence if at least 50 scallop quota units are held on it R30(1)
Quota units	**Quota units**
Eligibility	Minister is not to transfer a scallop quota unit to a person who is not the holder of a fishing licence (scallop) R32(3).
Minimum and maximum holdings	• Minimum of 10 and maximum of 1200 units • The holder of a fishing licence (scallop) must not hold (or receive payment/benefit) from more than 2400 scallop quota units at one time • Minister is to ensure that a fishing licence (scallop) with less than 50 scallop quota units held on it is deactivated unless held less than 50 scallop quota units at commencement of Fisheries (Scallop) Rules 2000 R33(6).
Conditions on permanent transferability(sales)	Minister is not to transfer scallop quota units if only 10 scallop quota units are held on the fishing licence (scallop) unless they are transferred with the licence or the licence is surrendered and the units are transferred to another fishing licence (scallop)
Conditions on temporary transfers (leasing)	Permanent transferability conditions do not apply to to the transfer of scallop quota units on a temporary basis.
Third party register of rights	None

In the Commonwealth, fishing authority is afforded by the holding of quota Statutory Fishing Rights (SFRs). These rights authorize the taking of a determined amount of scallops each season in accordance with conditions specified on the concession and associated legislation and policies. A boat must be nominated to an SFR. Currently, there are 65 SFR holders.

Table 5 summarises the characteristics of Commonwealth entitlements. One of the most important differences between the Victorian and Tasmanian entitlements and the Commonwealth entitlement is that, in the Commonwealth, no boat or fishing licence is required to fish for scallops so that there is more potential fluidity in the number of operators in the fishery.

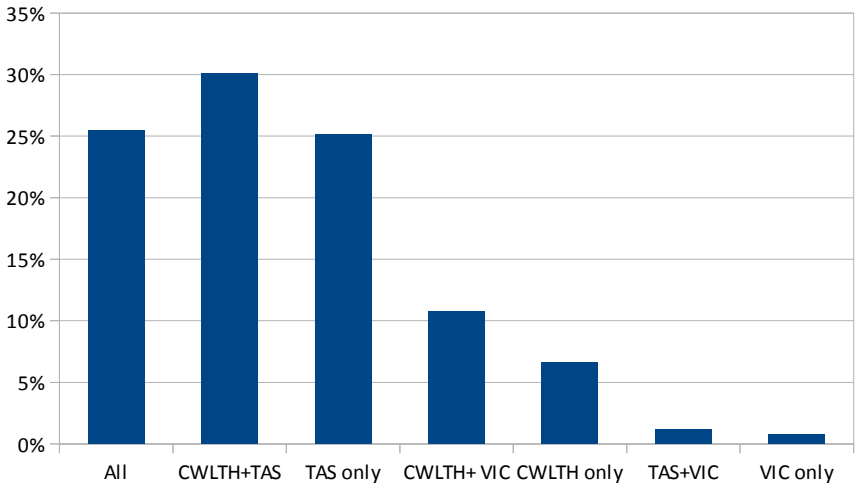
Table 5 Characteristics of Commonwealth entitlements

Characteristics	Commonwealth
Quota units	**Quota units**
Eligibility	Must own or hold Quota SFRs. Concession holders must nominate a boat against a Quota SFR before they are allowed to fish in the BSCZSF. Fishing conditions apply to a Quota SFR.
Duration	For the duration of the management plan.
Minimum or maximum holdings	Minimum holding of at least one Quota SFR for each species (Commercial and Doughboy Scallops)
Conditions on permanent transferability (sales)	Concession owners may permanently transfer Quota SFRs AFMA is not able to approve the transfer of SFRs if: • the owner is subject to legal proceedings in relation to that Right; • the Right has been suspended • an application has been received to register another interest in the Right; and • until all due levies for the right have been paid in full.
Conditions on temporary transfers (leasing)	Quota SFR may be leased but lease only has effect for the fishing season in which the lease is granted. The lease will only take effect if all levies for the right have been paid and no scallops have been taken under the right for that fishing season.
Register of rights	Public register maintained and published on AFMA's website.

6.1 Multiple entitlement ownership, few active fishers

Despite the relatively large total number of entitlements, many entitlement holders have entitlements in one or two of the other jurisdictions. An analysis of current entitlement holders shows that the 229 entitlements are owned by 99 entities. Figure 10 shows how the ownership is broken down by jurisdiction, showing that the large majority of these entities have access to Commonwealth waters.

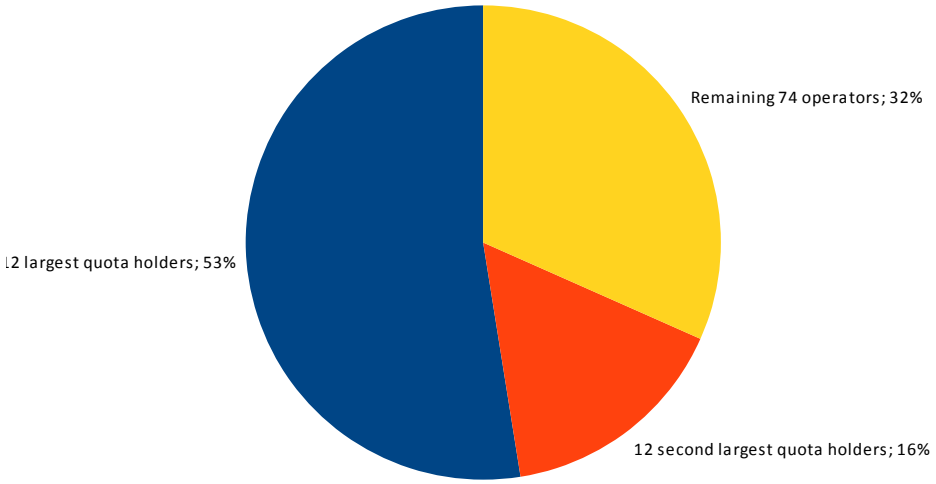
Figure 10: Percentage of entitlements owned by jurisdiction



As mentioned in section 5.4, there are only 15-24 active operators in the whole south eastern Australian fishery (all jurisdictions)holding entitlements for at least two, and sometimes three jurisdictions – a strategy which not only provides sufficient quota to be profitable but minimises the risks associated with closures in one (or two) jurisdictions. The remaining entitlement holders either fish irregularly, lease out their quota to the active operators, or do nothing with it.

A basic analysis of the ownership of unit holdings across all three jurisdictions illustrates this point. In this analysis, it is assumed that the median catch over the period 2002/4--2008/9 (excluding years when the fishery is closed) is distributed according to the unit holdings of each entitlement holder in each jurisdiction. This means that for Victoria, the median catch has been allocated equally across all entitlement holders whilst for Tasmania and the Commonwealth, median catches have been allocated according to their scallop unit or SFR holdings respectively.[27] Where it is known that entitlement holders hold more than one entitlement using the same nominated boat, these holdings are combined. Although actual amounts may not be accurate, the purpose of the analysis is to show relative shares in the fishery.

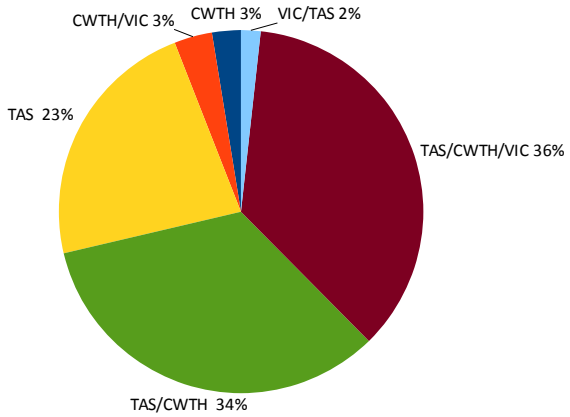
Figure 10: Percentage share of the fishery by size of quota holding



27 Using catch instead of TAC was preferred as TACs have not been binding. See section 5.2.

Figure 11 displays the results of this analysis, showing that 12 entities own quota which accounts for around 53% of the Southeastern scallop fishery and 24 entities own quota for around 68% of the fishery. These are the most active operators in the fishery. Taking into account leasing units/entitlements from inactive entitlement holders, their share of the fishery would be much higher. Of these active operators, Figure 12 shows the entitlement mix of these operators.

Figure 12: Breakdown of entitlements held by the 24 largest quota owners



6.2 Overvaluation of entitlements in the 2005 Commonwealth buy-out

In 2005, the Commonwealth government buyout, Securing our Fishing Future (SOFF), recognised the significant overcapacity and latent effort in the BSCZSF scallop fishery and targeted the fishery for effort reduction. Reduction targets were set according to what was believed to support a sustainable and profitable industry. As the fishery would be closed for three years from 2006, the Commonwealth Department of Agriculture, Forestry and Fisheries (DAFF) initially allocated a budget of $3.5 million to the BSCZSF for a 100% reduction target for a fishery which had not generated more than $8 million in GVP since 1996/7. The budget was subsequently increased to $6 million with a reduction target 80% of BSCZSF packages[28] (122 packages). A 2008/9 ANAO audit of the SOFF could find no documentation to explain either the increase in budget allocation or the change in reduction target.[29]

Evaluation of tenders was carried out using an algorithm developed by the Australian Bureau of Australian Bureau of Agricultural and Resource Economics (ABARE).[30] The use

28 A package consisted of 3 500 Commercial Scallop SFRs, 3500 Doughboy Scallop SFRs and a Boat SFR, if one was held.

29 http://www.anao.gov.au/uploads/documents/2008-09_Audit_Report_38.pdf

30 Using the total prices asked and the concessions offered by tenderers, the algorithm analysed the tenders to identify the maximum number of concessions that could be purchased across the fisheries with the funds available (the 'optimal' bundle). If multiple concessions were offered, the algorithm could assign multiple combinations of effective prices that equaled the total price asked. Each tenderer received the total tender

of an algorithm meant that DAFF did not need to set maximum prices for each type of concession purchased. Using the total prices asked and the concessions offered by tenderers, the algorithm analysed the tenders to identify the maximum number of concessions that could be purchased across the fisheries with the funds available (the 'optimal' bundle). To find the optimal bundle, the algorithm assigned an 'effective' price to each concession. If the tender contained only one concession, then the effective price would equal the total price asked. However, if multiple concessions (for different fisheries) were offered, the algorithm could assign multiple combinations of effective prices that equalled the total price asked. Each successful tenderer would receive the total tender price asked but the effective prices 'paid' by the algorithm for each concession in a tender could be very different to the prices they had asked for individual concessions in the tender. BSCZSF packages were generally tendered alone (in round one 72% of all tenders) such that for those packages, the "effective price" was the total asking price.

In Round 1, there were only five BSCZSF successful tenders (out of 84 tendered), all of which were offered in conjunction with other concessions. . The rejection of the remaining 79 tenders was attributed to high offer prices and therefore poor value for money as they were all higher than the average price DAFF was willing to pay of $39,000. The ANAO calculated the actual average price per concession to be approximately $23 000 based on the average price 'paid' by the algorithm across the five successful BSCZSF tenders in round one. In the second round, reduction targets were reduced to 75% (equivalent to 109 concessions) to enable an increase in average price payable per concession. DAFF also incorporated a maximum price that it was prepared to pay for each type of concession into the evaluation methodology for round two.. The indicative price, as it was called, would be applied if targets had been reached and funds were left over. For BSCZSF packages, the indicative price was set at $110, 000 which was approximately half the average price *asked fo*r by successful BSCZSF packages in round one ($228 000).[31] ANAO suggests that had targets been reached, the indicative maximum price of $110,000 may have been too high.[32] Lowering the reduction target in round 2 also meant that the average price "paid" by the algorithm could increase to $55 000.

Only a further 17 concessions were bought in round 2, despite 69 offers made. ANAO attributed this lack of success to the average asking prices being higher (see Table 6) than DAFF was willing to pay. This may be an indication that many of the entitlements may have been overvalued by their owners and that, as observed by the ANAO, DAFF contributed to this outcome by not disclosing pricing information from round one and failed to provide sufficient detail surrounding the evaluation methodology to assist tenderers. As a result of all these factors, the opportunity for rationalization of the Commonwealth fishery has been lost.

price asked but the effective prices 'paid' by the algorithm for each concession in a tender could be very different to the individual prices asked.

[31] DAFF was unable to provide documentation to support the rationale for setting the indicative price for the BSCZSF packages.

32 http://www.anao.gov.au/uploads/documents/2008-09_Audit_Report_38.pdf

Table 6: Saving our Fishing Future Buyout Results for the Bass Strait Scallop Fishery (ANAO)

	Round 1	Round 2
Number of tenders offering BSCZSF packages	84	56
Average asking price ($)	285,566	206,210
Lowest asking price ($)	85,000	75,000
Highest asking price ($)	750,000	620,000
Average price algorithm could pay	39,000	55,000
Estimated average price actually paid for successful tenders	23,000	

6.3 Future buyouts very unlikely

All jurisdictions have indicated that there are no funds available for any further government buyouts.

Therefore, any future management options have to be evaluated from the perspective of encouraging autonomous adjustment and the reduction of any excess fishing capacity in the three fisheries.

6.4 Few sales of entitlements/units

The underlying economic assumption in valuing tradable entitlements of quota units is that the value of that asset to that individual is the discounted expected income from that asset or the market price- whatever is highest. In a relatively perfect market where entitlements/units can be freely traded at any time, these two values would be closely aligned and market price would reflect the discounted expected income stream and their perceived value for the majority of concession holders (as the efficiencies of concession holders converge).

The market for permanent transfers of entitlements in all three jurisdictions is very thin indicating that there is an absence of buyers. Given the historical fluctuations in catches and the closure of fisheries in one or more jurisdictions, it can be expected that buyers would heavily discount expected income of scallop quota, whilst sellers may overvalue the asset on the basis of past earnings, perhaps from the 1970s and 1980s when new beds were discovered.

For example, in Tasmania excluding permanent transfers between entities with the same owners and between entities to avoid scallop licence fees, the total number of permanent transfers of scallop units in the fishery over the period 2006-2011 has amounted to 729 units (7% of total units).

In Victoria, there have been 29 Scallop (Ocean Fishery) licences transferred over the last five years all of which have been bought by existing licence holders.[33] In the Commonwealth, in 2009 and 2010, there were 10 and 12 permanent transfers of SFRs respectively. In 2010, the market for permanent transfers picked up probably reflecting the optimism that there would be good catches in 2010 and 2011. In these years, TACs were also close to binding. There were 27 permanent transfers in 2010, accounting for less than 30% of all SFRs. However it was not possible to obtain information to what extent these transfers were between entities with the same owners.

[33] Pers comm. John Vaytauer, Fisheries Victoria

The Commonwealth buyout demonstrated that expectations of the value of entitlements were far higher than the government was willing to pay. Subsequent, albeit limited, data on values of entitlements in the scallop fishery suggest that these expectations are much higher than the market is also willing to pay. This is exacerbated by a market with few buyers.

In discussions with industry, the values of entitlements/units appear to be based on short term income expectations of the fishery. Thus, if the fishery is expected to be open and there are positive results from surveys, then entitlement values (and lease prices) are higher than when the fishery is closed. In Tasmania, the unit of currency for permanent transfers are scallop quota units. No value is attributed to the fishing licence (Scallop) so that when a permanent transfer takes place, the licence is transferred as well.[34] In Tasmania, the few units that have been sold have been offered for between $900- $1,500[35]. In the Commonwealth, since boat SFRs have been scrapped, the unit of currency is quota SFRs. SFRS have traded between $14-$24/SFR. In Victoria, the unit of currency is Scallop (Ocean) Fishery entitlements which are said to be currently on the market at an offer price of $10,000-15, 000.[36]

6.5 Options to estimate relative values of entitlements

An essential condition in estimating relative values is that the process should be both fair and equitable. Estimation of the relative value of entitlements in three jurisdictions first requires the agreement on a common "currency" such as quota price/kg or catch history. Selection of the currency will depend on whether there is sufficient data in all jurisdictions as well as stakeholder support for the choice. Given the inherent natural variability of the stock, constraint of catches due to demand and processing capacity as well as multi-annual closures in each jurisdiction, it is unlikely that catch or effort history would be acceptable on fairness and equity grounds as an estimator of relative values of entitlements. Moreover there is no evidence to indicate that catch/effort history is factored into the current value of entitlements. Therefore, the most feasible method, subject to more consultation and in-depth analysis, is to estimate entitlement values on the relative market values of entitlements converted to a common currency such as price/kilo of quota.

7. Costs of Management

Previous attempts at jurisdictional integration have highlighted the duplication of management costs as a result of the three jurisdictions compared to the overall value of the fishery. However cost recovery is a relatively recent phenomenon in some Australian fisheries management jurisdictions and may act as an added impetus for integration/rationalization for industry.

The biggest difficulty in comparing actual management costs between jurisdictions is that each jurisdiction recovers costs in different ways and with varying levels of comprehensiveness, particularly with regard to overhead costs. The Commonwealth has the most comprehensive and transparent cost recovery policy, recovering most of

[34] Pers comm. DPIPWE, Industry stakeholders
[35] Pers.comm. Industry stakeholders
[36] Pers.comm. Industry stakeholders

management costs from levies with the exception of compliance costs. Victoria has implemented cost recovery for some of the costs of research, management and compliance but some overheads are not included[37]. Tasmania has the least transparent cost recovery policy with some significant overhead costs not recovered in levies.[38]

Whilst full review of management costs in these three jurisdictions has not been undertaken, Table 7 shows estimated industry-paid management costs from levies and Table 8 shows estimated actual costs of management including those recoverable from levies.[39] Table 8 should be read with considerable caution given that each jurisdiction does not have the same method of calculating costs and some costs are not fully disaggregated by fishery. Compared to other fisheries, the estimated actual costs of management as a percentage of GVP are high[40] – much of which can be attributed the nature of the fishery and management of one fishery under three jurisdictions. In terms of recoverable costs, the percentage of GVP is also high, but there are distortions in the figures – given the varying cost recovery policies.

Table 7: Estimated industry-paid management costs by jurisdiction

	$'000					
	VIC	TAS	CWLTH	TOTAL	Total GVP$ '000	recovered costs as a % of GVP
2006/7	152	215	250	617	6686	9%
2007/8	116	215	250	581	4634	13%
2008/9	93	132	370	595	2946	20%
2009/10	96	132	280	508	3744	14%
2010/11	4	215	400	619		

Source: AFMA, DPIPWE, Fisheries Victoria

[1] Reduction in costs in recent years reflect the zero TACC for the fishery and the associated changes in compliance and monitoring programs. The fee of $4,000 in 2010/11 were administration fees associated with licence renewals.

[2] Includes the portion of fees levied on industry that are returned to Treasury (approx 43-45% of the total).

[37] Pers. comm. Fisheries Victoria

[38] Pers.comm. DPIPWE

[39] In Tasmania, licence fees are attributed in the scallop fishery i.e. i) fixed management costs, which apply irrespective of whether fishing occurs or not and are payable by all license holders and ii) seasonal fees which will be paid by fishers actively participating in an open season. The costs in this table exclude the levies payable to TSIC, TSFA and FRDC. In Victoria, licence fees include a management, compliance, FRDC levy, research (catch and effort unit) and SIV levy. In years when the fishery is closed/zero TACC, management, FRDC levy, research and compliance fees are excluded. The costs of the SIV component are included in this table. In the Commonwealth, all management costs, research (80% industry; 20% government), logbooks, licensing and all observer costs are included but excludes investigation and enforcement.activities.

[40] For example in Western Australia, management costs are now set at 5.75% of GVP (0.75% covers the levy for FRDC and WAFIC) , 8-9% of GVP in South Australia northern zone rock lobster and 5% of GVP in southern zone rock lobster fishery. In the Commonwealth Northern Prawn Fishery (NPF) at 3% GVP, the South East Trawl (SET) Fishery at 6% GVP and the Western Trawl fishery at 9% GVP.(http://pzja.gov.au/wp-content/uploads/2011/06/TSPMAC-Meeting-4-14-June-2007_Finances.pdf)

Table 8: Estimated actual management costs by jurisdiction

	$'000					
	VIC[1]	TAS[2]	CWLTH	TOTAL	Total GVP$ '000	actual costs as a % of GVP
2006/7	300	315	250	865	6686	13%
2007/8	300	315	250	865	4634	19%
2008/9	300	315	370	985	2946	33%
2009/10	300	366	280	946	3744	25%
2010/11	130	370	400	900		

Source: AFMA, DPIPWE, Fisheries Victoria

[1] These figures represent the average total cost of managing the fishery, including science (monitoring), compliance, administration and management. The figure of $130,000 in 2010/11 estimates ongoing science and management costs that are incurred in years where a decision is made to set a TACC of zero.

[2] In the absence of a full cost recovery exercise these costs are indicative only – calculated by adding $100k to industry paid management costs. They may not be accurate.

8. Decision-making

Governance arrangements in each jurisdiction are probably the area where there are the fewest commonalities partly driven by the legislative framework under which fisheries management operates, the culture within the three management agencies, the physical proximity of management and industry, the management arrangements themselves and the relationships between stakeholders in each jurisdiction. An added complexity is that some stakeholders, in all jurisdictions lobby at higher levels of government to change aspects of management arrangements, which, if successful can undermine decision-making processes.

8.1 Disagreements in Victoria and complexity in the Commonwealth

The annual cycle of management decisions in each jurisdiction follows a particular process, either outlined in legislation or policy. The simplest decision making processes are in Victoria, where the overarching process is specified in the *Fisheries Act 1995*. The process involves workshops of relevant stakeholders, facilitated by an independent Chair, to discuss stock assessments and ultimately recommend a Total Allowable Commercial Catch. The views of industry in Victoria have been fractured with disagreement on season openings, condition criteria and viable catch rates per hour; particularly between the active and inactive or smaller and larger entitlement holders. This has led, and continues to lead, to discord and conflict during management discussions regarding the Victorian zone. This conflict amongst Victorian entitlement holders also emerge in management discussions in the Commonwealth zones, where many Victorians also hold entitlements.

Tasmania has clear decision-making processes which are specified in detail in their Draft Policy and Decision-making Guidelines. These processes tend to run relatively smoothly and expeditiously despite some friction between smaller and larger operators which is generally well brokered by the Tasmanian Scallop Fisherman's Association. This has been particularly important in such a naturally variable fishery and one that is spatially managed and dependent on relative high levels of industry participation for surveys. For example, a decision to enable an operator to undertake an opportunistic survey whilst a vessel is close to the area can be made in a matter of hours by ensuring that the delegated authority is available to sign the permit. This can be contrasted with the Commonwealth procedures which require a scientific permit for a research purpose, the

grant of which can take up to 10 working days, by which time the opportunity to survey may have been lost as the vessel is no longer in the area.

Commonwealth decision-making is far more complex. This is mainly due to the onerous legislative and formal consultative requirements that AFMA has to adhere to, compared to those in Tasmania and Victoria. There are a number of steps which need to take place before decisions are made, and this has resulted in a great deal of frustration for operators. Operators naturally directly compare AFMA's performance with their counterparts without necessarily appreciating the additional legislative constraints under which AFMA operates. However, the lack of physical proximity between the Commonwealth managers and the operators and the high staff turnover in AFMA with five managers in as many years exacerbates the frustration of operators.

8.2 Consultative committees have similar functions and overlap in personnel

As mentioned previously, the southeastern Australian scallop fishery is relatively small with only 15-24 active operators. This has implications for the pool of representatives willing and able to contribute to the consultative processes in each jurisdiction. Furthermore, managers of each jurisdiction need to be aware of developments in the other two jurisdictions and so participate wherever possible in their consultative meetings. The result is that there is considerable personnel overlap between the jurisdictions, particularly between the Commonwealth and Tasmania.

The Commonwealth has both a Management Advisory Committee (MAC) and Resource Assessment Group (RAG). Tasmanian combines both these functions into a Scallop Fisheries Advisory Committee (FAC) but also has a separate scallop research prioritization process managed by IMAS whereby research on scallop related projects are prioritized by both industry and government. ScFAC has representation at this meeting. Under the Commonwealth Fisheries *Administration Act 1991* the MAC has a maximum membership of nine, with no maximum membership specified for the RAG and ScFAC has maximum membership of thirteen with representation from a greater diversity of stakeholders compared to the MAC. Observers in all committees are allowed. All independent chairs are remunerated; all members of MACs are paid sitting fees and expenses whilst RAG members are paid expenses. ScFAC members are not paid sitting fees but expenses are reimbursed.

Table 9 shows the membership of each of these entities as well as the overlap in personnel (the same person). As can be seen there is considerable overlap of both personnel (and therefore associated cost) and in function of these committees – particularly with the MAC and the RAG and with the MAC and ScFAC. Many of the decisions taken at these meetings concern the sustainability of the scallop resource (as opposed to the fishery within a jurisdiction) and are taken in relation to management arrangements in the other jurisdictions. The opportunity for integration and/or rationalization of membership and function of these committees is therefore clearly apparent.

Table 9 Composition of the management advisory bodies in the Commonwealth and Tasmania (blue boxes show personnel -same people- overlap)

Role	*Commonwealth MAC*	*Commonwealth RAG*	*Tasmanian ScFAC*
Chair	Independent	Independent	Independent
Industry	Member	Member	Representative
Tasmanian State Government Manager	Permanent Observer	Permanent Observer	Manager
AFMA Manager	Member	Member	Observer
Environment/Conservation	Member	Member	Representative
Industry	Member	Member	Representative
IMAS Research		Member	Representative
Victorian Government Manager	Permanent Observer	Permanent Observer	
Executive Officer	AFMA	AFMA	DPIWE (Observer)
Tasmanian Scallop Fishermen's Association	Observer		Observer
Industry (Processor)	Member		Representative
Industry			Representative
Industry			Representative
BRS/DAFF Research		Member	
QDPI Research		Member	
Marine Police			Officer
DPIWE Licensing and Quota Audit			Representative

8.3 Comanagement increasing

As part of the spatial management strategy implemented by Tasmanian and the Commonwealth, in-season self-management is being implemented once an area has been open for fishing. In Tasmania, the industry committee chaired by the Executive Officer of TSFA plus two active operators is able to operate a harvest plan[41] once an open area is gazetted allowing areas to be gradually released into the fishery. The committee works well largely due to the efforts of the TSFA and the arms length approach of DPIPWE.

In the Commonwealth zone, a similar committee has been established , also chaired by the EO of the TSFA and made up of four active operators (2 Tasmanians and 2 Victorians), an IMAS representative and the AFMA manager. Clear guidelines have been drafted as to the criteria to open a new zone. The AFMA manager has *de facto* veto rights and must agree to the decision of the committee before it can be implemented.

In the absence of spatial management, no such committee exists in Victoria.

[41] A harvest plan is developed in collaboration with industry and focuses on the timing of openings, monitoring and reserving of scallop areas for future access. It is not a harvest strategy.

9. Future Management Options

Since the last attempt in 2004 to review jurisdictional arrangements in the South Eastern scallop fishery, there has been some alignment of management arrangements, a move to spatial management in all but one jurisdiction and an increasing desire by industry to reduce the costs of management as cost recovery becomes more comprehensive in all three jurisdictions. In addition, fisheries agencies are operating under tight and limited budgets and are wary of any changes that may lead to increases in their non-recoverable costs.

Any change in jurisdictional/management arrangements will, however, incur transitional costs including staff resources.[42] Whilst the long term aim is to reduce overall management costs, in the short term it can be expected that there will be additional transitional costs. This may be acceptable provided they bring about improved management outcomes.

The Terms of Reference of the review required the identification of specific management activities, e.g. TAC setting, monitoring and compliance that have the potential for integration/rationalisation to best meet key overarching objectives of the review as described in section 1.2. However, in discussions with management agencies and industry stakeholders, the consultant was requested to include more general future management options which could be further discussed at the second meeting of the Steering Committee in November 2011.

Consequently, this section of the report is divided in to two subsections. The first sub-section discusses five general future management options. The second sub-section explores in more detail the specific management activities which have the potential for integration and rationalization.

9.1 Guiding principles

To assist in evaluating any future management option, a set of guiding principles have been developed:

1. **Increases the probability of having an annual commercial southeastern Australian scallop fishery.**
2. **Maximises advantage/minimises disadvantage for all jurisdictions.**
3. **Improves the economic performance of the commercial southeastern Australian scallop fishery.**
4. **Encourages rationalisation of entitlements.**

9.2 Management options

Five possible management options are discussed in this section:

[42] Tasmania has clearly stated in the past that it is not in a position to make any financial contribution to any transitional or future costs which are additional to current staffing levels, and if was to be pursued, these costs would need to be borne by industry or supplied from elsewhere.

Option 1: Staged Approach A: Alignment, Rationalisation and Integration

Option 2: Staged Approach B: Formal commitment to integration, alignment and rationalisation

Option 3: Commonwealth manages all jurisdictions under a revised OCS arrangement

Option 4: Commonwealth hands over jurisdiction to Tasmania under a revised OCS agreement

Option 5: Subcontracting management services from one/two jurisdictions to another jurisdiction.

Option 1: Staged Approach A: Alignment, Rationalisation and Integration

Attempts to rationalise management through jurisdictional changes have been made three times before with little success, despite the agreement by most stakeholders that the South eastern scallop resource should be managed as one fishery.

Given the previous failed attempts at renegotiating the OCS and the desire for cost reduction in the fishery, this option proposes a three staged approach to future management arrangements, with the implementation of subsequent stages dependent on the success, benefits and willingness of the different jurisdictions along the way:

1. **Alignment** of management activities which are non-controversial and could lead to some overall cost savings. This would build confidence, improve communication and enhance cooperation between management agencies and between operators in the three jurisdictions. Management activities which could be aligned are described in section 9.3.
2. **Rationalisation** of management activities which evolve naturally from the alignment phase and which can further lead to cost savings and improve the timeliness and efficiency of decision making in the fishery as a whole. Management activities which could be rationalized are described in section 9.3
3. **Integration** of management arrangements in the three jurisdictions through revision of the OCS, reallocation of entitlements and the move toward a single jurisdiction fishery.

Opportunities

- Improved management outcomes due to cooperation in research
- Builds up trust and working relationships between stakeholders in the three jurisdictions paving the way for integration.
- Small potential cost savings for specific management services (e.g. common logbooks, EPBC accreditation) and research.
- Reallocation of rights, a contentious issue, may be easier following alignment and rationalisation processes.

Challenges

- Will take a long time. Discussions about alignment of management arrangements have been ongoing since 2004.
- Incurs transitional costs payable by government and industry with proportions payable yet to be determined.
- Will not address latent effort until rationalization/integration stage.
- May delay more comprehensive reform.

Option 2: Staged Approach B: Formal commitment to integration concurrent with alignment and rationalization

This approach is a reverse of Option 1, whereby there is a formal commitment to integration through a revised OCS arrangement either under single or dual jurisdiction. Following the formal commitment, alignment and rationalisation of management arrangements as described under Option 1 would take place within a specified timeframe. Revision of OCS arrangements can be varied at the Ministerial level provided the definition of the fishery remains constant.

Opportunities

- Improved management outcomes as the resource is managed as one or two fisheries instead of three.
- Formal integration can include an implementation timetable for integration and rationalization
- Potential cost savings for specific management services and research services
- Once rights reallocated may speed up autonomous adjustment.

Challenges

- Requires high level of initial commitment upfront.
- If dual jurisdiction only, will still have complexity of two sets of management arrangements.
- May disadvantage the “excluded” jurisdiction.
- Incurs transitional costs payable by government and industry with proportions payable yet to be determined. .
- Formal integration will require an initial reallocation of rights (of access) and quota entitlements. This will be a contentious issue and may slow down the process.
- Needs a single/dual cost recovery model. If Commonwealth model used, then Victorian and Tasmanian entitlement holders may incur higher levies unless management costs are significantly reduced.

Option 3: Commonwealth manages all jurisdictions under a revised OCS arrangement

Under this option, the Commonwealth manages all jurisdictions under their own legislation. This will require one access right and quota SFRs.

Opportunities

- Improved management outcomes if the resource is managed as one fishery.
- Increases the probability of commercial fishery each year and regularity of supply to processors/the market.
- Potential cost savings for specific management and research services
- Will speed up autonomous adjustment as entitlements are uniform.
- Management levies for entitlement holders holding entitlements in both the Commonwealth and one or both State jurisdictions should be lower.

Challenges

- May take a long time. Discussions about alignment of management arrangements have been ongoing since 2004.
- Commonwealth has shown no current interest in taking over management of the resource.
- Either requires surrendering rights in internal State waters (may be unacceptable to Tasmania and Victoria) or having management arrangements in parallel – possibly adding a layer of complexity.
- Incurs transitional costs payable by government and industry with proportions payable yet to be determined.
- Requires revision of the Commonwealth management plan.
- Formal integration will require an initial reallocation of rights (of access) and quota entitlements. This will be a contentious issue and may slow down the whole process.
- Management levies for Tasmanian and Victorian-only entitlement holders may increase as Commonwealth cost recovery model will be implemented.
- Tasmania reluctant to allow access of Victorian and Commonwealth only endorsed vessels in their waters.

Option 4: Commonwealth and Victoria hands over jurisdiction to Tasmania under a revised OCS agreement

Under this option, the Commonwealth and Victoria hands over jurisdiction to Tasmania under a revised OCS agreement. If issues concerning handover in either the Commonwealth or Victorian jurisdiction become insurmountable, the possibility for only the Commonwealth or Victoria to handover jurisdiction to Tasmania is not precluded in this option.

Opportunities

- Improved management outcomes as the resource is managed as one fishery.
- Increases the probability of commercial fishery each year and regularity of supply to processors/the market.
- Potential cost savings for specific management and research services for Commonwealth and Victorian entitlement holders as less complex processes to be adhered to.

Challenges

- May take a long time. Discussions about alignment of management arrangements have been ongoing since 2004.
- If only two jurisdictions participate in an OCS, there may be ongoing complexity of as two jurisdictions remain.
- Incurs transitional costs payable by government and industry with proportions payable yet to be determined.
- Will need to resolve access of Commonwealth/Victorian vessels in Tasmanian waters (0- 3 nm).
- Management of any Victorian scallop fisheries within 3 nm excluded.
- Formal integration will require an initial reallocation of rights (of access) and quota entitlements including issues like maximum and minimum holdings.
- Must be zero cost to Tasmanian taxpayers. This would mean that ex-Commonwealth/Victorian entitlement holders may have to pay higher management levies than Tasmanian entitlement holders under current Tasmanian cost recovery model.

Option 5: Devolution of management from the Commonwealth to Tasmania

This option, provision of management services in the Commonwealth fishery is devolved to Tasmania, whilst discussed separately could also be part of Options 1 and 2. Under this option, most, but not all, day to day management and research could be devolved via a Commonwealth government contract. If successful, then devolution of management services in Victoria to Tasmania could also be considered. Other activities, such as TAC setting, may be more difficult to devolve. As this is the first time the Commonwealth has explored devolved management, AFMA is seeking further advice. This is anticipated to be available in early 2012.[43]

Opportunities

- Potential cost savings for specific management and research services as greater economies of scale achieved.

Challenges

- Does not resolve the complexity of managing one resource under three different jurisdictions/objectives.
- The contractor would have to meet AFMA's legal and policy requirements including indemnities.
- May delay more comprehensive reform.
- May cause friction as entitlement holders managed by the same agency may be subject to different management levies due to differing cost recovery policies e.g. if the Commonwealth sub-contracts to Tasmania, Commonwealth SFR holders will be subject to different levies than Tasmanian entitlement holders for the same services.
- Will not reduce latent effort.

[43] Pers. Comm. Nick Rayns

9.3 Management Activities which could be integrated and/or rationalised

Options 1 and 2 include the integration and rationalization of management activities. This section discusses the challenges and opportunities by activity. Nine areas with potential for integration/rationalization have been identified:

1. Harvesting Rules
2. TAC setting
3. Research
4. Data collection, processing and management
5. Assessing and reporting the fishery as a whole
6. Export accreditation
7. VMS administration
8. Amalgamation of Bass Strait Scallop Industry Management Committee and TSFA Industry Committee
9. Amalgamation of the advisory/consultative committees

9.3.1 Harmonisation of Harvesting Rules

As discussed in section 4.5, harvest strategies in Tasmania and the Commonwealth are increasingly aligned. The current Commonwealth scallop harvest strategy is under review because it does not fit well with a naturally highly variable fishery, such as scallop. Recent circumstances in the fishery have highlighted areas where changes need to be made.

On the assumption that the review takes place and changes are made, then the harvesting rules in the Commonwealth and Tasmanian zones may become closer aligned. Victoria, on the other hand, has limited harvesting rules and no spatial management but has expressed a willingness and interest to develop a harvest strategy in line with Tasmania and the Commonwealth. This is reflected in their support as co-investigator of an FRDC cross jurisdictional proposal from IMAS to “Determining when and where to fish: Linking scallop spawning, settlement, size and condition to collaborative spatial harvest and industry in-season management strategies.”

Opportunities

- Simplifies operational issues across jurisdictions

- Increases the probability of a fishery each year and the existence of a residual stock of scallop which will gradually increase the value of entitlements
- Enables protection of beds until ready for harvesting
- Cost savings in combined jurisdictional surveys, shared research and data analysis time

Challenges

- Legislative and policy requirements – e.g. the objectives of the Commonwealth Harvest Strategy Policy.
- Spatial management is information hungry requiring ongoing surveys and consequently relatively expensive if stock status is poor (if the expense cannot be covered by quota). The difficulty of finding vessels available to undertake the end of season survey in the Commonwealth has presented problems with the survey. Victoria undertook an end of season industry survey for the first time in a few years in 2009 to determine whether there would be a fishery the following year.
- Opportunistic surveys will play a greater role so decision-making processes (particularly in the Commonwealth) must enable surveys to take place. The delay in the grant of scientific permits in the Commonwealth has created some tension in the fishery compared to the speed in which Tasmania can do the same. Although AFMA can grant, amend or revoke a Scientific Permit and has to only follow internal processes, it appears these processes can inhibit opportunistic surveys.
- Lack of information on/understanding of stock recruitment and natural mortality (bed 'die-off') processes

9.3.2 TAC setting: a whole of fishery TAC – divided in zones

Closely related to aligned harvest strategies is TAC-setting for the fishery as a whole, rather than by zone. Section 4 discussed the differences in current approaches by jurisdiction and highlighted that processing capacity, condition, price and market size influence the size of the catch and the setting of TACs.

Opportunities
• Aligning supply in the fishery as a whole with demand potentially contributes to improvement of economic returns from the fishery • Provides greater certainty of supply for processors • Binding TACs more likely to lead to autonomous adjustment
Challenges
• Requires consultative processes in each jurisdiction which are aligned in timing. For example, in the Commonwealth, the AFMA Commission must determine the TAC after consulting with ScallopMAC. The Commission may also consider the views of ScallopRAG and other interested persons. This process usually takes up to four months. • Objectives may differ across jurisdictions. • Requires agreement as to allocation of overall TAC. • Requires survey times to be synchronized.

9.3.3 Harmonisation of Research

Currently IMAS undertakes research surveys for all three jurisdictions using industry vessels. Given that the same researchers carry out the work, there is potential for greater rationalization in the implementation of these surveys and the analysis and interpretation of results.

Opportunities
• Improved assessments due to analysis of the resource as a whole rather than discrete fishery management jurisdictions • Improved overall understanding of populations in the SE scallop fishery • Cost savings from coordinated research
Challenges
• Timing of surveys and analysis of results to coincide with each jurisdictions' requirements • Aligning incentives in each jurisdiction to ensure industry participation

9.3.4 Data collection, processing and management

Common logbooks were tried in 1998-2001, but with little success. The main reasons for their failure were differing data requirements and data processing abilities and general confusion about the roles, responsibilities and costs under each jurisdiction.[44] Nevertheless, there remain opportunities to harmonise data collection, processing and management procedures. To do so, what would be needed is:

- commonly agreed data requirements which meet the legislative requirements of the three jurisdictions
- one agency responsible for data entry and reporting which will avoid any conflicting data entry issues
- MOU between three management agencies to cover costs.
- Clear communication to fishers about where to send the forms. In the future this may be made easier if electronic lodgment becomes more widespread.

Opportunities
• Improvements in data for monitoring through the production of consistent and comparable data set for the fishery, irrespective of jurisdiction • Potential cost savings from printing, data entry and reporting • Some reduced time savings for operators fishing in two or three jurisdictions provided a common logbook is used
Challenges
• Databases in all jurisdictions will need to be adjusted/adapted • Victorian entitlement holders are currently only required to submit monthly returns compared to daily returns for Tasmanian and Commonwealth entitlement holders. There may be some resistance from Victorian fishers to reporting on a daily basis (noting however, that few Victorian-only licences actively fish so that most Victorian operators are used to logbook requirements in other jurisdictions). Databases in all three jurisdictions need to be programmed to accept the common format. • Savings in overhead costs of data entry/analysis maybe marginal if staffing levels are not impacted.

[44] Pers. comm., AFMA, Fisheries Victoria

9.3.5 Assessing and reporting the fishery as a whole

Currently all jurisdictions produce status reports on their zone of their fishery. Given that it is acknowledged that the southeastern Australian commercial scallop fishery is a single species and most likely a single stock, each jurisdiction could report on the fishery as a whole (e.g. biology, TACs, catches, closures) with a sub-report on their zone of the fishery to meet their own requirements.

Opportunities
• Reporting in this way would emphasise that the scallop resource is one fishery operating in three jurisdictional zones. • Bring about greater public understanding of the stock status as a whole. • Provide more comprehensive information to third party interests (such as banks) regarding resource status allowing better valuation of entitlements
Challenges • Some minor changes to current reporting formats for all jurisdictions required.

9.3.6 EBPC Export Accreditation Approved Wildlife Trade Operation

Under the Environmental Protection and Biodiversity Conservation Act 1999 Act, the Minister for Sustainability, Environment, Water, Population and Communities regulates the export of scallops from the three fisheries. This is done by way of:

- a strategic assessment of the fishery, including assessment of the impact of scallop fishing on protected species being made for the Fishery; and
- Export accreditation being granted for each export trading operation.

Currently there are no scallop exports from any jurisdiction, but future opportunities may exist. All jurisdictions have previously applied for and received export accreditation, but expiry dates are coming up as Table 10 shows.

Table 10: Expiry dates for export accreditation

Jurisdiction	EPBC Export Accreditation Expiry Date
Tasmania	25 August 2011
Victoria	1 January 2012
Commonwealth	21 April 2013

Tasmanian accreditation has now been aligned with the Victorian accreditation.[45] Currently, each agency would have to submit a separate assessment, but the opportunities for applying for joint accreditation should be explored with SEWPAC.

[45] Pers.comm, DPIPWE

Opportunities
• Reduction in costs of assessment application- one application instead of three
Challenges
• Agreement by SEWPAC to assess a joint submission Agreement by SEWPAC to assess a joint submission and to align the timing of submissions - maybe some hurdles • The Commonwealth will still be required to undertake strategic assessments of their fisheries under the EPBC Act in addition to those required for export accreditation. • Lead agency needs to be identified and costs of preparation shared

9.3.7 VMS Administration

Vessels in all jurisdictions are required to have operational VMS. Currently Tasmanian vessels poll to DPIPWE in Tasmania whilst Commonwealth and Victorian vessels poll to AFMA. As most Victorian vessels have Commonwealth endorsements, AFMA currently only charges Fisheries Victoria for the administration costs of Victorian endorsed only vessels.

Opportunities
• Some personnel cost savings if VMS is centralized • Multi-jurisdictional trips allowed
Challenges
• Alignment of compliance objectives using VMS across jurisdictions; currently these are aligned. • Tasmania has to pay licence fees and requires personnel for VMS administration for its other fisheries; therefore the cost savings for Tasmania may be marginal. Possibilities for Commonwealth doing all VMS for all Tasmanian vessels could also be explored.

9.3.8 Amalgamation of the Bass Strait Scallop Industry Management Committee and TSFA Industry Committee

As discussed in Section 8.3., there are two in-season industry committees. These two committees could be combined to form one, operating under similar guidelines. The TSFA has demonstrated its ability to chair and organize the Committee in the Tasmanian zone and are therefore well placed to do the same for the Commonwealth zone. There is no reason to include managers or scientists in these committees, provided there are clear guidelines and criteria being adhered to, harvest strategy decision rules are sufficient to achieve legislative objectives and the management agencies are kept aware of decisions taken.

Opportunities
• Contributes to the alignment of harvest strategies • Potential cost savings from the non-participation of managers/scientists • Greater industry coordination across jurisdictions
Challenges
• Adequate representation for all industry members. • Costs of participation need to be worked out • Clear processes need to be put in place where there is disagreement between groups of operators (e.g. small and large)

9.3.9 Amalgamation of the advisory/consultative committees

As discussed in Section 8.2, there is considerable overlap of personnel between the Commonwealth MAC, RAG and the Tasmanian ScFAC. There are three possibilities to amalgamate these bodies: combine the MAC and the RAG, combine the MAC and the ScFAC or combine all three. Victorian representatives would have to be included in the new structures to ensure representation. AFMA is already reviewing the roles of the RAGs (Review of AFMA's arrangements for obtaining and using scientific & economic information, May 2011). In addition, given the relative size of the fishery (number of active operators in all three jurisdictions an annual GVP which has varied between $2million- $7 million) in the last five years, integrating the advisory/consultative committees would be a cost saving measure.

Opportunities
• Potential cost savings (reimbursable costs, time of participants) • Greater opportunity to discuss whole- of- resource issues • Will encourage whole of resource TAC setting • Improved alignment of jurisdictional TACs to processing capacity and market demand
Challenges
• Current roles and responsibilities of the MAC, RAG and ScFAC differ – legislative reform will be required to enable a new type of structure

10. Selection of options

The Steering Committee discussed all options described in section 9 during their second meeting held in early November 2011. All options were evaluated against whether or not they contributed to the achievement of the four guiding principles outlined in section 9.1.

On the basis of these discussions, the following options were selected as candidates for further consideration amongst the three management agencies:

Option 1 (Alignment, Rationalisation and Integration)
Option 4 (Tasmania ,Commonwealth and Victorian OCS)
Option 5 (Devolution of management from Commonwealth to Tasmania)

The Steering Committee considered that Option 2 (Formal commitment to integration, alignment and rationalisation) was not viable at the present time as it was unlikely jurisdictions would formally commit to an OCS without known the details of later stages of alignment and rationalisation. Option 3 (Commonwealth manages all jurisdictions under a revised OCS Fisheries Arrangement), whilst having support from some Steering Committee members, was considered unlikely to be acceptable to Tasmanian stakeholders.

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Appendix 1

EXPLORING OPTIONS FOR IMPROVING MANAGEMENT OF THE COMMERCIAL SCALLOP RESOURCE IN SOUTH-EAST AUSTRALIA

TERMS OF REFERENCE

Background

1. The Commercial Scallop resource in south-east Australia is managed across three separate zones. The Commonwealth manages the central zone and Victoria and Tasmania manage zones generally out to 20nm off their respective coastlines. All three scallop fisheries have a historical boom and bust nature, although fluctuations have been reduced in recent years by the implementation of "paddock harvesting' in some jurisdictions, are highly likely to have some level of biological connectivity and are regularly closed due to recruitment variability resulting in a lack of consistent viable scallop beds each season.

2. The Australian Bureau of Agricultural and Resource Economics and Sciences, in collaboration with the Commonwealth Scientific and Industrial Research Organisation, have undertaken a research project, titled *Reducing Uncertainty in Stock Status (RUSS)*. The draft outcomes have identified that the performance of the scallop fishery would be greatly enhanced if it were treated as a single cooperative fishery across all jurisdictions. This means there is a greater probability of a viable fishery each year and a higher probability of presence of a residual stock of scallops.

3. The future management of the scallop resource by one jurisdiction under a single outcome-focussed regulatory regime is expected to provide greater ability for governments and scallop fishers to adapt to future challenges such as climate change.

4. The Department of Sustainability, Environment, Water, Population and Communities recommended that, in pursuit of ecologically sustainable management, AFMA should pursue consistent and/or complementary management arrangements for the Commercial Scallop resource.

5. There are many management activities common to the three fisheries which lend themselves to differing levels of integration/rationalisation.

6. It should be noted that there is expected to be considerable management cost savings to fisheries administrations and operators if there was a single management agency, which would result in more orderly harvesting with considerable potential for improving economic returns from the fishery. Any transition to such an arrangement will need to address a number of important issues, the most significant of which is the existing access rights that exist in the three jurisdictions.

7. Working on integration and rationalising the common management activities could also yield substantial benefits in the short term and build a platform on which to base single jurisdiction approach.

Terms of Reference

The consultant is to provide and evaluate the likely performance of, options for holistic, rationalised and harmonised management arranges for the South Eastern Australia commercial scallop fishery[46]. A consultancy is sought to identify management options that will address the following overarching objectives:

- Improving the efficiency and cost-effectiveness of managing the south-east Australian scallop resource.
- Ensuring sustainability of harvesting the scallop resource.
- Optimising overall industry economic performance.
- Pursuing ecosystem based management of the south-east Australia scallop resource.

[46] Excluding bays and estuaries in Victorian waters. In Tasmanian waters, waters less than 20 meters deep, shark refuge areas and scallop dredge prohibited areas.

Specifically, the consultant is required to:

1. Provide a comprehensive review of:
    a. stock structure, recruitment and historical catch and effort, including fleet characteristics, numbers of licences and vessels and location of major scallop grounds in the Commonwealth, Tasmanian and Victorian scallop fisheries;
    b. scallop markets, domestic and export;
    c. historical and current management arrangements in the Commonwealth, Tasmanian and Victorian fisheries for Commercial Scallop, including:
        i. Licensing arrangements (single and multiple endorsements);
        ii. Specification of fishing access rights (including quota);
        iii. Management plans (including rules governing the use of fishing equipment, catch reporting, etc);
        iv. Co-management arrangements;
        v. Harvest strategies (including stock assessments and sustainability or economic performance limits/targets); and,
        vi. Cost recovery.
    d. relevant Offshore Constitutional Settlement arrangements between the Commonwealth, Tasmania and Victoria;
    e. any previous, current or planned changes to access arrangement agreements;
    f. the findings of and decisions related to any previous relevant reviews or research projects; and,
    g. the legislation and regulations covering the management and export of Commercial Scallop in the three jurisdictions, particularly any legislative and regulatory provisions that might impede rationalisation or amalgamation.

2. Provide advice on the recent / relevant value of current entitlements (including single and multiple endorsed concessions) from all jurisdictions and options for placing a relative value on multiple endorsed entitlements.

3. Identify management activities that have the potential for integration/ rationalisation to best meet the above objectives including:
    - industry representation (Scallop Association);
    - monitoring and assessment, including logbooks, observer programmes etc.;
    - compliance, including vessel monitoring systems;
    - management advisory committees (or equivalent);
    - export accreditation under EPBC Act provisions;
    - development of management plans, harvest strategies, including economic objectives;
    - cost recovery/costs of management;
    - management of excess fishing capacity;
    - TAC setting; and
    - co-management (scallop bed management/ ‘paddock’ fishing).

4. For each activity identified as having potential for integration/rationalisation, consider:
    - legal issues;
    - specific benefits and costs;
    - potential barriers to implementation; and
    - implications for economic efficiency.

5. Provide options for moving towards single or coherent management, taking account of taking into account the following:
    i. benefits and disadvantages, including supply, market and price implications;

ii. legal issues;
iii. the fishing rights issued to existing commercial operators in each jurisdiction
iv. costs and implications for economic efficiency;
v. transitional processes and timing, including restructuring within each jurisdiction;
vi. stumbling blocks to a smooth transition and
vii. potential means to minimise any adverse impacts

For each option, evaluate the likely future performance of the fishery against the overarching objectives.