



Australian Government
Productivity Commission

Marine Fisheries and Aquaculture

Productivity Commission Draft Report

August 2016

This is a draft report prepared for further public consultation and input. The Commission will finalise its report after these processes have taken place.

© Commonwealth of Australia 2016



Except for the Commonwealth Coat of Arms and content supplied by third parties, this copyright work is licensed under a Creative Commons Attribution 3.0 Australia licence. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/3.0/au>. In essence, you are free to copy, communicate and adapt the work, as long as you attribute the work to the Productivity Commission (but not in any way that suggests the Commission endorses you or your use) and abide by the other licence terms.

Use of the Commonwealth Coat of Arms

For terms of use of the Coat of Arms visit the 'It's an Honour' website: <http://www.itsanhonour.gov.au>

Third party copyright

Wherever a third party holds copyright in this material, the copyright remains with that party. Their permission may be required to use the material, please contact them directly.

Attribution

This work should be attributed as follows, *Source: Productivity Commission, Marine Fisheries and Aquaculture, Draft Report.*

If you have adapted, modified or transformed this work in anyway, please use the following, *Source: based on Productivity Commission data, Marine Fisheries and Aquaculture, Draft Report.*

An appropriate reference for this publication is:

Productivity Commission 2016, *Marine Fisheries and Aquaculture*, Draft Report, Canberra.

Publications enquiries

Media and Publications, phone: (03) 9653 2244 or email: maps@pc.gov.au

The Productivity Commission

The Productivity Commission is the Australian Government's independent research and advisory body on a range of economic, social and environmental issues affecting the welfare of Australians. Its role, expressed most simply, is to help governments make better policies, in the long term interest of the Australian community.

The Commission's independence is underpinned by an Act of Parliament. Its processes and outputs are open to public scrutiny and are driven by concern for the wellbeing of the community as a whole.

Further information on the Productivity Commission can be obtained from the Commission's website (www.pc.gov.au).

Opportunity for further comment

You are invited to examine this draft and comment on it by written submission to the Productivity Commission, preferably in electronic format, by **Friday 14 October 2016**, by attending a public hearing or submitting a short comment on the inquiry website (<http://www.pc.gov.au/inquiries/current/fisheries-aquaculture#draft>). Further information on how to provide a submission is included on the inquiry website: <http://www.pc.gov.au/inquiries/current/fisheries-aquaculture/make-submission#lodge>.

The Commission will be holding public hearings in October 2016. Details regarding public hearings will be made available on the Commission's website in due course.

The final report will be prepared after further submissions have been received and public hearings have been held, and will be forwarded to the Australian Government in December 2016.

Commissioner

For the purposes of this inquiry and draft report, in accordance with section 40 of the *Productivity Commission Act 1998* the powers of the Productivity Commission have been exercised by:

Melinda Cilento

Commissioner

Disclosure of interests

The *Productivity Commission Act 1998* specifies that where Commissioners have or acquire interests, pecuniary or otherwise, that could conflict with the proper performance of their functions during an inquiry they must disclose the interests.

Ms Melinda Cilento has advised she is the director of a number of public and private companies, none of which participated in any way in this inquiry.

Terms of reference

I, Scott Morrison, Treasurer, pursuant to Parts 2 and 3 of the Productivity Commission Act 1998, hereby request that the Productivity Commission undertake an inquiry into the regulatory burden imposed on the Australian marine fisheries and aquaculture sectors.

Background

Commonwealth, State and Territory governments are responsible for the management of Australian fisheries within their respective jurisdictions. Regulations are used to implement controls, such as limits on catch or effort levels, and regulate fishing methods in order to manage Australia's fisheries in a way that meets social and economic considerations and ecological sustainability objectives.

Except where agreement is reached to the contrary, state/territory laws apply to coastal waters (up to three nautical miles) and Commonwealth laws apply from those waters out to the limit of the Australian fishing zone (200 nautical miles). As most recreational and traditional indigenous fishing activity occurs in waters within state/territory jurisdiction, state/territory administrations generally manage these forms of fishing activity.

As a result, Australia's commercial fisheries are governed by a total of eight jurisdictions (the Commonwealth, states and the Northern Territory), with each jurisdiction developing specific regimes for fisheries management, fisheries research, reporting and environmental protection. In addition, there are 59 separate arrangements under the Offshore Constitutional Settlement that determine how cross-jurisdictional stocks are to be managed. There are also four joint fisheries authorities. This regulatory environment oversees an industry that has a gross value of production of \$1.3 billion per annum. It is also an industry that has been the subject of a large number of recent inquiries and reviews at many levels.

While Australia's fisheries are regarded as sustainable, reliable and safe, there is scope to improve the management of fisheries through effective and coordinated regulatory and management arrangements. This includes the streamlining of regulations, rationalising jurisdictional and offshore constitutional settlement arrangements through improved cross jurisdiction and multi-jurisdictional regulatory regimes, information and service sharing, and harmonisation of environmental, management and compliance arrangements.

While aquaculture is within scope, it was the subject of a Productivity Commission research paper in 2004 which examined existing planning and environmental regulatory arrangements. The Commission should use the findings of this research as a basis to

inform its current inquiry rather than commencing a new investigation into issues impacting the aquaculture sector.

Scope of the inquiry

The inquiry will identify opportunities to increase productivity and cut unnecessary and costly regulation, including where regulations are poorly coordinated between jurisdictions. The inquiry will therefore consider whether there are opportunities to improve fisheries regulations without compromising fishery policy and environmental objectives. Consideration would be given to regulatory simplification, streamlining and consistency of arrangements across multiple jurisdictions, alternative more efficient regulatory models, the practices of the various regulators and removing unnecessary restrictions on competition.

In doing so, the inquiry will consider the value of strengthened relationships and effective and coordinated management of our fish stocks with a view to reducing the regulatory burden incurred by business, and consumers.

In undertaking the inquiry, the Commission is to have particular regard to impediments to increasing productivity and market competitiveness of the Australian fishing and aquaculture industries, including:

1. The extent to which enhanced and improved use of cross jurisdiction and multi-jurisdictional regulatory regimes, information and service sharing can improve the economic efficiency and the ecologically sustainable use and management of fisheries resources.
2. The extent to which harmonisation or integration of environmental, management and compliance arrangements could improve the effective and efficient operation of the fishing industry and delivery of fisheries policy and environmental outcomes.
3. The extent to which accreditation schemes or recognition of equivalency could reduce the regulatory burden and increase productivity.
4. The extent to which greater use of cost recovery arrangements is applicable and informs the cost of delivering fishery production, conservation and other community service obligations.
5. The extent to which fisheries management regimes align with and protect the interests of the wider community (in particular, the balance between commercial, recreational, indigenous fishing and conservation interests, and consumers' interests).
6. The extent to which fisheries management regimes support greater participation of Indigenous Australians, provide incentives to Indigenous communities to manage their fisheries, and incorporate their traditional management practices in the fishing industry.

-
7. The degree to which cross jurisdictional regulatory arrangements are transparent, accountable, proportionate, consistent, effective and targeted.
 8. The degree to which cost effective and practical non-regulatory mechanisms could be expanded to achieve fisheries management outcomes.

The primary focus of this review will be on Commonwealth, state and territory regulation of wild capture marine fisheries. This will include the interaction of fisheries specific regulation within Commonwealth and State/Northern Territory jurisdictions. It will also need to have regard to the role of the Environment Protection and Biodiversity Conservation Act (1999) and other fisheries- related environmental legislation that are directly relevant to Australian marine fishing.

Process

The Commission is to undertake an appropriate consultation process including holding hearings, inviting public submissions and releasing a draft report to the public.

The Commission will consider the submissions and reports of all recent relevant inquiries and government responses. The Commission is to take into account the initiatives at the jurisdictional level relevant to the scope of the inquiry.

The final report should be provided within twelve months of the receipt of these Terms of Reference.

Scott Morrison
Treasurer

[Received 23 December 2015]

Contents

Opportunity for further comment	iii
Terms of reference	iv
Abbreviations	xi
Key points	2
Overview	3
Draft recommendations, findings and information requests	29
1 About this inquiry	41
1.1 The nature of fisheries regulation	41
1.2 Inquiry context	47
1.3 Commission approach	48
1.4 Guide to rest of this report	49
2 Access to fisheries resources	51
2.1 Determining where fishing can occur	52
2.2 Determining limits on fishing	57
2.3 Determining allocations between fishers	66
3 Commercial fishing	77
3.1 The commercial fishing sector	78
3.2 Primary management techniques	83
3.3 Scope for improvement in other management and regulatory arrangements	95
3.4 Food security, sufficiency and worker safety	100
4 Recreational fishing	105
4.1 Current estimates of participation and catch	107
4.2 Towards better management	111
4.3 Control mechanisms	116
4.4 Regulatory enforcement mechanisms	125
4.5 Improving the information base	127

5	Indigenous customary fishing	131
5.1	Overview of customary fishing	132
5.2	How customary fishing is regulated	133
5.3	Proposed reforms	139
5.4	Participation of Indigenous Australians in commercial fishing	148
6	Fisheries spanning jurisdictions	153
6.1	Basis of jurisdictional responsibility	154
6.2	Problems in cross-jurisdictional fisheries	158
6.3	Past reform attempts	164
6.4	Reform directions	166
6.5	Reform priorities	172
7	Managing the environmental impact of fisheries	179
7.1	Overview of the regulatory framework	180
7.2	How are regulatory arrangements working?	182
7.3	Is there scope to streamline environmental assessments of fisheries?	189
7.4	Managing protected species	194
8	Aquaculture	203
8.1	What is at issue?	204
8.2	How aquaculture is regulated	206
8.3	Aquaculture trends in Australia	207
8.4	Impacts of regulation on the aquaculture sector	212
8.5	Are the regulatory settings right for the future?	219
9	Downstream processes	223
9.1	Downstream processes and their regulation	224
9.2	Issues in the downstream sector	230
10	Other areas for improvement	237
10.1	How does Australia compare?	238
10.2	Development and implementation of fishing controls	239
10.3	Enforcement	249
10.4	Cost recovery and contestability of services	253

A	Conduct of the inquiry	263
B	Case studies on shared fisheries	269
	References	289

Acknowledgments

The Commission has used a range of information sources in preparing this draft report. The Commission is grateful for the contributions made by stakeholders through their submissions and comments, and their participation in consultations and public forums.

The Commission has also used research and data from a range of sources to inform recommendations, including the Australian Bureau of Statistics, Australian Bureau of Agricultural and Resource Economics and Sciences and the Fisheries Research Development Corporation.

The Commission thanks relevant agencies for the provision of fisheries and related data including Australian Fisheries Management Authority (AFMA), the Department of Agriculture and Fisheries (Queensland), the Department of Primary Industries (NSW), the Department of Primary Industries, Parks Water and Environment (Tasmania), the Department of Primary Industries and Regions (South Australia), the Department of Fisheries (Western Australia), the Department of Primary Industries and Fisheries (Northern Territory) and the Department of Economic Development, Jobs, Transport and Resources (Victoria).

Abbreviations

ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
ABS	Australian Bureau of Statistics
AFMA	Australian Fisheries Management Authority
AFMF	Australian Fisheries Managers Forum
AFZ	Australian Fishing Zone
CCSBT	Convention for the Conservation of Southern Bluefin Tuna
CPUE	Catch per unit effort
CRIS	Cost Recovery Implementation Statement
FAO	Food and Agriculture Organisation of the United Nations
FRDC	Fisheries Research and Development Corporation
GVP	Gross value of production
IC	Industry Commission
ITE	Individual transferable effort
ITQ	Individual transferable quota
IUU	Illegal, unreported and unregulated (fishing)
MAC	Management Advisory Committee
MoU	Memorandum of understanding
OCS	Offshore Constitutional Settlement
OECD	Organisation for Economic Cooperation and Development
PC	Productivity Commission
PIRSA	(Department of) Primary Industries and Regions (SA)
RBC	Recommended biological catch
SARDI	South Australian Research and Development Institute
SBT	Southern bluefin tuna
SESSF	Southern and Eastern Scalefish and Shark Fishery (Cwlth)
SETFIA	South East Trawl Fishing Industry Association
SPF	Small Pelagic Fishery (Cwlth)
TAC	Total Allowable Catch
WAFIC	Western Australian Fishing Industry Council

OVERVIEW

Key points

- Following past over-fishing, Australian governments have sought to apply policies to reduce catch volumes, and thereby restore and maintain fish stocks. Generally, these have been successful in improving sustainability.
- A developing issue is weak knowledge of the impact of increasingly successful but unmanaged recreational fishing on some high-value fish stocks.
- Current policy settings are sometimes overly prescriptive and outdated. In particular:
 - most commercial fisheries are managed primarily through controls over fishing methods, despite long recognition that this is a relatively inefficient way of meeting catch constraints, and inhibits fishers from introducing more cost effective practices
 - recreational and Indigenous customary fishing activity is at best sporadically monitored and impacts on stock sustainability largely uncounted in fishery management regimes. This is despite the fact that recreational fishing is a popular pastime for millions of Australians, and that recreational catch rivals commercial catch for some species, placing pressure on some key stocks
 - governments differ in the extent to which they have adopted best practice fishery management techniques, which is leading to significant costs for fishers operating in some cross-jurisdictional fisheries, and risks to sustainability of stocks.
- Commercial fisheries should move as a default position to apply transferrable quota systems. This would result in fewer constraints on fishing practice and provide a more efficient and effective means of adhering to harvest limits.
- Recreational fishing needs greater recognition in fisheries management, and decisions on restrictions and facilities for fishers require development of a sound evidence base.
- The introduction of licensing for recreational fishers where not presently used, and the better use of licensing systems to manage fishing where they are used, will provide a means for better meeting the needs of both future generations of fishers and environmental outcomes.
- The value of access to fisheries is multifaceted, incorporating economic, social and cultural benefits. Allocation of access where there is competition for fisheries resources should seek to maximise this value.
- Indigenous customary fishing is given special recognition consistent with native title rights more generally. However, there is limited clarity about what these rights entail for catch limits, which is an outcome of customary fishing being generally exempted from fishery management regimes. There is relatively poor input from Indigenous people into fishery management. Effective incorporation of customary fishing into management systems would help resolve these issues.
- Benefits from dissolving boundaries via active cooperation in the management of critical cross-jurisdictional fish stocks are often recognised but only rarely delivered.
- Other improvements include making regulatory standards for protected species clearer, greater delegation of operational decision making to fishery managers and strengthening cost recovery arrangements.
- Little change in the regulation of aquaculture over the past 10 years has not impeded the sector's growth. The major producing states already had several best practice regulatory features and other states have faced challenges that are predominantly non-regulatory in nature.

Overview

Inquiry context

Fish are a renewable, but not inexhaustible, resource. They are subject to the well-recognised potential for a ‘tragedy of the commons’, where the uncoordinated efforts of individual fishers depletes the resource. Governments must therefore limit catches to sustainably manage resources and, where there is competition between fishers, determine the rules for shared access. Governments also regulate fisheries to maximise their returns to the community, as ‘open access’ policies have historically led to over-expenditure on fishing activities relative to yield.

There are around 165 commercial wild catch fisheries spanning Australia’s Exclusive Economic Zone, which is larger than the land area of Australia, generating around \$1.5 billion in revenue. Millions of Australians fish recreationally. Coastal Indigenous communities have long been users and custodians of Australia’s marine environment, and continue to have strong cultural associations and concerns for the sea and its resources. Australia’s fish resources also provide non-extractive value, such as for the tourism sector, for which viewing native fish and the marine environment are significant drawcards.

The central aim of Australian fishing laws is to strike a balance between exploiting and maintaining the value of fish resources for the benefit of current and future users. The complex and dynamic nature of fish and marine ecosystems, and the multiple and changing uses of marine resources, make the achievement of this goal challenging. Further, each fishery is different (with different species, marine environments and nature of demand) and requires localised management arrangements. Fisheries management is complicated by the fact that, despite its large size, Australia’s fishing area has relatively low biological productivity. Australia accounts for 0.2 per cent (by tonnage) of global commercial production. (However, its production is concentrated in relatively high value species such as rocklobster and abalone and, as a result, accounts for approximately 2 per cent of global product by value.)

There will always be scientific uncertainty about the magnitude of environmental risks, and differing views on the degree to which governments should act to, and effectively can, mitigate these risks. Governments recognise that information that reduces uncertainty and guides improvements in management methods has potentially high payoffs, but such information can be difficult and costly to obtain. Given the large costs of irreversible environmental degradation from overfishing, governments now err on the side of sustainability when making regulatory decisions.

The regulation of fisheries involves three core tasks: research and/or collection of data to inform management; the development and implementation of controls over activity; and enforcement of those controls. Australian fisheries laws control two main matters: 1) the taking of fish, such as where people can fish, the types of species that can be caught, how much and how; and, 2) who can fish where there is competition for access.

Management arrangements – wild catch fisheries

The Commonwealth, states and the Northern Territory each regulate marine fisheries, with the states and Northern Territory generally responsible for fisheries that lie within three nautical miles from Australia's coastline and the Commonwealth those that lie between three and 200 nautical miles from the coastline.

As recreational and Indigenous customary fishing have traditionally been undertaken close to shore, only the states and Northern Territory presently regulate these forms of fishing. All jurisdictions regulate commercial fishing. In addition, a number of fish stocks spanning jurisdictional borders are subject to intergovernmental management arrangements.

Although there are many similarities in the fisheries laws of each jurisdiction, there are also significant differences, particularly in relation to the management of fishing sectors (commercial, recreational and Indigenous customary). Australia's waters are thus governed by multiple fisheries laws, and fisheries regulations comprise a complex array of interrelated regimes governing commercial, recreational and customary fishing.

Governments are converging towards best practice methods for determining overall catch limits in fisheries. These include the use of quantitative assessments of fish populations, and harvest strategies to define the desirable level of resource use and/or points at which changes in management are required so as to meet policy objectives. Limits may be set with reference to the quantity or weight of fish caught (output controls) and/or fishing methods, for example, fishing gear, boat sizes and days fished (input controls). In Australia, total catch limits are set predominantly for commercial fisheries, reflecting the historical focus of regulators on this sector.

Controls must suit the type of species targeted and be cost-effective given the fishing sectors involved. However, best practise strongly favours the use of output controls as the primary method of regulating aggregate catch, as they directly target the amount of fish caught and impose fewer constraints on methods of catching fish (and so allow for improvements in the efficiency of fishing practices over time).

Where output controls are used, quotas for individual fishers are most commonly determined as a share of allowable catch from the fishery. The setting of quotas as shares allows their automatic adjustment when any changes occur to catch limits. Quotas also have the advantage of minimising incentives to 'race to fish', spreading the catch over the fishing season and raising average utilisation rates of equipment. Tradeable quotas

facilitate structural adjustment by making it easier for fishers to enter and exit the industry, and increases the value of the industry as more efficient fishers can purchase quotas.

Aggregate output controls are usually complemented by other controls, such as gear restrictions or bycatch exclusion devices, to minimise the impact of fishing on non-target species and the environment.

Sector management — a slow drift to reform

The shift to controlling harvest as the dominant commercial fishery management technique in Australia has occurred gradually over the past 15 or so years. Individual transferable quota systems are presently used in fewer than half of all fisheries; the remainder are still managed through input controls, although reform efforts are continuing. Past input based management techniques, which encouraged over-investment, have proven difficult and costly to unwind.

Recreational fishers are primarily regulated using controls such as allowed gear, and bag and size limits, given their diversity in activity and the large area over which they fish. As recreational fishing has historically been viewed as less consequential than commercial fishing, it is subject to significantly less monitoring.

Indigenous customary fishing is generally either regulated through possession limits and gear restrictions or exempt from fishing laws.

How controls are set

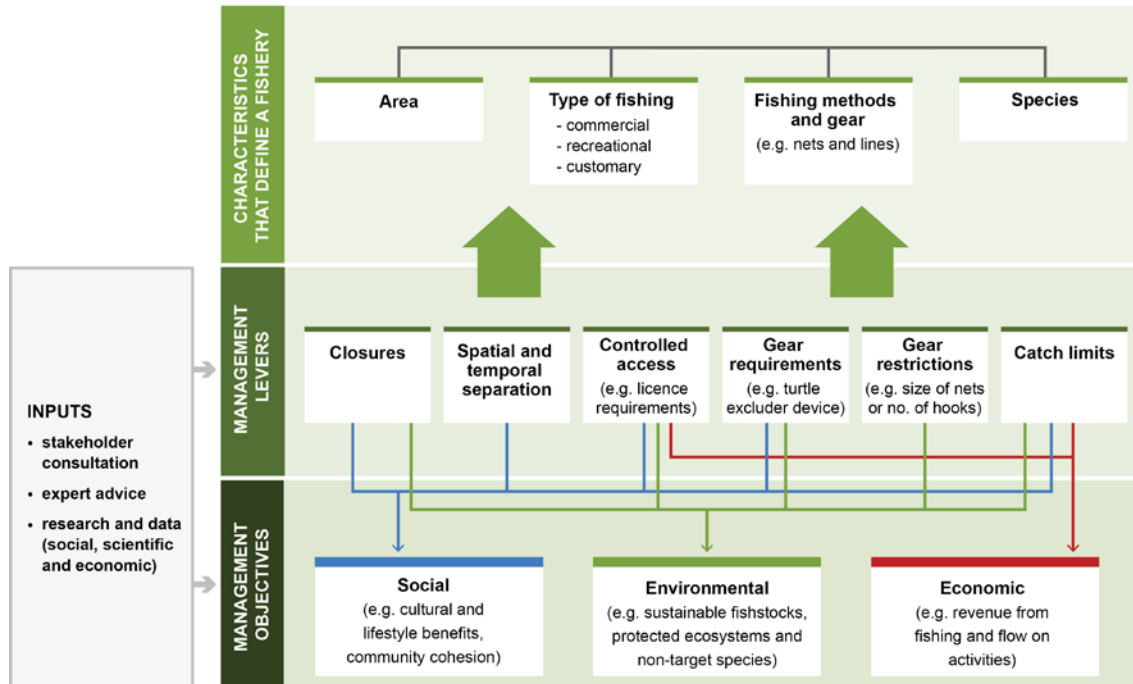
The controls on catch limits and fishing practices needed to meet environmental objectives are largely technical matters determined by scientific and statistical research. Harvest control rules and other requirements to meet fishery policy goals are implemented through management plans for each fishery, which are developed and enforced by fisheries authorities. Typically, harvest controls focus on the sustainability of the target stock, although in Commonwealth fisheries they are also designed to maximise economic returns.

Decisions on who may access fisheries reflect governments' objectives for the use of fishery resources. Objectives vary across the jurisdictions, and may include economic and social, as well as environmental, aims. Where there is competition for the same fishing stock, allocation decisions (where made) reflect government judgements on the value of access to the different fishing sectors and the community. Governments use a broad repertoire of allocation methods, including spatial separation of access, temporary area closures and allocations of catch shares to sectors out of a total allowable catch limit.

In short, there is a range of tools in regulators' and fisheries managers' 'tackle boxes' that can be used to achieve fishery policy goals (figure 1). Governments' principal goals should be to make efficient and effective regulatory decisions on resource use, drawing on

contemporary information about impacts, and recognising that regulatory effort and research should be proportional to the value of fisheries to the community.

Figure 1 Fisheries controls



Aquaculture

Aquaculture has grown in overall importance as wild-caught production in Australia has declined. Aquaculture is regulated to mitigate the industry’s impact on the environment, provide access to publicly owned land and water, and manage potential conflicts with other users of these resources. Given their jurisdiction over most planning and local environmental matters, states and territories are primarily responsible for the management and regulation of aquaculture.

The primary modes of control (and facilitation) are the grant of leases on public land and waters so as to provide secure tenure to a site and the issuing and administration of various development and operating approvals. These approvals may stipulate conditions such as restrictions on the type of infrastructure that can be employed and requirements to maintain the quality of water to a specified level. Regulations also usually seek to control interactions with other wildlife, such as seals and seabirds.

How well are fisheries regulations working?

Reforms aimed at rectifying over-fishing in wild catch fisheries have produced better environmental outcomes and underwritten an economically sustainable industry over the longer run. As one indicator, some 11 per cent of fishing stocks in Australia (for which a status has been determined) have been fished to unsustainably low levels, compared to 29 per cent of the world's fish stocks. In recent years, Australian authorities have sought to standardise and increase the coverage of stock surveys to obtain a more accurate picture of risk and to target regulatory effort.

However, wild catch fisheries in most jurisdictions need to be better managed so as to reduce unnecessary costs and ensure that the community gets maximum value from its resources. Particular concerns include:

- the cost of fisheries regulation and management relative to the value that can be gained from fishing given the likelihood of ongoing catch constraints
- the outlook for the commercial fishing industry, where there are concerns about the slow pace of reform in some jurisdictions and the impact of fisheries regulation on competitiveness, investment and innovation
- relatedly, that the management of some (mostly commercial) fisheries spanning jurisdictional borders is ineffective and inefficient due to multiple and sometimes inconsistent regulatory regimes
- the adequacy of current fisheries management regimes in dealing with community expectations and preferences for the use of fishery resources
 - including concerns about the impact of the recreational sector on fishing stocks, with catch now estimated to rival or exceed commercial catch for a range of key species; in all probability, this will increase in future with population growth and utilisation of new fishing technologies
 - there is longstanding concern that Indigenous customary fishing is insufficiently recognised in states' fishery management regimes, an issue that should be taken out of the too-hard basket
- that decisions on where fishing can occur and by whom are being made in an arbitrary way in several jurisdictions, with significant impacts on current users.

The Commission's approach

This review identifies reform areas that are of high priority and common interest to jurisdictions, given the need to match regulatory effort to the value that can be gained from Australia's fisheries.

In doing so, it focuses on the frameworks for determining access to fishery resources and managing each fishing sector, given that it is these higher-level policies that will influence day-to-day management and have the most significant bearing on outcomes. It also

considers the management of cross-jurisdictional fisheries and the efficiency of core fishery management tasks.

Access arrangements

Access to fishing grounds

Governments must make decisions on access to and use of marine resources, balancing the interests of different users.

From a national perspective, fishing laws generally do not seem to unreasonably limit the establishment of new commercial fisheries or recreational fishing grounds. But broader decisions on the use of marine environments can frustrate the establishment of fisheries and/or limit activities in existing fisheries. There are widely-held concerns about the adverse impacts on fishing of coastal developments, marine infrastructure and the declaration of marine park areas.

Land and marine developments

Effluent outflows and runoff associated with coastal developments, and marine infrastructure, such as artificial reefs, can adversely affect fisheries, particularly for commercial fishers. Even small changes in the location of developments can significantly affect the viability of fishing areas or commercial fishers' operating costs.

Notwithstanding this, most states do not require coastal and marine development proposals to consider their impacts on commercial fishing, a defect that should be corrected.

Marine park areas

Marine park areas are established for biodiversity conservation reasons and by intention may affect access to fishing grounds and the types of fishing that can take place, if fishing is permitted at all.

Better practice in some jurisdictions, for example, the Commonwealth and South Australia, incorporates consultation on proposed marine parks and zoning arrangements to better understand and, to the extent practicable, mitigate impacts on fishers, communicates the reasons for decisions, and evaluates outcomes against objectives. Emulating such best practice processes would promote better outcomes. Otherwise, marine parks are outside the scope of this inquiry.

Determining limits in fisheries

Harvest strategies set out stock management responses given acceptable levels of risk, and so are central to the adaptive management process that constitutes sound fisheries management. In addition to providing predictability on how fishery stocks will be managed, they guard against ad-hoc decisions on fishery controls. Most commercial fisheries have fishery-specific harvest strategies. All jurisdictions should continue to adopt harvest strategies as the primary tool for managing fishing stocks.

Harvest strategy policies

There is an important distinction between harvest strategies (particular approaches) and the overarching policy for such strategies, which can help provide coherence to those strategies.

A harvest strategy policy describes how government fishing policy should be incorporated into the harvest strategies for each fishery, including setting out governments' policy priorities, acceptable levels of risk and preferred methodologies for guiding utilisation of fish stocks and changes in management responses. Such policy ensures that harvest strategies across all of a government's fisheries are consistent with desired standards, and reduces the time and the degree of contention involved in setting specific strategies. Thus the existence of a harvest strategy policy makes it more likely that a government's fishing policy goals will be met, and met efficiently, and places greater accountability on fishery managers to follow the policy or justify deviations from it. They also better facilitate review of the overarching goals and outcomes of fishery management.

However, only the Commonwealth, Northern Territory, South Australia and Western Australia have harvest strategy policies. Other jurisdictions should implement them.

The policies of the Commonwealth and Western Australia are more specific than those in South Australia and the Northern Territory in prescribing methods for determining the target level of fish extraction. *The Commission would value feedback on approaches for setting catch limits.*

Determining allocations between fishers

Fish cannot be fenced, and so different sectors sometimes compete for access to common stocks. Unsurprisingly, the arrangements for allocating access are highly contentious as they can affect livelihoods and social amenity.

The basis for allocation is sometimes opaque, uncertain or of questionable efficiency, which provides fertile grounds for disputes. The stated policy objectives of governments include multiple and sometimes competing goals that often provide limited guidance on how judgements should be made. Where governments have stated their policy aims, it is

not clear that they have been determined to maximise the value of fishery resources to the community as a whole.

Although South Australia, Western Australia, New South Wales and the Northern Territory have allocation policies, decision-making is not supported by the regular collection of representative information on the demand, catch and value of recreational and Indigenous customary fishing.

There needs to be a clearer and less contested means of allocating access to different fishing sectors. The key guiding principle is to allocate fishing resources to the highest value uses across multiple competing parties.

The ‘value’ obtained from fisheries resources can have different facets and forms. For example, value could be economic (revenue from fishing and flow on activities), social (recreational enjoyment, community cohesion) or cultural. Many of these sources of value are hard to measure.

As most allocation decisions in Australia do not involve a previously unallocated fishery, policy makers have to determine whether a reallocation in favour of one group at the expense of another will increase the overall value gained from the fishery. That requires estimating the marginal or incremental value derived from additional access or lost due to reduced access.

Governments should provide clear guidelines on what they will take into account in allocation decisions, including how they will prioritise policy objectives. Ultimately, there should be a clear gain to the community from any re-allocations of access — for example, the benefits to recreational fishers and local economic activity from transferring some of the allocation from commercial to recreational fishers should exceed the losses to commercial fishers and related activity.

Basing allocation decisions purely on the level of expenditure by fishing groups (as proposed by some) would be poor policy. The low-cost extraction of fish for high value uses would perversely be trumped by higher-cost methods, an aberration in its own right, but one that would also create incentives for cost-padding, and spurious analysis.

Valuing access to the fishing sectors

The value of marginal access by commercial fishers can be estimated through the costs of producing and purchasing fish, and the price of fish sold in markets. However, there are no equivalent markets for valuing access by recreational and Indigenous customary fishers, which complicates allocation to these groups.

While imperfect, it is nevertheless possible to construct proxies for the value of additional recreational fishing opportunities based on indirect estimates of recreational fishers’

willingness to pay (for example, as revealed by people’s willingness to incur travel costs to go fishing, or as elicited through surveys).

Customary fishing by Indigenous Australians has cultural dimensions that make its value very difficult to quantify. It is much harder to see customary fishing through the prism of the separate preferences of individual fishers. Fishing by one person has communal and cultural values that would not necessarily be well captured by a ‘willingness to pay’ measure for each individual.

In accordance with the principles agreed by all states and the Northern Territory governments in 2004 for the management of Indigenous fishing, governments should set aside shares in overall allocations sufficient for local Indigenous communities to maintain their traditional customs. This would, in practice, accord priority to customary fishing take. This proposal would apply to a lesser extent in the Northern Territory, where Indigenous Australians have been granted extensive freehold title over intertidal waters.

The level of the allocation should be informed by advice from Indigenous communities and data collected on customary practices and use.

Providing a share of allowable catch sufficient to cover cultural use by the local Indigenous community — reflecting demand and their particular laws and traditions — is unlikely to significantly affect activity by other fishers as customary fishing comprises a small share of the total catch in most fisheries. To the contrary, providing explicit shares of access in managed fisheries will enable better accounting and enforcement of each sector’s shares.

Customary fishing, as for other sectors, should be subject to overarching fishery management goals, including the sustainable utilisation of fish stocks. As such, allocations to the customary sector should be binding and not exceed the limits required to meet policy aims. The Commission envisages that distribution of the customary allocation would be a matter for the local Indigenous communities to determine.

Further, controls (such as gear restrictions and minimum fish sizes) may be applied, as for other fishers, as a condition of access to manage the impact of fishing activities on by catch and the broader marine environment.

To ensure that the customary allocation and any controls over customary fishing activities are culturally sensitive and do not infringe on native title rights, it is important they be developed in consultation with Indigenous communities. Further discussion on the participation of Indigenous Australians in fishery management is below.

Allocation policies

Calculation of the marginal values of access for the commercial and recreational sectors can be complex, but provides a basis and benchmark for objective and soundly-based decision making. Governments should be transparent and consistent in how they approach

allocation decisions. Ultimately, allocation policies should seek to promote the best use of fishery resources and ensure decisions are evidence-based. Governments should give high priority to collecting better information, particularly for highly-contested fisheries.

Victoria, Tasmania and Queensland should institute resource allocation policies. The Australian Government should also develop a policy, reflecting the increasing reach of recreational fishers into its more distant waters.

Scope to move to inter-sectoral trading

Pragmatism requires that, for the moment, governments continue to determine allocations between sectors. However, there may be scope to extend existing arrangements for the trading of fishing access rights in the commercial sector to include the recreational sector.

Transferable quota systems set limits on the total amount of allowed catch or effort for a particular fishery within a period, and apportion tradeable entitlements to fish within these limits. Such price-based mechanisms for allocating access across sectors have the advantages of avoiding subjective decisions and allowing access to those who value it most.

The practical inclusion of the recreational sector is a longer-term, but still desirable, goal. In practice, this would require its representative organisations to hold and deal with collective rights. There is already an imperative to improve data collection and valuation techniques, which would help. And the recreational sectors in some states also recognise that they need to better organise given the inadequacy of current arrangements for contested fisheries. Transferable quota systems that include recreational fishers are therefore worth considering in the longer-term, but, given the transaction costs involved, are only suitable for high-value fisheries.

Improving commercial sector prospects

Output, value and employment in the commercial sector have been trending down for well over a decade. In part, this trend reflects constraints on activity due to past overfishing. The industry is also suffering, however, from outmoded fishery management policies, including the use of input controls (controls over how fishing occurs) as the predominant management technique in the majority of fisheries. The use of input controls has suppressed productivity improvement, encouraged over-investment and discouraged structural adjustment. (Notably, most of the sector comprises small fishing businesses, most commonly operating in low-value fisheries.)

Use of individual transferrable quota (ITQ) systems for the management of commercial fisheries as the default option (or, where this is not technically feasible, market-based input controls — individual transferrable effort (ITE) systems) will help improve productivity in and prospects for the sector, as will the regular review of regulations to ensure that they are

the minimum required to achieve governments' objectives. Recommendations discussed elsewhere, including the provision of clearer and more certain basis for decisions on access to fisheries, rationalising or streamlining cross jurisdictional fishery management and clarifying environmental standards, will also help reduce regulatory burdens and risks.

Market-based controls

The jurisdictions that are at the forefront of using ITQ systems are generally those that most suffered from over-fishing and/or have a significant number of higher-value fisheries — the Commonwealth, South Australia and Tasmania. Other jurisdictions continue to manage most of their fisheries through input controls, although some are undergoing or have flagged future reform (New South Wales and Queensland). However, all jurisdictions have retained some input-controlled fisheries because of the perceived value (on the part of fishers) attaching to existing entitlements. ITE systems are used at low levels.

Impediments to the greater use of ITQ systems have included concerns about their relatively higher administrative costs. When they are in place, they require more sophisticated monitoring systems. Moreover, they involve transitional costs, including the revision of business models for fishers, because ITQ systems require the imposition of explicit, usually lower, limits on catch and dissolve existing rights to fish in favour of new, tradeable, rights. This may have flow-on impacts on supplier businesses, local employment and communities. However, such impacts are, to an extent, both necessary and unavoidable, with the alternative being continuing decline in sector competitiveness and value. The task of instituting reforms and transitioning to the new system could nevertheless be made easier by improving processes for allocating rights under ITQ systems, as outlined below.

The higher cost of ITQ systems suggests that they are more suited to high value fisheries. But notably the Commonwealth and South Australia are also now using these in fisheries targeting lower-value fish, which suggests cost-effectiveness should be determined on a case by case basis.

ITQ systems can be challenging to implement in fisheries where multiple fish species are targeted and for fish that have highly variable annual recruitment (where the amount of growth in fish biomass bears little relationship to the previous year's fish stocks). But jurisdictions are developing innovative approaches to multi-species fisheries (for example, setting different total allowable catch limits for lower-value fish in a fishery to high-value fish) that improve prospects for application of ITQ-based management.

Dealing with latent effort

Reforms have been partially frustrated by the existence of un- or under-utilised entitlements to fish ('latent effort'). These inflate the 'demand' for the fishery and complicate the allocation of new entitlements. Jurisdictions have periodically sought to buy out entitlements to reduce the number of fishers. The prospect of future buyouts is encouraging some people, however, to remain in commercial fishing (or to maintain their rights to commercially fish).

The Commission has been advised that, at a practical level, any restructure of rights without compensation will be unworkable. However, the sector needs to also be realistic about future prospects and the need for reform to enable improved sustainability, productivity and profitability.

In implementing ITQs, governments have most commonly allowed a short period of trading in historical entitlements to enable businesses to exit the industry or adjust their business models. Such market mechanisms tend to be very complex, and require that fishers have high levels of sophistication to participate.

Removing latent effort would simplify the process of allocating new entitlements and increase the likelihood that fishers would receive sufficient entitlements for them to operate viably.

The experience of Australia and overseas suggests that a better future approach would be to separate the process into two steps: 1) the first would be to either rescind all fishing rights or reduce latent effort through a bidding system; and 2) only once the level of entitlements has been reduced (or removed) would fishing businesses be permitted to participate in a market process to trade rights.

Scope for conditional bidding

Governments implementing reforms that fundamentally alter the nature and mix of entitlements for commercial fishers should consider trading systems that allow some conditional bidding. This would allow fishers to make their offers conditional on a desired outcome — such as the ability to sell all of their entitlements or to purchase a minimum package of rights. Without the ability to make conditional offers, commercial fishers may be unable to purchase enough entitlements to support the viability of their business, or to exit the industry. Either situation risks an increase, or continuation, in latent effort and inefficiency (at least in the short run).

There should be a presumption in favour of ITQs

Governments should move each of their fisheries to ITQ management unless it is demonstrated that this is technically impractical or not cost effective for the individual fishery. If individual transferable quotas are not feasible, fisheries should be managed

using ITE systems, which would at least provide a mechanism for ensuring that entitlements are better utilised, and utilised by the most efficient fishers.

Reducing regulatory costs and imposts

Governments have closely regulated commercial fishing for over thirty years. Over that time, regulatory challenges and objectives have changed, but the regulatory response has typically been to overlay additional requirements onto existing fisheries management practices.

In addition to statutory reviews of fisheries laws, fisheries regulators should regularly review, in conjunction with harvest strategies, whether the specific controls and management arrangements applying to fisheries are still appropriate for each fishery. There seems scope for some streamlining and simplification:

- market mechanisms (as described above) require less prescriptive arrangements
- new technologies (including electronic data collection systems) allow more efficient monitoring of fisheries.

Other issues

Some participants raised concerns about food security and Australia's self-sufficiency in wild caught seafood. Australia is not at risk of food insecurity as there is no lack of fish availability. In fact, global fish production (including aquaculture) is outstripping population growth and international seafood prices are declining.

Self-sufficiency is a fruitless and inefficient objective. It is fruitless because Australian wild caught seafood production could not be increased to achieve self-sufficiency without creating unacceptably high risks of over-fishing. As in trade generally, it is also often more efficient to purchase fish from foreign producers who can fish at lower costs. It is worth noting again that Australian waters are relatively unproductive in biological terms. Even if the concept of food self-sufficiency was accepted, there is little integrity to an argument that a country be self-sufficient in every food type.

There are more grounds for concern about the comparatively poor safety record of the commercial fishing industry and the uncertainty about which agencies have regulatory responsibility for reviewing workplace safety.

Commercial fishers and regulators should work closely together to ensure safety regulations are regularly reviewed so that they remain practical and effective in reducing the risks of injury and fatality in the sector. The current transfer of responsibility for maritime safety from the states and territories to the Australian Government has intensified concerns about the supervision of safety matters. Governments should ensure that there are good linkages between work health and safety and maritime regulators (including in

relation to sharing of information on incidents) and clarify which agencies are responsible for different types of incidents.

Recreational fishing

Recreational fishing is sometimes, but inaccurately, seen as an inconsequential adjunct to commercial fishing. This neglects the scale of recreational activity and its large social value to the community, with millions of Australians fishing each year. There is also a local economic flow-on effect in servicing this recreational activity, from accommodation and boat servicing to bait supply. Recreational catches also now rival or exceed commercial catches for some species, and recreational fishing practices can have adverse effects on non-target species (bycatch) and ecosystems. The rising sophistication and affordability of scanning technology and vessels has particularly increased fishers' ability to fish further from shore and more intensively.

The demand for access to certain fishing areas or species by the recreational fishing sector has contributed to significant tension in some jurisdictions. The extent of competition for resources is hard to assess as there is relatively little information on shifts in activity and catch. This limits the current scope to objectively reflect demand for recreational fishing in decisions on access to marine resources, and/or in the provision of additional services for recreational fishers.

It is probable that the recreational sector's impact on fisheries will grow with population growth and utilization of new fishing technologies. In catch-constrained management regimes, it is not practical or consistent with policy aims for the regulatory approach to be one of ad-hoc intervention or neglect.

Recreational fishing activity is licensed in some states and should be licensed in all.

Licensing

A well-designed licensing system is a key step for better managing recreational fishing. While some states have a licensing system in place, these could be better used to collect more comprehensive information, and better manage and support activity.

The better measurement of recreational activity, impacts and risks is an important element in ensuring:

- a better basis for monitoring effort and allocating access to fishery resources
- a means to better target information and services (for example, ramps and educational resources) for recreational fishers

-
- a sampling frame for surveys to monitor catch, gear used, expenditure, social impacts and the value derived from recreational fishing, which should factor into decisions on access, management of recreational fishing activity and services.

Licensing also provides a means for directly conveying and enforcing access conditions, especially for high risk fisheries. Systems can be tailored, through variations in fees or conditions, or caps on the number of licenses issued, to help manage demand for vulnerable species. Further, they can provide a source of revenue to improve recreational fishing management, and for research and additional facilities for recreational fishers.

Queensland, South Australia and the Northern Territory do not have licensing systems for recreational fishers. The experience of jurisdictions that do shows that they need not entail significant regulatory burden or high costs for fishers (for example, permits can be obtained online at a low fee and issued for short or longer term periods). The price of licences should be a secondary objective to their use to gather information on and manage resource use.

For maximum efficiency, licensing systems should have high coverage rates. Licences should be readily available at low cost for the majority of fishers (those not operating in high-risk fisheries, which may require more intensive monitoring and management). Governments may exempt certain groups from the payment of fees for welfare reasons, but there should be few, if any, exemptions from being ‘counted’ and contributing data.

Charter fishers should be required to keep records on catch and effort (like commercial fishers) given their greater incentives to maximise take. Records should be the subject of compliance review.

The adoption of licensing systems by all states and the Northern Territory would support consistency in cross-jurisdictional fisheries, where currently only some recreational fishers are licensed. The Commonwealth should consider licensing if it assumes greater responsibility for the management of recreational catch.

Licensing provides a practical and proportional way of better incorporating recreational fishing into harvest and other management strategies. Taking this action now will reduce the risk and likelihood of more draconian measures down the track.

Other management controls

The number of recreational fishers, diversity in their activity, a large and often remote coast-line and the capacity for fishers to rapidly respond to available fish stocks makes controlling catch more difficult for the recreational sector than for the commercial sector. Current management approaches vary, but can include size, bag, boat and possession limits; restrictions on the types of gear that may be used; and temporal and spatial closures. The efficacy of controls varies depends on the fishery and species.

While it is difficult to be definitive about the effectiveness of controls because of data inadequacies, available research suggests that size, bag and gear limits are effective in many fisheries.

It is clear that in a few fisheries (primarily where there are limits on catch and the species is targeted by both recreational and commercial fishers) existing restrictions are not effective and that, if practical, controls on the aggregate catch of recreational fishers should be implemented. Harvest tagging systems, which set a harvest limit over a period and provide for the tagging of catch as a condition of possession, should be considered for valuable, at-risk species.

Returning a live fish to the water after capture ('catch and release' fishing) is a common practice in recreational fisheries. While catch and release fishing is generally viewed as helpful in conserving stocks of inshore fish, emerging research suggests that these methods are associated with higher mortality rates for deep-water species. Further research is required in this area to consider whether alternative approaches are needed.

Recreational fishing surveys

Management controls should be developed with an understanding of the status of the targeted species and their ecological systems, recreational participation, catch and fishing methods, and the value of recreational fishing to the community. The existing ad-hoc jurisdictional and regional surveys do not provide adequate information for understanding, managing and developing Australia's recreational fisheries. Regular and systematic collection of evidence on recreational fishing is required.

While jurisdictions have recently agreed to explore opportunities to harmonise and share information and to develop data collection approaches for the long term, more decisive action needs to be taken to address requirements in this sector. The Commission recommends a two-step approach:

- The Australian Government should conduct a national survey in 2017-18 using a comparable method to the 2000-01 *National Recreational and Indigenous Fishing Survey*, with states and the Northern Territory contributing to the cost of this survey.
- From 2022-23, all governments should undertake five yearly surveys of recreational fishers, whether at the national level or on a coordinated basis.

Enforcement

The diversity and expanse of recreational fishing activity makes enforcement difficult and the risk of being caught low. Strong penalties for knowing and persistent breaches of laws, such as the illegal take of key species, are likely to be more cost-effective ways of achieving compliance than the dedication of significant resources to enforcement. Penalties

and the resources employed for enforcement should be proportional to the level of risk to the sustainability of fisheries.

Indigenous customary fishing

The marine environment holds cultural importance for many Indigenous Australians. Customary fishing in accordance with traditional Indigenous laws and customs can confer ceremonial, communal and spiritual benefits connected to country, and be an important component of a community's traditions. Because of these unique attributes, governments treat customary fishing differently from commercial and recreational fishing.

Customary fishing should be better incorporated into fishery management

For management purposes, most jurisdictions either exempt customary fishers from licensing requirements, but subject to them to some gear and possession requirements, or exempt them from management frameworks altogether. Although this provides a form of special recognition, largely exempting customary fishing from fishery management laws appears to have resulted in more harm than good. Exemption has meant that the interests and impacts of customary fishing are not always considered in fishery management regimes. Perhaps unsurprisingly, ambiguity in relation to customary fishers' rights and obligations has led to tension and conflict in some high-demand fisheries.

Although all governments have expressed a desire to better incorporate customary fishing into fisheries management regimes, there has generally been slow progress.

Clearer recognition of Indigenous customary fishing

Customary fishing by Indigenous Australians should be recognised as a sector in its own right in fishery management regimes. To avoid any inconsistencies, the definition of customary fishing should be consistent with native title. This would provide for fishing by Indigenous Australians in accordance with proven traditional laws and customs. The specific rights enjoyed by a customary fisher will stem from traditional practice in that fisher's community.

Customary fishing is currently considered to exclude fishing for commercial purposes, but for some Indigenous communities, traditional practices include the trade or barter of fish within or between communities. The right to trade has been affirmed — in at least a restrictive sense — by the High Court of Australia in *Akiba v Commonwealth* (2013) HCA 33, and by statute in Western Australia.

Allowing trade in accordance with traditional customs is consistent with intentions underpinning recognition of customary fishing rights. Governments should provide

statutory clarification of customary rights to fish for commercial purposes, but only where consistent with proven traditional laws and customs.

Customary fishing rights should not be tradeable or transferrable, recognising the unique characteristics of the associated cultural benefits and that these benefits are exclusive to the Indigenous community concerned.

Clearer recognition of the sector will allow fishery authorities to set sector-specific catch or effort limits, as discussed above. The collection of information to support customary fishing management will require good-faith engagement by fisheries managers with customary fishers and preparedness by customary fishers to share information. Consultation with Indigenous communities is essential to ensure that native title rights are not inadvertently infringed when governments seek to apply contemporary fisheries management practices to customary fishing.

Establishing entitlement to Indigenous customary fishing rights

The requirements for proof to claim entitlement to undertake customary fishing differ by jurisdiction. For example, in Tasmania and New South Wales, a person must have Aboriginal ancestry, identify as an Aboriginal person and be accepted by the Aboriginal community, while in South Australia identification is established through the development of traditional fishing plans. *The Commission would value views from stakeholders on existing methods and desirable ways of establishing entitlement.*

Greater participation in fisheries management

Management strategies for fisheries used by customary fishers should be developed, where possible, in consultation with relevant Indigenous communities.

Customary fishers should, like other sectors, contribute to fisheries management costs insofar as they benefit from such management. However, practical difficulties may preclude efficient cost recovery in most jurisdictions. Indigenous communities may be able to contribute effectively either in full or part through other means including, for example, self-management through Indigenous ranger programs. In addition to being a more culturally-appropriate means of enforcement, ranger programs allow application of traditional knowledge and empower Indigenous Australians to be more engaged in fisheries management.

Cross-jurisdictional stock management

Marine fisheries that span Commonwealth, state and/or Northern Territory borders are a consequence of the marine jurisdictions defined by the Offshore Constitutional Settlement (OCS).

Management of cross-jurisdictional fisheries is more costly due to the existence of multiple regulatory systems. Where the rules of those systems are inconsistent or do not sufficiently consider each other, there are also higher risks of over- and under- fishing, unequal treatment of fishers, administrative inefficiency and compliance costs. The risks mainly relate to the management of 24 stocks and here, the degree and nature of detriment varies widely.

Regulatory stasis seems to pervade the reform of cross-jurisdictional fisheries. Given the costs and complexity of instituting major reforms, there have been few attempts, and several have faltered. For example, negotiations on the Commonwealth and New South Wales trawl fisheries have been occurring for nearly 10 years and the ‘on again, off again’ attempts to reform the southeast Australian scallop fishery have been going on for 30 years.

Given limited resources, governments should:

- focus on fish stocks that are of higher value/risk and subject to inconsistent management arrangements, and hence vulnerable to significant cost escalation or diminution in value if poor management arrangements continue
- consider whether transfer of management responsibility to one government or better alignment of management arrangements would produce the greatest net benefits.

High priority candidates for reform include management of southern bluefin tuna, east coast snapper and the fishing stocks managed in the Commonwealth/New South Wales trawl fisheries. Well-recognised risks with the management of these stocks suggest:

- the Australian Government should set allowable catch limits of southern bluefin tuna for all fishing sectors (including the recreational sector). For practical reasons, the government could continue to draw on states for day-to-day management of recreational fishers, but this should be in accordance with the catch limits determined by the Australian Government. Catch limits should be in place for the southern bluefin tuna fishing season commencing on 1 December 2018
- the New South Wales, Victoria and Queensland governments should ensure the joint stock assessment process for the east coast biological snapper stock proceeds as a priority
- the New South Wales Offshore Trawl Fishery should be absorbed into the Commonwealth Trawl Sector of the Southern and Eastern Scalefish and Shark Fishery by the end of 2018.

Governments should make reform of the specified cross-jurisdictional fisheries arrangements a collective priority, and dedicate sufficient resources to implementing reforms.

The rigidly defined geographic boundaries specified in many OCS fisheries arrangements are inflexible, and are ill-suited to changing fish populations and distributions arising from climate change as well as being inimical to adaptive fishery management. The costs and

risks of shared fishery management will be reduced if all governments adopt known best practice approaches to core tasks (such as stock assessments and harvest controls), routinely seek to implement reciprocal or consistent arrangements in relation to catch controls and data collection, and regularly review the terms of intergovernmental agreements underpinning shared management.

These tasks should be the subject of joint Ministerial direction to agencies.

Environmental regulations

Regulations vs public expectations

The environmental standards and assessment processes employed to mitigate risk in fisheries appear, on the whole, to be meeting their objectives. Several stakeholders raised concerns about the efficiency of assessment processes for fisheries regulated under the *Environment Protection and Biodiversity Conservation Act 1999* (around 80 per cent of fisheries) but these related to functions that, by necessity, are undertaken by separate entities, and so do not warrant amalgamation (as proposed by some). (Other fisheries are considered below).

An emerging concern is the gap between the standards or outcomes expected by some in the community and those set (or thought to be set) by governments. Greater public awareness and concern about overfishing and marine environments have heightened expectations of governments, as well as accountability for standards set and achieved.

The gap between public expectations or perceptions, and regulatory standards and outcomes, has resulted in higher costs for the commercial fishing sector. This is evidenced by the take-up of third party certification schemes and pressure on governments to increase restrictions on fishing — most prominently in relation to large vessels and ‘charismatic’ (in some way special to the public), but not necessarily at risk, species.

These responses are partly a consequence (or the cost) of poor practices and overfishing in the past, which has sometimes created a need for ‘social license’ to viably operate in addition to compliance with government standards. The policy concern is public misperceptions may remain or intensify, which would undermine the value of regulation and lead to unnecessarily higher costs for fishers and the community, whether through unnecessarily stringent regulations raising production costs or reducing catch, both of which will flow through to higher prices for consumers.

The Commission’s analysis indicates that environmental standards for fisheries are set conservatively. To the extent that there are misperceptions, the industry itself has a role in correcting these. But governments should also do more to make standards and outcomes more transparent. This includes:

-
- the Australian Government publishing the annual reports that fisheries produce on their performance against accreditation requirements, which would provide useful information to the public and enable fishers to more readily point to their ‘credentials’
 - clarifying and more transparently reporting against standards for the regulation of protected species.

Regulation of protected species

Fishing brings a risk of interactions with threatened, endangered or protected species (TEP) in some areas. Regulators do not always specify their appetite for such risks and, in some cases, set the standard for mortalities effectively at zero.

The question is one of balance. If governments know that there is a risk to TEP species in a fishery, they should specify mortality limits (for example, over a season) and require fishers to take measures to meet these limits, rather than leave the implication that mortalities are to be an implausible zero.

All jurisdictions require fishers to report interactions with TEP species, but only the Commonwealth and South Australia make information on these interactions readily accessible (online). All governments should make information on interactions with TEP species publicly available, in conjunction with limits. In turn, this will inform the adjustment of limits and strengthen accountability for meeting them.

The Australian Government should also clarify the purpose of the Marine Species List established in Part 13, Division 4 of the *Environment Protection and Biodiversity Conservation Act 1999*, and the criteria for adding or removing species from the list.

Third party accreditation schemes

Several stakeholders sought the streamlining of, or exemption from, environmental approvals for fisheries that have achieved certification from credible third parties.

Third party certification should not replace regulatory requirements or set regulatory benchmarks. Regulatory standards set the minimum environmental standards that fisheries must meet in order to permit their continued use by the community. Third party certification schemes are concerned with one aim — environmental protection. Their standards are by definition more conservative and are not balanced against other objectives that governments pursue through the managed use of fishery resources.

Where practicable, regulators should minimise regulatory costs and burdens by drawing on information used by third party certifiers.

State and territory-managed fisheries

State and territory governments assess any fisheries not assessed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. Assessment processes are generally less extensive, which appears to reflect that the relevant fisheries are generally of lower value and/or risk, being often niche or small-scale. *The Commission would value feedback from stakeholders about the adequacy of environmental management regimes for these fisheries and, if required, options for improvement.*

Downstream processing

Around 90 per cent of the seafood produced in Australia by volume is sold as fresh or frozen product. The majority of seafood processing therefore adds very little value to the product, with the value added resting in correct handling and timely delivery to local and overseas markets. There is no evidence to indicate that regulation has resulted in significant negative impacts on the operations of the downstream sector.

Some industry participants asked that the Commission recommend that mandatory country-of-origin labelling be extended to seafood sold for immediate consumption. This is unnecessary for public policy (food safety and consumer protection) reasons, which are adequately dealt with under existing law.

Some participants also requested that the Australian Government mandate Australian Fish Name Standards (AS 5300 -2015) — a voluntary standard introduced in 2007 that specifies the prescribed fish name for fish sold to consumers or for wholesale, export and import. Making the standard mandatory would require agreement across all jurisdictions on all names; a costly and difficult exercise. As current arrangements do not appear to be having significant negative impacts on consumers or businesses, the standard should remain voluntary.

Seafood processor licence and accreditation fees

There is considerable variation in fee-setting for processor licences and accreditation across jurisdictions. Some jurisdictions apply a flat fee for all processors while others differentiate by the type of species being processed or by the size and scale of the premises.

Fees should reflect the efficiently-incurred costs of regulating facilities. Using a tiered scale of fees would better reflect and efficiently deal with differences between processors, including reducing the scope for smaller businesses to cross subsidise the regulation of larger businesses.

Aquaculture

Regulation has played a minor role in recent shaping of the industry

There is little evidence suggesting that regulations have systematically impeded the viability or growth of aquaculture businesses (for example, by preventing investment, experimentation and hence advancement in the key drivers of nutrition, fish and marine health, and genetics). Notably, Australia's aquaculture output growth rate over the past decade — underpinned by growth in salmon — was similar to those of the dominant producer countries in Asia. Its growth rate in value terms was second only to Norway among OECD countries.

The development of the industry has been shaped more by technological, geographic and other non-regulatory influences.

- For existing farmed species, there has been limited growth other than in salmon and barramundi production due to changes in consumer tastes, competition from imported products, and other activities or requirements affecting the suitability of new sites.
- Newer species have faced technical and biological challenges in ensuring fish health and growth in a controlled production environment. Few have achieved sustained commercial viability. For example, most ventures in marine areas have failed due to weather events, disease, unexpected predators, as well as poor business planning. Anecdotally, these failures have made it harder for new projects to access financing.

Adapting aquaculture regulation for the future

Nevertheless, the regulatory environment can be improved.

Greater use of spatial planning — where needed

The future growth of the aquaculture industry faces several challenges. These include coastal development and increasing competition for access to coastal land and waters, environmental concerns and access to infrastructure.

There are few, though prominent, examples of regulatory arrangements that have stymied proposed aquaculture developments. These include land-based developments adjacent to the Great Barrier Reef, where environmental requirements have effectively prevented any aquaculture development.

Where there are viable prospects, the use of spatial planning to designate zones for aquaculture development will continue to be very important. These help to establish the legitimacy of businesses (that is, address the actual and perceived risks associated with fish farming) and reduce the red tape associated with environmental impact assessments and

public consultations for new developments. South Australia and Tasmania, which have well-established industries, have long used spatial planning.

The Queensland government has announced that it will identify aquaculture development areas, including around the Great Barrier Reef. It will also specify conditions on aquaculture developments to avoid and mitigate any environmental impacts and any required environmental offsets. Western Australia recently introduced aquaculture zoning to foster development of the sector in the Kimberley and mid-west regions.

Whether other jurisdictions should institute spatial planning regimes and related policies depends on prospects for aquaculture development. This should be determined in consultation with industry and so avoid the ‘catch 22’ situation of a lack of a regulatory framework deterring potential investors and a lack of projects meaning that the regulatory framework is not developed.

Addressing community concerns

Community concern about the environmental impacts of aquaculture is growing in Tasmania, in common with other developed countries that have established industries, such as New Zealand, Norway, Canada and Scotland. As has been the experience of the wild caught sector, the sector is requiring ‘social license’ to operate in addition to regulatory assurance.

Community concerns in Tasmania centre on the perception of regulatory capture. They have been fuelled by the fact that the functions of regulating and promoting the industry rest in a single minister and agency, and views that the government is unwilling to regulate in a way that might limit the growth of an industry that has become a major driver of economic activity and employment in the state. As noted in the Commission’s 2004 study into aquaculture, there should ideally be separate agencies for industry development and regulation to remove potential conflicts of interest and improve public confidence in environmental protection, resource planning, operating conditions and enforcement.

Other areas for improvement

In addition to improving fisheries management frameworks, there is scope to improve the undertaking of certain core tasks and activities that support fisheries management.

Decision-making by executive government vs fishery managers

Decisions on fisheries controls can broadly be categorised as either strategic or operational. Strategic decisions influence the objectives of fisheries, while operational decisions are those required to put policy intentions into effect.

Under harvest strategy frameworks, many operational decisions in fisheries are technical matters and can be made more efficiently at the agency/fishery manager level. Recent reviews in Australia suggest there is a high level of political involvement in operational decisions in some states and this results in adverse outcomes. Governments should delegate operational decisions to the relevant fishery management authorities to the extent possible.

Consultation and collaboration with stakeholders

Consultation is central to the design and effective implementation of fisheries management controls, including allocation decisions. In some cases, fisheries management tasks can be undertaken more efficiently and effectively through co-management.

There are particular concerns about the use of advisory groups in fisheries, including lack of clarity in their roles, sufficiency of expertise, the adequacy of representation of views and transparency in processes. These can be addressed through clear terms of reference, a conflict of interest policy, clear descriptions of members' roles and required expertise (and transparent appointment processes), fixed membership terms, and performance assessment regimes.

The scope for co-management arrangements varies by fishery, but past experience has demonstrated that the expertise of stakeholder groups and willingness of both stakeholders and governments to work together are essential pre-requisites.

Policies on co-management need to provide practical guidance to stakeholders on the types of activities governments will consider collaborating on or delegating, and required capability standards of stakeholder groups. Such guidance would aid identification and advancement of suitable co-management opportunities in fisheries.

Enforcement

All governments follow risk-based approaches to enforcement. There appears to be generally high compliance with regulations. Concerns remain in some quarters about illegal fishing, however, although the extent to which this occurs for most species is uncertain. Governments should provide easily accessible channels through which the public can advise of illegal fishing activity. To make the best use of this information, governments should ensure their fisheries agencies are sufficiently resourced to quickly follow up complaints.

Cost recovery and contestability

The efficiency and equity benefits of cost recovery systems are well-known. But there are also pressing imperatives for good cost recovery arrangements in fisheries management for other reasons, including to:

- support the provision of essential regulation and provision of services to fishers
- increase the accountability of fisheries managers to fishers about what and how services are delivered — which will help to ensure that regulatory effort is proportionate to the value of the fishery
- encourage reform. This is especially so for cross-jurisdictional fisheries, where the unequal treatment of fishers in relation to regulatory fees has impeded progress.

There is scope to adopt or improve cost recovery arrangements in all states and the Northern Territory. Full cost recovery arrangements may not be viable in some jurisdictions (or fisheries) until intended major policy reforms have been implemented (such as in New South Wales). And as noted earlier in regard to licensing, the objective of the regulatory action should determine the scope and nature of any charging.

Efficiency can also be enhanced by making processes such as research, consultation and data management contestable.

Draft recommendations, findings and information requests

Chapter 2: Access to Fisheries Resources

DRAFT RECOMMENDATION 2.1

The New South Wales, Victorian, Tasmanian and Queensland Governments should develop and implement a harvest strategy policy. Harvest strategy policies should be developed with regard to the *National Guidelines to Develop Fishery Harvest Strategies*.

DRAFT RECOMMENDATION 2.2

The Australian, Victorian, Tasmanian and Queensland Governments should develop a policy to guide the allocation of access to fisheries stocks between different sectors.

The allocation policies of all governments should seek to promote the best use of fishery resources and provide certainty in relation to the processes involved in determining resource shares. At a minimum these policies should outline:

- triggers for review of existing allocations between sectors
- the review process, including how consultation will occur
- key considerations that will guide decisions.

These policies should be publicly available.

DRAFT FINDING 2.1

Decisions by governments on the allocation of fishery resources are severely constrained by a lack of comprehensive and current data on the participation and take of the recreational and customary fishing sectors.

DRAFT FINDING 2.2

A move to inter-sectoral trading of access rights is worth considering in the longer term for suitable, high value fisheries.

Chapter 3: Commercial fishing

DRAFT FINDING 3.1

Output controls, in particular, individual transferable quota systems, provide a more effective and efficient way of managing commercial fisheries than controls over methods of fishing (input controls).

There is scope to improve the implementation of individual transferable quota systems and increase their take-up.

Fisheries that are not amenable to aggregate catch limits due to highly variable fish stocks would be more efficiently managed through individual transferrable effort systems than current input controls.

DRAFT RECOMMENDATION 3.1

The Northern Territory and all state Governments should move each of their fisheries to an individual transferable quota management system unless it is demonstrated that this is technically impractical or not cost effective. If individual transferable quotas are not used, fisheries should be managed using individual transferable effort systems.

The Australian Government should complete the move of its fisheries to either individual transferable quota or individual transferable effort systems.

Governments should publicly release reasons for the approach taken to each fishery.

DRAFT RECOMMENDATION 3.2

The Australian, state and Northern Territory Governments should ensure that commercial fishing regulations are reviewed regularly to ensure they remain 'fit for purpose' against clearly articulated policy objectives. At minimum, reviews should occur when harvest strategies are revised.

DRAFT RECOMMENDATION 3.3

State and territory governments should take into account any impacts of proposed planning and land/marine use developments on the commercial fishing sector.

Chapter 4: Recreational fishing

DRAFT RECOMMENDATION 4.1

Within the next three years:

- the Queensland, South Australian and Northern Territory Governments should introduce licensing for independent recreational marine fishing, and the Victorian and Tasmanian Governments licensing for marine fishing charter boat operators
- governments should minimise license exemptions.

DRAFT RECOMMENDATION 4.2

Governments should consider implementing harvest tagging management systems for valuable at-risk species when conventional management controls (such as bag and size limits) are ineffective in achieving sustainability goals.

DRAFT RECOMMENDATION 4.3

The Australian, state and Northern Territory Governments should sponsor more research on the survival rates of catch and release methods in deep water fisheries.

DRAFT RECOMMENDATION 4.4

State and territory governments should review and strengthen penalty regimes for recreational fishing to deter regulatory non-compliance.

Penalties should be proportional to the level of risk posed.

DRAFT RECOMMENDATION 4.5

The Australian Government should conduct a national survey of recreational fishing in 2017-18, using a comparable approach to the 2000-01 national survey. The cost of the survey should be shared by all governments.

From 2022-23 all governments should undertake five yearly surveys of recreational fishers, whether at the national level or on a coordinated basis.

Surveys should be consistent across jurisdictions and focus on participation, catch and effort, identification of species important to recreational fishers and information on the value of recreational fishing.

Chapter 5: Indigenous customary fishing

DRAFT RECOMMENDATION 5.1

Customary fishing by Indigenous Australians should be recognised as a sector in its own right in fisheries management regimes.

The definition of Indigenous customary fishing should be consistent with native title.

DRAFT RECOMMENDATION 5.2

The Indigenous customary fishing sector should be afforded a priority share of resources in fisheries where catch or effort is limited. This allocation should be sufficient to cover cultural use by the local Indigenous community in accordance with proven traditional laws and customs.

Customary fishing rights should not be tradeable or transferrable, recognising the unique characteristics of the associated cultural benefits and that these benefits are exclusive to the community concerned.

Customary allocations and any controls over customary fishing activities should be developed in consultation with Indigenous communities.

DRAFT RECOMMENDATION 5.3

The definition of customary fishing in fisheries laws should provide for fishing for commercial purposes, but only where consistent with traditional laws and customs.

Chapter 6: Fisheries spanning jurisdictions

DRAFT RECOMMENDATION 6.1

In reforming cross-jurisdictional fisheries, Australian, state and Northern Territory Governments should:

- focus on fish stocks that are of higher value/risk and subject to inconsistent management arrangements
- consider whether transfer of management responsibility to a single government or better aligning management arrangements would produce the greatest net benefits.

DRAFT RECOMMENDATION 6.2

The Australian Government should set allowable catch limits of southern bluefin tuna for all fishing sectors (including the recreational sector). Sectoral allowances should be in place in advance of the southern bluefin tuna fishing season commencing on 1 December 2018.

In consultation with fishers, the Australian Government and state governments should negotiate the nature of, and responsibility for, the day-to-day management of recreational fishers targeting southern bluefin tuna.

DRAFT RECOMMENDATION 6.3

The New South Wales Southern Fish Trawl Fishery should be absorbed into the Commonwealth Trawl Sector of the Southern and Eastern Scalefish and Shark Fishery by the end of 2018.

DRAFT RECOMMENDATION 6.4

The New South Wales, Victorian and Queensland Governments should make the joint stock assessment process for the east coast biological snapper stock a reform priority and provide the resources necessary to ensure the timely completion of the assessment.

DRAFT RECOMMENDATION 6.5

Australian, state and Northern Territory Governments should make the reform of cross-jurisdictional fisheries a collective priority and issue a joint reform strategy within 12 months of the release of the Commission's final report. Progress against the strategy should be reported annually over its term.

DRAFT RECOMMENDATION 6.6

The management arrangements for cross-jurisdictional fisheries and supporting memoranda of understanding should be reviewed regularly by governments to ensure they remain fit for purpose. At a minimum, they should be reviewed as part of any revision of the harvest strategy for the relevant species.

The task of reviewing and developing reforms to reduce the costs of cross-jurisdictional fisheries should be the subject of a joint Ministerial direction to agencies.

The *Principles Guiding Revision of the OCS Fisheries Arrangements* should be amended to include an intention to limit the extent of shared jurisdiction over expanses of water wherever possible.

Chapter 7: Managing the environmental impact of fisheries

DRAFT RECOMMENDATION 7.1

The Australian Government should publish online the annual reports that fisheries produce as part of their accreditation requirements under the *Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)*.

DRAFT RECOMMENDATION 7.2

The Australian, state and Northern Territory Governments should expand the use of explicit mortality limits for fisheries that have a high risk of interaction with threatened, endangered and protected species.

Limits should be used in conjunction with controls on fishing methods and equipment that have proven effective in minimising the impact of fishing activity on protected species.

DRAFT RECOMMENDATION 7.3

Governments that do not already do so should make summaries of information on interactions with protected species publically available (online).

Summaries should be provided on a fishery by fishery basis and at a minimum include:

- the species with which there was an interaction
- the gear type used
- whether the specimen survived, was injured or died as a result of the interaction
- the total number of fishing days undertaken in the fishery across the duration of the reporting period.

DRAFT RECOMMENDATION 7.4

The Australian Government should clarify the purpose of the List of Marine Species established in Part 13, Division 4 of the *Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)* and provide further information on the criteria against which species are added to or removed from this list.

Chapter 8: Aquaculture

DRAFT FINDING 8.1

The development of aquaculture requires access to suitable sites. Spatial planning assists in the efficient identification of these locations. Spatial planning may also provide greater certainty, regulatory predictability and a more streamlined approval process for investors.

DRAFT FINDING 8.2

The regulatory arrangements for aquaculture have not significantly changed since the Commission's 2004 study. This has not been a significant impediment to the growth of the aquaculture industry in Australia as the major aquaculture-producing states already had many best-practice regulatory features and other states have faced challenges that are predominantly non-regulatory in nature.

DRAFT FINDING 8.3

Concerns about the environmental and amenity impacts of aquaculture developments are prominent in some states, highlighting tensions for governments in both regulating and promoting industry growth. These concerns could be minimised by having separate agencies responsible for regulatory and industry development functions.

Chapter 9: Downstream processes

DRAFT RECOMMENDATION 9.1

Governments should not extend mandatory country of origin labelling to seafood sold for immediate consumption.

DRAFT RECOMMENDATION 9.2

The Australian Fish Names standard should continue to be used on a voluntary basis. Further development of the Standard by Fisheries Research and Development Corporation should continue to reflect the needs of industry and the preferences of consumers.

DRAFT RECOMMENDATION 9.3

Australian, state and Northern Territory Governments should ensure that licence and accreditation fees for seafood processors reflect the efficiently-incurred costs of regulating these facilities.

Chapter 10: Other areas for improvement

DRAFT RECOMMENDATION 10.1

Australian, state and Northern Territory Governments should ensure that operational decisions are delegated to the relevant fishery management authorities to the extent possible.

DRAFT RECOMMENDATION 10.2

The governance arrangements of advisory groups formed under fisheries laws should include: clear terms of reference; a conflict of interest policy; clear role descriptions for members; fixed membership terms; performance assessment regimes; and reporting arrangements.

Members of advisory groups dealing with technical matters should be appointed based on their expertise.

Ministers or departments should have the power to dismiss advisory group members who breach the terms of their engagement.

DRAFT RECOMMENDATION 10.3

Australian, state and Northern Territory Governments should have clear policies on co-management in fisheries. These policies should provide practical guidance to stakeholders on the types of activities where governments are willing to collaborate or delegate responsibilities. The policies should include details of the capability and governance standards that are expected of stakeholders seeking to enter into a co-management arrangement.

DRAFT RECOMMENDATION 10.4

Fisheries agencies should provide easily accessible channels through which the public can share information on illegal fishing. Governments should ensure their fisheries agencies are sufficiently resourced to enable timely and proportionate follow-up action on information supplied by the public.

DRAFT RECOMMENDATION 10.5

State and the Northern Territory Governments should implement best practice cost recovery arrangements where cost-effective. Where indirect methods of obtaining sectoral contributions towards costs are used, governments should set fees with reference to efficiently-incurred costs for essential services.

Governments should transparently disclose the services or regulatory activities for which costs are recovered, and the amount and extent of costs recovered.

Requests for further information

INFORMATION REQUEST 2.1

What factors should guide government decisions on take limits — in particular, target reference points?

INFORMATION REQUEST 5.1

What is the best way for individual Indigenous Australians to prove their entitlement to undertake customary fishing?

INFORMATION REQUEST 5.2

How should cost recovery be applied to customary fishers?

INFORMATION REQUEST 7.1

Are fisheries not assessed under the Environment Protection and Biodiversity Conservation Act 1999 (Cwlth) subject to adequate environmental management? If not, how should the environmental management of such fisheries be improved?

INFORMATION REQUEST 7.2

Can the processes by which state governments and the Northern Territory manage the impact of pest native species on fishers be improved?

1 About this inquiry

The Australian Government has asked the Productivity Commission to undertake an inquiry into the regulation of Australia’s marine fisheries and aquaculture sectors. This chapter provides background to the inquiry, including why fisheries are regulated and the nature of fisheries regulation, the context for this inquiry and how the Commission has approached its task.

1.1 The nature of fisheries regulation

Fisheries are subject to the well-recognised potential for a ‘tragedy of the commons’, where unrestricted access to a community-owned resource can result in a range of suboptimal outcomes (box 1.1). Effective regulation helps to ensure that fisheries are sustainable and provide maximum value to the community.

Box 1.1 Why marine fisheries are regulated

Unrestricted access to fishing and fisheries can threaten the sustainability of targeted species, and can pose a threat to the ecosystem generally by damaging marine habitats or impacting on non-targeted or threatened species.

While it is in fishers’ own interests for fisheries to be used sustainably over time, the incentives facing individual fishers to do so may be muted without limits that are also observed by others, and limited property rights over the resource. It is also difficult for individuals to monitor and secure the sustainability of the shared resources (for example, by researching and monitoring fish stocks and biology and enforcing limits on access).

Experience also shows that where there is open access to — and competition for — fishery resources, there will almost inevitably be too much expenditure and effort relative to yield — too many boats, too much gear and too many fishers. This leads to poor productivity, including loss of potential profits for the commercial sector, and raises doubts about whether fishery resources are being shared and used in a way that is maximising benefits to the community as a whole.

The more complex the fishery, the less clearly defined its boundaries and the more dispersed and diverse the fishers, the harder it is to manage the common resources efficiently. The public ownership of fish resources means that management of the resource is usually supervised, if not conducted, by governments.

There are around 165 commercial wild catch fisheries spanning Australia’s Exclusive Economic Zone. Millions of Australians fish recreationally, with the ability to ‘wet a line’ for recreation and leisure viewed by many as part of the Australian way of life. Coastal Indigenous communities have been users and custodians of Australia’s marine

environment for many thousands of years, and continue to have strong cultural associations and concerns for the sea and its resources. Australia's fish resources also provide non-extractive value, such as for the tourism sector, for which viewing native fish and the marine environment are significant drawcards.

Low productivity waters

The area of Australia's exclusive economic zone is the third largest in the world (after the United States and France) and larger than the land area of Australia (Gullet 2008), with responsibility shared between all state governments, the Northern Territory and the Australian Government. Despite its large size, Australia's fishing area has low biological productivity by global standards, due to its shallow continental shelf and lack of nutrient-rich currents. Low natural productivity is considered to offer little capacity to increase the allowable levels of fish caught (Ridge Partners 2015).

Australia's commercial wild catch sector has sought to create value by targeting high-value fish, such as abalone, rock lobster and certain species of prawns. Aquaculture has also grown in importance as a source of seafood. Its share of fisheries production by value in Australia increasing from under 30 per cent in 2001-02 to around 40 per cent in 2013-14. Overall, Australia makes up less than 0.2 per cent of global seafood production by tonnage (ABARES 2015b) but about 2 per cent of value (FRDC 2014b).

Fishing affected by other uses of the marine environment

As Australia's marine environment is used for a variety of purposes, other activities (for example, recreational activities, oil exploration) can affect the scope and nature of fishing activity and vice versa. Similarly, coastal developments may affect fishing activity through their impacts on fishing grounds, demand for fishing or changed preferences for the broader use of marine resources. Very few jurisdictions have marine management strategies that consider all marine uses and impacts in an integrated way. Fisheries regulation focuses on controls on fishing activity, and may seek to balance the demands of different users of fishery resources (for example commercial and recreational fishers) in a particular area.

International obligations

Australian fishing laws are subject to a number of international instruments concerning fisheries, including the 1982 United Nations Convention on the Law of the Sea, which sets member nations' rights in relation to their Exclusive Economic Zones, and various Food and Agriculture Organisation codes and plans relating to illegal fishing, over fishing and by catch. Australia is also party to agreements on migratory species such as the Convention for Conservation of Southern Bluefin Tuna. No significant issues relating to the standards set by international obligations have been brought to the Commission's attention.

Regulatory arrangements

The areas of Australian governments' fisheries jurisdictions are defined by state/territory boundaries and those agreed by the states, Northern Territory and the Commonwealth under the Offshore Constitutional Settlement (chapter 6). Broadly, the latter provides for state and Northern Territory jurisdiction over waters from the low water mark to three nautical miles out, and Commonwealth jurisdiction over waters from three nautical miles seaward of the low water mark to the edge of Australia's Exclusive Economic Zone.

What is regulated?

Fishing broadly includes any activity concerned with the taking, culturing, processing, storing, transporting or sale of fish or fish products (Ridge Partners 2015). The definition of 'fish' for the purposes of fisheries laws generally includes both vertebrate and invertebrate species (for example, finfish, sharks, crustaceans, molluscs, squid, sometimes plants such as algae), but excludes marine mammals or reptiles (Gullet 2008).

The four main fishing sectors in Australia are:

- commercial wild catch fishers (in this review, 'commercial fishing' or 'commercial fishers' describe wild catch only)
- recreational fishers, who fish for personal consumption, sport or other enjoyment
- Indigenous customary fishers, who fish in accordance with relevant Indigenous laws and customs; and
- aquaculture producers.

As recreational and Indigenous customary fishing have historically occurred close to shore, only the states and Northern Territory regulate these sectors, while both the Australian Government and the state and Northern Territory Governments regulate commercial fishers. A range of intergovernmental agreements exist to manage fisheries or fishing stocks that traverse jurisdictional borders, the most prominent of these being Offshore Constitutional Settlement Fisheries Arrangements (chapter 6).

Aquaculture activity is mostly regulated by state and local governments, as they have, to date, largely occurred on state and territory-controlled land and water (chapter 8).

'Fisheries' are a construct/concept established to allow fishing activities to be treated as a unit for management purposes, and may be defined with reference to the people involved (for example, the South Australian Charter Boat Fishery), target species (for example, the Blue Crab Fishery), spatial boundaries (for example, the Coral Sea Fishery) and/or the method of fishing (for example, the Western Deepwater Trawl Fishery). Often, a combination of these characteristics are used. Wild catch stock assessments, fisheries management plans, the grant of commercial entitlements to fish and monitoring of activities are typically undertaken at the fishery level.

The connectivity of marine ecosystems and, sometimes, changing distributions of fish populations, mean that the characteristics that define a fishery may change over time. All commercial fishing activities are currently managed on a ‘fishery’ basis. Other wild catch fishing activity not undertaken within an established fishery is regulated with reference to the user group, whether recreational or Indigenous customary fishing.

Fishery policy objectives

All governments have their own, separate marine fishing laws, reflecting the particular objectives and management preferences of their jurisdictions. All jurisdictions, however, aim to utilise fish resources in a manner consistent with the principle of ecologically sustainable development¹. Other objectives range from promoting the value of fisheries (whether to specific or all sectors) to promoting safe fishing practices.

There will always be scientific uncertainty about the magnitude of environmental risks, and differing views on the degree to which governments should act to, and effectively can, mitigate environmental risks. Governments recognise that information that reduces uncertainty and guides improvements in management methods has potentially high payoffs, but such information can be difficult and costly to obtain. Given the large costs of irreversible environmental degradation from overfishing, governments now err on the side of sustainability when making regulatory decisions.

Features of Australia’s wild catch fisheries management

While all governments seek to limit fishing effort, they use different methods to meet this aim. The predominant methods of control over total catch are either ‘input based’ — regulating how fishing occurs (such as hours/days fished, fishing methods) — or ‘output based’, regulating the quantity of fish taken in accordance with a pre-determined allowable harvest of the target species.

Governments have been gradually moving from input to output controls for commercial fisheries (in particular, to tradeable quotas for catch). Output controls provide a more accurate way of meeting catch limits, and support productivity improvement, as they involve fewer restrictions on how and when fishing is undertaken (other controls may be instituted on gear or boats to minimise the impact of fishing methods on the environment). In contrast, input controls are less precise, can encourage a ‘race to fish’ because there is an incentive for fishers to catch as much fish as they can, as early as they can, before fishing effort is constrained, and inhibit productivity improvement. However, input-based management techniques have proven difficult and costly to unwind (chapter 3).

¹ For example, the National Strategy for Ecologically Sustainable Development suggests the following definition: ‘using, conserving and enhancing the community’s resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased’ (Ecologically Sustainable Development Steering Committee 1992).

Recreational and customary fishing is regulated through controls such as bag limits and fishing methods, and are generally not subject to total catch limits given the diversity and dispersion of activity. Both sectors are subject to significantly less monitoring and controls than the commercial sector as they historically have been viewed as having less consequential impacts on fishing stocks and the environment.

In addition to controls on the harvest of target species, governments also:

- impose restrictions on fishing areas or methods to restore or protect fishing grounds, and minimise the impact of fishing on non-target species and the environment
- regulate access to fishery resources where there is competition between different fishing sectors (further on this below).

Effective fisheries management requires the adaptation of regulatory controls to reflect new information on fish and marine resources, and changing preferences for their use. The regulation of fisheries thus involves three ongoing tasks: research and/or collection of data to inform management; the development and implementation of controls over fishing activity; and enforcement of those controls.

Given the sheer size and diversity of Australia's marine environment and targeted species, the costs of such 'overheads' can be significant. The cost of managing New Zealand's wild catch fisheries and aquaculture production is 6–7 per cent of its gross value of production compared to 12 per cent in Australia (Commission estimates).² Part of the difference is almost certainly due to Australia's much larger marine fishing territory and population.

Ongoing challenges for fishery managers are ensuring regulatory decisions are efficient and effective in the midst of uncertainty, and striking a prudent balance between the collection of further information, which adds costs and time, and risks.

Responsibility for setting fishing controls rests with both ministers and fisheries management authorities. Ministers are generally responsible for setting the strategic directions for fisheries (for example, any specific objectives for the use and performance of fisheries), and authorities for making decisions to put these policy intentions into effect. There is some variation across jurisdictions, however, with greater political involvement in operational decision-making in some states.

Fishery management regimes are more cautious the greater the uncertainty over a stock and its environment. Given constrained government resources and limits on catch, this

² Australian cost estimates based on: ABARES (2015); AFMA (2014a); DoF WA (2014); MRAG Asia Pacific (2014); Department of Agriculture and Fisheries (Qld) pers. comm. 6 June 2016; Department of Economic Development, Jobs, Transport and Resources (Vic) pers. comm. 26 April 2016; Department of Primary Industries (NSW), pers. comm. 19 May 2016; Department of Primary Industry and Fisheries (NT), pers. comm. 3 June 2016; Primary Industries and Regions SA, pers. comm. 19 July 2016 and 27 July 2016.

New Zealand cost estimates based on data from: MPI NZ (2015); and, Ministry of Fisheries (New Zealand) (2011a, 2015).

implies governments should target regulatory effort so it is proportional to the value of fisheries to the community. High risk and/or high value fisheries, where the economic or environmental consequences of mismanagement are highest, should attract relatively greater monitoring.

The nature of fisheries also requires that management frameworks must balance flexibility to respond to changes with the provision of certainty to fishers. The latter significantly relies on:

- clear articulation of governments' policy objectives for fisheries (and clarity on the treatment of embedded trade-offs); and
- transparent and accountable decision-making processes, given that the evidence informing controls over fishing will always be partial and decisions will invariably involve judgements on how and what information is used.

The fisheries management 'tacklebox'

As noted, the most commonly used tools to control catch depend on the sector. The controls on each fishery are different, reflecting the fishery's particular characteristics.

Table 1.2 outlines some of the policy options and regulatory levers available for the management of fisheries.

Table 1.2 Regulatory options for the ongoing management of fisheries

<i>Regulatory alternatives</i>	<i>Examples and application</i>
Prohibitions on fishing	Fishers may have restricted (or be denied) access to fishing marine protected areas in order to protect features of the marine environment or conserve biodiversity.
Allowable catch limits	Catch limits are set to preserve the sustainability of the fishery in the first instance. However, they can also support economic objectives by discouraging over-investment in the fishery.
Controls on fishing methods	Fishers can be restricted to (or from) the use of certain fishing methods — for example, commercial fishers may be restricted to using only longline methods while recreational fishers might be precluded from using nets. These controls are applied in some fisheries as an indirect control on catch. Controls on methods are also commonly used to limit fishing methods harmful to the environment.
Direct controls on catch by individuals	Direct controls on catch take different forms — for example, individual transferable quotas (ITQs) determined out of a total allowable catch limit in commercial fisheries and bag limits in recreational fisheries. ITQ systems promote better economic outcomes by allowing fishing quotas to be traded. Other controls, such as minimum size limits, are applied as sustainability measures.
Gear requirements	Fishers can be required to use certain fishing gear or equipment — for example, turtle excluder devices. These requirements are most often applied to limit the impact of fishing on non-target species.
Closures	Fisheries managers can decide to close an entire fishery or certain areas with the fishery. Closures normally occur when there are significant concerns over sustainability (either of target or non-target species) or a need to protect a certain habitat. Periodic or seasonal closures to fishing grounds may also be used to protect species that may be vulnerable during their breeding season or to reduce the overall fishing effort.
Spatial and temporal separation	Fisheries managers can restrict a sector to an area in order to minimise conflict between fishers. Alternatively sectors may be separated by assigning specific times or seasons in which they may fish.

1.2 Inquiry context

Overall, Australia’s marine fisheries are considered to be performing well relative to the rest of the world in terms of sustainability.

There are, however, concerns about the outlook for the commercial fishing industry, which have raised questions about whether fisheries regulation and management are impeding productivity improvement and investment in the sector.

In addition, changing community expectations and preferences for the use of fish resources raise significant questions as to whether the resources are being used in a way that is maximising community welfare and will be used sustainably in the future. This has been the dominant concern of submissions and consultations.

Specific issues include:

- the growing impact and demand of recreational fishers in some areas, with management regimes not adequately reflecting the large social value to the community of recreational fishing, or sufficiently monitoring activity despite recreational catch rivalling or exceeding commercial catch for some species.
- that decisions on where fishing can occur and by whom are being made in an arbitrary way in several jurisdictions, significantly affecting livelihoods and social amenity.
- the general exemption of Indigenous customary fishing from fishery management regimes, and associated inadequate consultation with Indigenous people on the management of relevant fisheries.
- questions as to whether resource sharing arrangements support the optimal use of fishery resources in the long term.

1.3 Commission approach

While there have been several reviews of fisheries regulations in recent years, these have focused on aspects of fisheries management or on specific jurisdictions' regulatory regimes. This review has a different orientation. It:

- addresses the management of cross-jurisdictional fisheries, widely seen as a significant and growing concern
- recognises the need to match regulatory effort to the value that can be gained from Australia's fisheries
- identifies the reform areas that are of high priority and common interest to jurisdictions
- focuses on the frameworks for determining access to fishery resources and managing each fishing sector, as it is these higher-level policies that will influence day-to-day regulatory burden and have the most significant bearing on outcomes
- considers opportunities to improve the efficiency and effectiveness of core management tasks.

In forming recommendations, the Commission has had regard to accepted principles of good regulatory design and 'best practice' fisheries management approaches in Australia and overseas. Several recommendations look to improve fisheries regulation by building on good practices already adopted in some (or many) jurisdictions.

The Commission invites written submissions on this draft report. Interested parties can also attend hearings to provide comment.

1.4 Guide to rest of this report

The rest of the report is structured as follows.

- Chapter 2 discusses access arrangements for fisheries, including how governments set overall catch limits for fisheries, and how they should allocate access across sectors when there is competition for resources.
- Chapter 3 considers the performance of the commercial fishing sector and ways to overcome impediments to the take-up of best practice management tools. It also recommends other changes to reduce regulatory burdens on the sector.
- Chapter 4 considers the importance of recreational fishing, the need for policy changes to better incorporate the sector's impacts and interests into fishery management, and the distinctive enforcement requirements for this sector.
- Chapter 5 discusses the regulatory frameworks applying to customary fishing and recommends changes to support greater recognition and participation of Indigenous Australians in fishery management regimes.
- Chapter 6 considers the extent and nature of detriment arising from cross-jurisdictional fisheries arrangements. Together with chapters 2, 3 and 7, this chapter sets out the key regulatory issues that affect the commercial wild catch fishing sector.
- Chapter 7 considers the efficiency and effectiveness of environmental management regimes for fisheries.
- Chapter 8 considers how the aquaculture sector has changed over the past 10 years and the influence of regulations on outcomes.
- Chapter 9 explores regulatory arrangements in the seafood processing sector.
- Chapter 10 recommends other ways that fishery management tasks can be improved.

2 Access to fisheries resources

Key points

- Governments' decisions about how much fishing can take place are set with regard to preserving the long-term sustainability of the fishing stock. Subject to this objective, governments set a level of utilisation that reflect their objectives about how fishery resources should be used.
- The basis for determining who can access fisheries when there is competition between fishing sectors is sometimes opaque or of questionable efficiency.
 - Governments should institute guidelines on what they will take into account in allocation decisions, and seek to ensure that decisions support a clear gain to the community from any reallocations of access.
- Efficient fishery management requires the prompt adaptation of controls or fishing effort when new information on the status of fish stocks comes to light.
 - All governments should adopt harvest strategy policies to provide guidance to fishers and fishery managers on standards for setting and administering harvest controls.
- The ability of governments to develop sound harvest and allocation strategies is severely constrained at present by a lack of robust data on the number and take of recreational and customary fishers.

Marine resources (including fisheries) are managed by governments on behalf of the public. Governments must make decisions about how marine resources will be accessed and utilised, balancing the interests of different users. This includes determining:

- where and when fishing can be undertaken
- any limits on the amount of fish that can be taken
- who can take fish in accordance with any set limits
- what methods of fishing can be used
- how to monitor, enforce and evaluate fishing policy and activity.

This chapter focuses on the first three issues. Chapters 3, 4, 5 and 10 consider the remaining issues in the context of specific controls for fishing sectors and general governance arrangements.

2.1 Determining where fishing can occur

Marine environments can often be used for a variety of purposes with little competition for access and therefore little need for government intervention. Other times, governments must decide what activities are allowed and when, with a view to maximising the value of the marine resources to the community.

The basis for decision making on allowable uses of the marine environment (for example, whether fishing should be allowed) is largely beyond the scope of this review. However, many of the principles that should apply to such decisions are those of good regulatory practice, and include that:

- decision making processes are transparent
- stakeholders are consulted
- consideration is given to the benefits and costs (including the opportunity costs) of alternative options
 - opportunity costs should be defined broadly and include forgone economic, social and environmental benefits. Consultation with stakeholders can help gauge these opportunity costs
- outcomes are evaluated and reported.

Where possible, decisions should be underpinned by information on, and objective assessment of, the value that the community and different users place on alternative uses of the marine environment.

The Commission has found that there are no undue restrictions under fishing laws on the establishment of new commercial fisheries or recreational fishing grounds. Broader decisions on the use of marine environments can, however, affect the expansion (or retention) of an existing fishery or the extent of activity in a fishery. In this regard, a key concern raised in this inquiry was the impact of marine parks on fishing now and in the future.

Marine protected areas and fisheries

Marine protected areas, also referred to as marine reserves or marine parks, are areas of the marine environment where activities are restricted for conservation purposes.

The legislation covering marine protected areas is different for each jurisdiction. Some areas are declared and managed under broader conservation Acts — for example marine protected areas in Commonwealth waters come under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Other jurisdictions — such as South Australia and Queensland — have specific legislation covering marine parks.

The objectives of establishing marine protected areas are unrelated to fisheries management objectives, centring on conserving biodiversity. Their boundaries are generally defined with reference to their ‘comprehensiveness, adequacy and representativeness’ (box 2.1).

Box 2.1 The ‘comprehensive, adequate and representative’ principle

Requirements that marine park areas be ‘comprehensive, adequate and representative’ are referred to by most jurisdictions’ legislation and guidance. For example:

- the Commonwealth’s *Guidelines for Establishing the National Representative System of Marine Protected Areas* state that the primary goal of policy is
... to establish and manage a comprehensive, adequate and representative system of [marine protected areas] to contribute to the long-term ecological viability of marine and estuarine systems, to maintain ecological processes and systems, and to protect Australia’s biological diversity at all levels.
- the *Marine Parks Act 2007* (SA) states as an objective:
to protect and conserve marine biological diversity and marine habitats by declaring and providing for the management of a comprehensive, adequate and representative system of marine parks.

A ‘comprehensive, adequate and representative system of marine reserves’ means:

- a marine reserve system containing examples of all major bioregions
- the inclusion of sufficient levels (number size, configuration) of each ecosystem within the protected area network to provide ecological viability and to maintain the integrity of populations, species and communities
- the inclusion of areas at a finer scale, to encompass the variability of habitat within ecosystems.

Sources: Australia and New Zealand Environment Conservation Council (1998); DoE (2012).

Most jurisdictions outline the process to be undertaken to declare a marine protected area and what should be included in area management plans (such as permitted activities in the area).

The permitted activities are determined with references to zones. Zones are determined in accordance with categories defined by the International Union for Conservation of Nature (IUCN)³. Four out of the six area categories are used in Australia (table 2.1). Table 2.2 illustrates allowable activities in zones within the South-east Commonwealth Marine Reserves Network Management plan.

³ The IUCN is a membership union comprising both government and civil society organisations. The IUCN protected area management categories are a framework, recognised by international bodies as the global standard for defining and recording protected areas (IUCN 2008).

Table 2.1 IUCN management zones used in Australia

<i>IUCN Category</i>	<i>IUCN Definition</i>	<i>Management Approach</i>
Category Ia Strict nature Reserve	Strictly protected areas set aside to protect biodiversity and also possibly geological/geomorphological features, where human visitation, use and impacts are controlled and limited to ensure protection of the conservation values.	Areas that should be managed mainly for scientific research and environmental monitoring.
Category II National Park	Large natural or near natural areas protecting large-scale ecological processes with characteristic species and ecosystems of the area, which also have environmentally and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities.	Area that should be protected and managed to conserve its natural condition.
Category IV Habitat/Species Management Area	Areas to protect particular species or habitats where management reflects this priority. Many will need regular, active interventions to meet the needs of particular species or habitats, but this is not a requirement of the category.	Areas managed primarily for conservation, through management intervention if necessary, to maintain habitats or species.
Category VI Managed Resource Protected Area	Areas which conserve ecosystems, together with associated cultural values and traditional natural resource management systems. Generally large, mainly in a natural condition, with a proportion under sustainable natural resource management and where low-level non-industrial natural resources use compatible with nature conservation is seen as one of the main aims of the area.	Area should be managed mainly for the ecologically sustainable use of natural ecosystems.

Sources: Director of National Parks (2013), DoE (2008).

Concerns regarding marine protected areas

Participants from all three fishing sectors (commercial, recreational and customary) raised concerns that the declaration of marine protected areas was impeding their ability to access fishery resources, and questioned whether governments took into account the adverse impacts of decisions on fishers or considered how the impacts could be minimised⁴. There were also concerns about how decisions on permitted activities within marine protected areas were made and questions about whether marine parks yielded long term sustainability or biodiversity benefits (for example GA & MJ Stevenson, sub. 26).

⁴ For example Sunfish Queensland Inc, sub. 3; The Fishermens Portal Inc, sub. 17; VRFish, sub. 25; GA & MJ Stevenson, sub. 26.

Table 2.2 Zoning arrangements in South-east Commonwealth Marine Reserves Network Management plan

<i>Activity</i>	<i>IUCN Ia</i>	<i>IUCN II</i>	<i>IUCN IV</i>	<i>IUCN VI</i>
General use/access	No	Yes ^a	Yes	Yes
Commercial shipping – transit	Yes	Yes	Yes	Yes
Commercial fishing	No	No	Sometimes ^b	Sometimes
Commercial tourism	No	Sometimes	Sometimes	Sometimes
Recreational fishing	No	No	Yes	Yes
Mining	No	No	No	Sometimes
Research and monitoring	Sometimes	Sometimes	Sometimes	Sometimes
Proportion of MPA assigned to this category	15%	25%	27%	33%

^a Activities are allowable provided they are in accordance with the management plan prescriptions without the need for a permit. ^b Certain types of activities allowable subject to the management plan. A permit may be required.

Source: Adapted from table 5.1 and appendix A, Director of National Parks (2013).

Many of the concerns regarding zoning arrangements came from recreational fishing groups who had objections to no-take zones (for example, Sunfish Qld sub. 3, AFANT sub. 20, Merimbula Big Game & Lakes Angling Club sub. 27). VRFish called for a scientific assessment:

We believe we should not be locked out of any part of the Commonwealth marine reserve system unless there is a comprehensive risk based scientific assessment that definitively shows that recreational fishing is more harmful to the marine environment than other recreational activities such as diving, large scale tourist activities or other activities such as cargo shipping and defence activities that are allowed in these areas. (sub. 25, p. 5)

The Commission notes that the criteria for determining activity should not just be to minimise harm, but include the value of the activity. So even if fishing activities cause no less harm, unless they are a more valued activity than any of the others, it would be difficult to argue they should be given preference.

Zoning may affect different fishers in different ways. For example, generally the ICUN IV or VI category displaces or places additional restrictions on commercial fishing, but has minimal impact on recreational fishing (table 2.2). No-take areas have a larger impact by displacing fishing by all sectors (commercial, recreational and customary).

In most jurisdictions, a greater proportion of the area protected is designated IUCN IV or VI (where recreational fishing is permissible) than areas are designated IUCN Ia and IUCN II (that prohibit recreational fishing). For example, in South Australia, Victoria and Tasmania, less than six per cent of state waters are dedicated sanctuary zones (closed to any fishing activities) (DEWNR SA 2014; Parks and Wildlife Service Tasmania 2015; Parks Victoria 2015). It is therefore unlikely that recreational fishers are being excessively inconvenienced by zoning arrangements.

Whether the establishment of marine protected areas has any benefits for fisheries management and fishers is subject to uncertainty and opposing views. The Australian Marine Conservation Society (sub. 33), the Humane Society International (sub. 31), WWF and TRAFFIC (sub. 62) have argued fishers and fisheries management do benefit, with:

- the use of no-take areas providing a scientific reference point
- marine protected areas (MPA) acting as an ‘insurance policy’ against unknown aspects of fishing or where there is a lack of research data
- the ‘spillover’ of fish from protected areas into adjacent fishing areas improving yield.

In contrast, others considered the benefits to be overstated. For example, Professor Caleb Gardner and Dr Emily Ogier (sub. 16, p. 13) stated that:

- while MPAs as research sites have improved the knowledge base for fisheries management, small regional MPAs are more valuable for this purpose
- data collected from marine reserves have not been used for year-to-year decision making in fisheries as they only provide information under the extreme case of no catch of any species
- the ‘spillover’ effect of MPAs only occurs in overfished stocks. As overfishing is uncommon in Australian waters, MPAs tend to reduce rather than increase fisheries production.

The Commission’s view

Given the terms of reference of this inquiry, the capacity of the Commission to examine marine parks in detail is limited. Marine protected areas in Australia are not designed to be a fisheries management tool and, rather, are established for biodiversity conservation reasons. They may by intention affect access to fishing grounds and the types of fishing that can take place, if fishing is permitted at all. As a result, assessing marine protected areas solely from the perspective of fisheries would not give sufficient weight to their policy purposes.

It is apparent, however, that many fishers are concerned about how decisions on marine parks are made. It is desirable that governments consult on proposals to declare and zone or re-zone marine protected areas to better understand and, to the extent practicable, mitigate impacts on fishers.

Several jurisdictions undertake periodic reviews of marine park areas.⁵ Reviews provide an opportunity to examine whether governments' objectives in establishing marine parks are being met, whether there are unintended consequences, and whether changes should be made to permissible activities. They have led to beneficial change, most recently in New South Wales, where the government amended legislation to ensure consideration of social and economic, as well as environmental, impacts of marine park management.

It is important that the reasons for decisions on access to fishing grounds, including the information sources that had a bearing on those decisions, be transparently disclosed. This will help those affected to understand and comply with requirements and to constructively engage with policy makers. Making the basis for decisions transparent will therefore help to improve the quality of future decisions and promote public confidence in decision making.

2.2 Determining limits on fishing

All jurisdictions pursue multiple objectives through their fishery management regimes. Across jurisdictions, objectives are broad and diverse (table 2.3). For example, objectives can relate to:

- the environment — such as those related to the ecological sustainable development of the fishery, and the protection of threatened species
- promoting the value of fisheries for users — maximising economic returns, or those aimed at facilitating commercial and/or recreational access to fisheries
- social and/or cultural aspects — including promotion of Indigenous customary fishing
- safety — such as Queensland's objective to reduce the possibility of shark attacks.

The diverse nature of these objectives means that policy makers and regulators are often required to balance a range of considerations when making decisions about the management of a fishery. Consequently, policy objectives, and how they are translated into operational practices, can have a substantial impact on how and what decisions regarding access and limits are reached.

⁵ The Commonwealth, Queensland, New South Wales and South Australia are required under legislation to review marine park management plans in consultation with stakeholders at least every ten years. In Victoria, this is every 15 years. Other jurisdictions appear to undertake reviews on a more ad hoc basis.

Table 2.3 Objectives of the jurisdictions' primary fisheries legislation

	<i>Cth</i>	<i>NSW</i>	<i>Vic</i>	<i>Qld</i>	<i>SA</i>	<i>WA</i>	<i>Tas</i>	<i>NT</i>
Ecologically sustainable development	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Equitable or 'appropriate' sharing of fisheries resources		Yes	Implied	Yes ^a	Yes	Yes		Yes
Provide benefits to the community and/or consider community's interests		Yes		Yes ^a	Yes	Yes	Yes	Yes
Conserve/protect fish stocks, habitats and ecosystems		Yes	Yes	Yes ^a	Yes	Yes		Yes
Facilitate and/or encourage participation in fisheries management			Yes	Yes ^a	Yes	Future ^c		
Efficient and cost effective fisheries management	Yes				Yes	Future ^c		
Promote recreational fishing opportunities		Yes	Yes		Yes			
Promote sustainable fishing			Yes			Yes	Yes	
Maximise net economic returns	Yes					Yes ^b		
Cost recovery	Yes				Yes			
Promote viable fishing		Yes	Yes					
Conserve threatened species		Yes						
Increase community understanding of aquatic ecosystems							Yes	
Accountability of decision makers to the community and fishers	Yes				Yes			
Recognise and/or promote Aboriginal cultural fishing		Yes						
Facilitate the rationalisation and/or restructure of the commercial fishing industry			Yes					
Reduce the possibility of shark attacks				Yes				
Enhance competition				Yes ^a				

^a Included as a principle underpinning the definition of 'ecologically sustainable development' within the Act. ^b The objectives are to yield the optimum (rather than maximum) economic, social and other benefits. ^c Included in the *Aquatic Resources Management Bill 2015* that is before the Western Australian parliament.

Sources: McPhee (2008); *Fisheries Management Act 1991* (Cth); *Fisheries Management Act 1994* (NSW); *Fisheries Act 1995* (Vic); *Fisheries Act 1991* (Qld); *Fisheries Management Act 2007* (SA); *Fisheries Resources Management Act 1994* (WA); *Aquatic Resources Management Bill 2015* (WA); *Living Marine Resources Act 1995* (Tas); *Fisheries Act 1988* (NT).

Good practice in setting limits

All jurisdictions nominate ecologically sustainable development as an objective of fishery management. Almost all also explicitly identify the promotion of sustainable fisheries

and/or the conservation or protection of fish stocks, habitats and ecosystems as objectives. Because of unavoidable uncertainties, jurisdictions adhere to the precautionary principle in making decisions. This principle requires that a lack of full scientific certainty not be used ‘as a reason for postponing a measure to prevent degradation of the environment where there are threats of serious or irreversible environmental damage’ (DEWR 2007, p. 11).

Ultimately, limits on the amount of catch are set with the objective of preserving the long term sustainability of fishing stock and their environments. Subject to this objective, governments set a level of utilisation that reflect their objectives about how fishery resources should be used.

All jurisdictions seek to manage fishery resources on an ecosystem basis. However, this is difficult to implement in practice. It necessitates the management of all inshore and offshore activities that may affect the relevant ecosystem. It also requires cross-jurisdictional management of ecosystems that traverse borders. Management is instead usually undertaken on a more limited basis (often centred on key species and their habitats, although regard is given to broader risks to ecosystems).

Stock assessments and harvest strategies

Limits on fishing effort are usually defined in terms of an allowable quantity of catch. Where this is not practical (for example, for species with highly variable recruitment), limits are usually defined in terms of allowable effort (such as the number of fishing days). In setting limits, three main tools are available to regulators: stock assessments, harvest strategies and a harvest strategy policy.

Stock assessments are quantitative statements about the status of fish populations based on scientific and statistical models (DAF Qld 2016a). Stock assessments can demonstrate the resilience of stock to levels of fishing activity and provide information on what the maximum sustainable amount of fishing is likely to be.

Harvest strategies are formal frameworks that specify ‘pre-determined management actions in a fishery for a defined species ... necessary to achieve the agreed ecological, economic and/or social management objectives’ (Sloan et al. 2014, p. 11).’ Harvest strategies are used to define the desirable level of utilisation of a fishery and/or points at which changes in management are required to ensure that policy objectives (typically relating to sustainability of the target stock) are met.

Harvest strategies are commonly used in Australia and in other countries, including the United States, Canada, New Zealand and Norway (Sloan et al. 2014). The benefits of harvest strategies are well accepted in fisheries management and include:

- increased certainty and transparency with respect to how fishery stocks will be managed and utilised
- allowing people who utilise fishery resources to make more informed and better plans

-
- less ad-hoc decision making, with a reduced capacity for politics to influence harvest decisions (which could lead to sub-optimal outcomes).

A number of submissions noted the benefits of harvest strategies (box 2.2).

Box 2.2 Some participant comments on harvest strategies

Many participants commented on the value of developing and implementing harvest strategies for fisheries. For example, Wildcatch Fisheries SA submitted:

Harvest strategies have a strong role in enhancing our fisheries management processes where they have clear rules to drive management adjustments in line with the performance measures established in each fishery or species strategy. The adoption of harvest strategies nationally would do much to change the landscape for managing fishers and bring the diverse recreational interests into a process that makes it clear where their and other users obligations exist to act for common benefit. (sub. 10, p. 3)

The Tasmanian Rock Lobster Fishermen's Association commented on the benefits having a harvest strategy policy for their industry:

The current harvest strategy has been a very effective tool for the sustainability of the fishery. Pre-defined rules for monitoring and assessing stocks, combined with reference points for performance allow control measures to be implemented to ensure sustainability.

The defined rules within the harvest strategy provide industry with a level of certainty around allocation and access to the resource that results in business having the capacity to balance investment with financial risk. (sub. 37, p. 8)

Seafood Industry Victoria also identified benefits of harvest strategies:

Harvest strategies certainly have a role in furthering our precautionary approach to fisheries management already implemented in Victoria, providing they have clear rules to drive adjustments (both up and down) as guided by the best available scientific information. The broad adoption of both management plans and harvest strategies for fisheries across the country would go a long way to increasing industries social licence to operate. However, caution must be taken when developing harvest strategies and must ensure a solid understanding of all extractions of the fisheries resource. The National Guidelines to developing Harvest Strategies is a solid starting point for the discussions. (sub. 44, p. 3)

Prof. Caleb Gardiner and Dr Emily Ogier submitted:

Harvest strategies solve long running problems in Australian fisheries of lack of objectives and politicisation of decisions on stock management. (sub 16, p. 7)

National guidelines for the development of fishery harvest strategies were released in 2014 (box 2.3). The guidelines draw on best practice approaches internationally and the experience of the Commonwealth, which has the most experience with harvest strategies in Australia.

Box 2.3 **The components of an effective harvest strategy**

The *National Guidelines to Develop Harvest Strategies* (Sloan et al. 2014) states that an effective harvest strategy will be suited to the specific fishery to which it applies and should consist of:

- a clear, precise set of operational, achievable objectives that implement the overarching legislation
- performance indicators for each objective
- reference points that define the target value of a performance indicator for a fish stock (target reference points); the value that will trigger a change in management approach (trigger reference points) and a value that is considered unacceptable (limit reference points)
- decision rules linked to the reference points and
- a strategy for monitoring performance indicators through the collection of data.

An effective harvest strategy will be unambiguous, particularly in relation to the operational objectives and decision rules. It will also be adaptive to accommodate new information or exceptional circumstances.

Sources: Sloan et al. (2014); PIRSA (2015b, 2015c).

A *harvest strategy policy* is an overarching statement that seeks to facilitate the development of science-based approaches to managing multiple fisheries. It describes how government fishing policy will be incorporated into the harvest strategies for each fishery by specifying what should be included in the fishery-specific harvest strategy, including how key parameters should be set.

A harvest strategy policy offers a number of benefits, and the Commission considers that it is best practice to develop and utilise one. While harvest strategies provide consistency and transparency in setting limits within fisheries, a harvest strategy policy promotes consistency and transparency across all fisheries in a jurisdiction, making it more likely that fishery policy goals will be met.

The existence of a harvest strategy policy places an onus on regulators and fishery managers to follow the policy or justify deviations from it. As a harvest strategy policy outlines the preferred level of utilisation of fishery resources, it also reduces the scope for ad-hoc decision making, which again guards against undue political interference in setting catch limits.

Similar to fishery specific harvest strategies, harvest strategy policies should be subject to periodic public review. Reviews would facilitate appraisal of the overarching direction of fisheries management, any necessary clarification and prioritisation of policy objectives, and refinement of best-practice directions for the development of harvest strategies.

Stock assessments, harvest strategies and an overarching harvest strategy policy are important tools for ensuring the sustainability of the targeted stock, and communicating to fishers how fishery stocks will be controlled.

Obtaining information to undertake stock assessments and to formulate harvest strategies can be costly (both in time and in money). Policymakers must weigh the costs of obtaining more evidence to inform the setting of limits against the benefits of better understanding the likelihood of potential outcomes, and determine the level of risk that is acceptable.

More evidence to inform limits should be sought when the costs of doing so are likely to be outweighed by:

- the reduction in risk to either the sustainability of the fish stock or the marine environment more generally. This is more likely when there is the potential for risks to have significant consequences and/or relatively little is known about the risk
- the higher the value obtained from utilising the fish stock.

What jurisdictions do now

Two recent studies have assessed the use of stock assessments and harvest strategies across different jurisdictions in Australia (Hobday et al. 2016; Sloan et al. 2014).

These studies suggest that stock assessments are undertaken for the majority, but not all, commercial fisheries. Utilising survey data from each Australian jurisdiction, Sloan et al, estimated that three-quarters of the 180 fisheries or fish stocks examined were subject to formal stock assessment. However, there was considerable variation across jurisdictions. For example, Western Australia and New South Wales had undertaken formal stock assessments in all their fisheries, while less than half of stocks studied in Victoria were subject to stock assessments (figure 2.1).

A more recent study by Hobday et al. also suggests that stock assessments are generally undertaken (table 2.4), although the number of fisheries examined in this study was smaller (95 fisheries).

While stock assessments appear to be widely used for commercial species (and fisheries where there is recreational and commercial catch), their use for species that are mostly taken by recreational fishers appears limited. Given that much of recreational fishing activity appears to be ably managed through the use of controls such as size and bag limits (chapter 4), investing resources in undertaking a stock assessment is not likely to be cost-effective.

However, there is a stronger case for undertaking formal stock assessments where recreational take puts the sustainability of stock at risk. For regulators to be able to judge whether a stock assessment is needed, robust measures of take and effort are needed.

Table 2.4 Selected indicators by jurisdiction

	<i>Fisheries^a</i>	<i>Stock status</i>	<i>Harvest strategy</i>	<i>Management plan</i>
Commonwealth	11	11	11	11
South Australia	11	11	11	11
Tasmania	5	5	5	5
Northern Territory	5	5	2	3
Protected Zone Joint Authority	3	3	1	2
Western Australia	41	41	6	41
New South Wales	7	7	1	7
Victoria	3	14 ^b	0	3
Queensland	13	9	0	0

^a Number of fisheries in each jurisdiction with equivalent performance indicators. ^b As reported.

Source: Hobday et al. (2016, pp. 23–25).

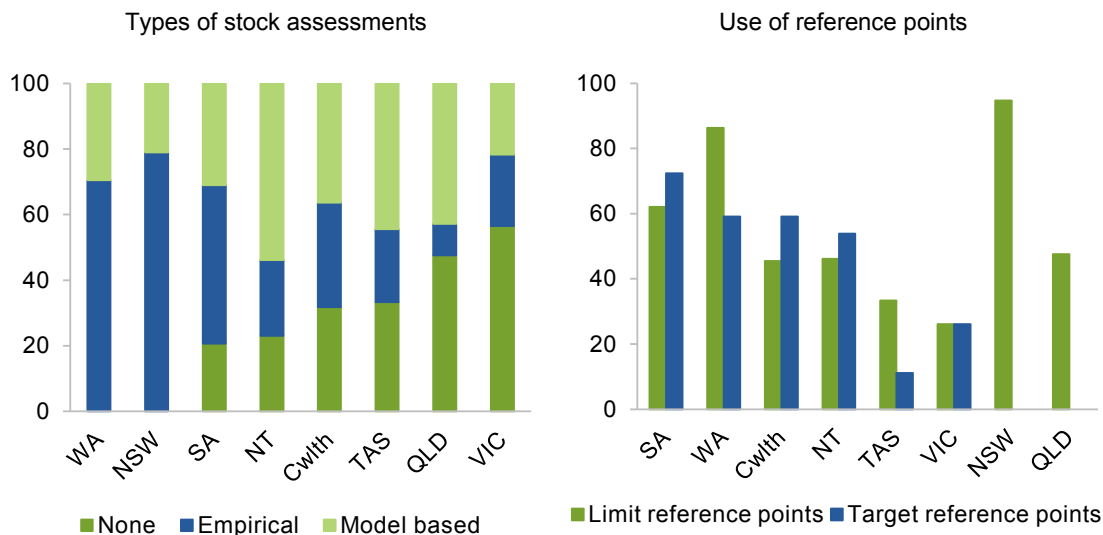
While commercial catch is usually measured and controlled, recreational fishing catch is subject to much less scrutiny. Gaps or separations in responsibility between jurisdictions can exacerbate these problems. This is evident where AFMA (the Australian Fisheries Management Association) has devolved responsibility for recreational fishing to the states (despite AFMA having the legislative capacity to regulate recreational fishing). Disjointed management has the potential to impede effective management of a number of valuable species, such as southern bluefin tuna (chapter 6).

Sloan et al. also evaluated the use of target reference points (which specify desired resource utilisation) and limit reference points (beyond which stocks, fisheries practices and management plans are reviewed).⁶ The inclusion of these features in harvest strategies is widely acknowledged to be good practice. Two commonly used target reference points are maximum sustainable yield (the level of catch that maximises revenue from fishing, or generates the largest amount of sustainable catch, either in terms of number of fish or tonnage) and maximum economic yield (the level of catch that is both sustainable and maximises returns to commercial fishers over a period) (Kompas 2011).

The use of target reference points varies across jurisdictions. South Australia, Western Australia, the Commonwealth and the Northern Territory have the highest use rate of target reference points (figure 2.1), while Queensland and New South Wales were found to not use them. All jurisdictions were found to make use of limit reference points with Victoria and Tasmania having the lowest identified use (figure 2.1).

⁶ Hobday et al. (2016) did not examine the use of trigger reference points (when fisheries management procedures should be reviewed).

Figure 2.1 Use of reference points and stock assessments
per cent of fishery stocks examined



Source: Sloan et al. (2014, p. 16).

Most commercial fisheries in Australia have fishery-specific harvest strategies. The Commonwealth, Northern Territory, South Australia and Western Australia have overarching harvest strategy policies.⁷ The policies of South Australia and the Northern Territory reflect the guidelines provided by Sloan et al. Key features of both policies include:

- a clear statement on what is an acceptable level of risk
 - risk is defined as ‘... there should be a “high likelihood” that the stock or management unit will not fall below the established biological reference point’, where a high likelihood is taken to mean that there is a greater than or equal to 90 per cent probability that the stock will be above the limit reference point over a period of time (PIRSA 2015b, p. 8, underline added)
- promotion of the use of target, trigger and limit reference points
- acknowledgment that there is a relationship between the level of exploitation in a fishery and the costs associated with undertaking monitoring and assessment. That is, where resources to inform management strategies are limited, more precaution around the level of exploitation is required.

The harvest strategy policy of the Commonwealth and Western Australia also have these features. However, both are more prescriptive than the South Australian and Northern Territory policies in defining what a target reference point should be. In the case of

⁷ See DAFF (2007), Attachment 3 of the submission from the Department of Primary Industry and Fisheries (NT) to this inquiry, PIRSA (2015c) and DoF WA (2015c).

Western Australia, the ‘default’ target is a level of take that maintains biomass at or above the maximum sustainable yield (MSY). The Commonwealth policy specifies that maximum economic yield (MEY) should be pursued.

MEY generally implies a smaller catch and a larger fish stock than MSY, as a larger stock makes it easier to catch fish and lowers the cost per unit of catch. That is, the target level of stock to be commercially extracted under the MEY approach is below the level of extraction that would threaten the sustainability of the stock. While maximum economic yield seems to be an appropriate target for most key species in a commercial setting (as is the case for species targeted in Commonwealth fisheries), it is less clear that it is an appropriate basis for limiting the total allowable catch across all sectors.

The Commission would appreciate additional input from stakeholders on the factors that should guide decisions on take limits, and the pros and cons of commonly used methodologies for setting target reference points. In particular, the Commission welcomes views on the circumstances in which MEY and MSY should be pursued, or other target reference points should be utilised.

INFORMATION REQUEST 2.1

What factors should guide government decisions on take limits – in particular, target reference points?

New South Wales, Victoria and Tasmania and Queensland⁸ do not have a harvest strategy policy. The costs of developing such a policy would be small (formalising existing practice in better-performing states and drawing on the national guidelines). There would be more significant costs in aligning the management of fisheries to the policy.

The Commission notes that a harvest strategy policy does not require all fisheries be managed in the same way. Rather, they set out desired standards and practices and, as noted, require regulators and managers to justify deviations from standards. Where the nature of the fishery or species means that it is most cost-effective to manage the fishery in a different way, this should be permitted to continue.

DRAFT RECOMMENDATION 2.1

The New South Wales, Victorian, Tasmanian and Queensland Governments should develop and implement a harvest strategy policy. Harvest strategy policies should be developed with regard to the *National Guidelines to Develop Fishery Harvest Strategies*.

⁸ The development of a harvest strategy policy in Queensland was floated in the Green Paper on Fishery Management Reform in Queensland, released in July 2016 (DAF Qld 2016b).

2.3 Determining allocations between fishers

One of the most contentious issues raised during this inquiry is how fishery stocks should be allocated across different user groups. Many submissions cited instances of competition between fishers, and particularly between recreational fishers and commercial fishers (a subset of which are contained in box 2.4). Numerous scientific papers, opinion pieces and blogs also point to the contentiousness of allocation decisions.

It is clear that competition for fisheries resources is a significant and growing issue. However, the extent of competition is hard to assess as there is relatively little information on shifts in activity and catch. Some competition may be transient.

Allocation decisions therefore do not need to be made in all fishing grounds or for all fishing species. However, in cases where competing demand for access to fishery resources threatens the sustainability of a stock or its environment, a clear and transparent process for addressing competition is required. It is probable that competition in some fisheries or for some species will increase as the population grows and recreational fishing technology improves.

Box 2.4 Some participant comments on competition for fishery resources

In relation to fishing for flathead off the New South Wales South Coast, the Merimbula Big Game and Lakes Angling Club submitted:

Recreational anglers are catching smaller and smaller fish because commercial netting is winnowing the stock – their nets leave behind the smaller fish. The outcome, should unrestricted commercial netting offshore of popular tourist resorts continue, will be a measurable drop in tourism and hence the economic wellbeing of the local NSW south coast towns. (sub 27, p. 6)

VRFish, which represents Victorian Recreational Fishers submitted:

The current management of the Small Pelagic Fishery (SPF) provides a clear example of how recreational fishing values and interests are not adequately addressed by the Australian Government. There are insufficient legislative measures in place to protect recreational fishing grounds and the surrounding regional communities that they support, especially for our premier game fish species such as Southern Bluefin Tuna (SBT) from the SPF. (sub. 25, p. 1)

The Amateur Fisherman's Association of the Northern Territory submitted:

Recreational fishers are limited to highly regulated and inefficient gear in comparison to the commercial sector. The commercial sector extracts large quantities of fisheries resources in comparison to recreational anglers and this leads to conflict over target species especially when it is in conjunction with overcrowding of prime recreational fishing locations. (sub. 20, p. 4)

Wildcatch Fisheries SA commented:

The regulation of commercial fishers has become the core role for many recreational groups who do not understand fisheries management and see their personal values as outweighing the collective need for all Australians to be able to have access to their fish stocks. (sub. 10, p. 4)

The Tasmanian Seafood Industry Council commented:

The very large number of recreational fishers that frequent our waterways, and the regulatory and political difficulties associated with controlling or constraining recreational catch has often resulted in cuts to sustainable commercial take, or at the extreme, the complete removal of sustainable commercial effort, with little to no compensation. (sub. 47, p. 5)

Seafood Industry Victoria submitted:

Across Australia small-scale fisheries are being removed or restricted in order to give increased access to resources for recreational fisheries, these same fisheries are promoted across the world as environmentally friendly and best practice. The latest example of this in Victoria was the removal of the sustainable, small-scale, low-impact net fishery in Port Phillip Bay, which had co-existed with recreational fishing for over 170 years. (sub. 44, p. 2)

The Queensland Seafood Industry Association commented:

There is considerable room for better fisheries allocation given that the resource is a public one yet history has demonstrated that fisheries managers are guided by the government of the day. The existence of over 200 commercial closures that exclude commercial harvesting in favour of recreational harvesting suggests that recreational fishers have an ongoing advantage in the allocation of fisheries resources. (sub. 29, p. 4)

The Fishermens Portal Inc (an organisation which represents commercial fishers in Queensland) submitted:

Fair access between recreational, commercial and Indigenous to the common resource is largely influence[d] by political aspirations to gain votes. Commercial fishers get the sharp end of the stick every time. Indigenous fishers have a traditional right to continue to fish as they always have. The recreational sector is the most powerful ... the effort from recreational fishers grows and grows. Bag limits will not control recreational effort. (sub. 17, p. 4)

Good practice in determining allocations

The nature of policy responses to competition for fishery resources should be guided by the nature of competition, including:

- the species or areas where there is competition
- whether competition only exists at certain times, days or seasons
- who is competing for access.

The following sections discuss approaches to allocating access to fishers regularly competing for the same stock at the same time or season.

The objective — maximising value

The ‘value’ obtained from fisheries resources can have different facets and forms. This value accrues to both individuals that access the fishery and the community more broadly, and encompasses both monetary and non-monetary benefits (table 2.5). Ultimately, governments should seek to maximise the value that may be obtained from access to fishery resources, taking into account the range of benefits that access may confer.

Table 2.5 The many benefits of fishing

<i>Sector</i>	<i>Personal benefits for fishers</i>	<i>Benefits to the wider community</i>
Commercial fishing	<ul style="list-style-type: none">• Financial returns from sale of fish• Enjoyment from working as fishers• Self-worth from being employed	<ul style="list-style-type: none">• Supply of fresh seafood and other fish products• Flow on expenditure to the local community from having a viable fishing industry• Taxation on wages and profits• Community cohesion associated with living in a fishing orientated community
Recreational fishing	<ul style="list-style-type: none">• Value obtained from the catch and consumption of fish• Financial returns to charter operators• Value related to the activity of fishing (spending time in nature, socialisation opportunities)	<ul style="list-style-type: none">• Flow on expenditure to the local community from having a vibrant recreational fishing industry• Community cohesion associated with living in a fishing orientated community
Customary fishing	<ul style="list-style-type: none">• Value obtained from the catch and consumption of fish• Opportunity to connect with cultural heritage	<ul style="list-style-type: none">• Flow on expenditure related to customary fishing• Benefits arising to the Indigenous and broader communities from the upholding and maintenance of traditional laws and customs

As most allocation decisions in Australia do not involve a previously unallocated fishery, policymakers have to determine whether a reallocation in favour of one group at the expense of another will increase the overall value obtained from the fishery. This requires estimating the marginal or incremental value derived from additional access or lost due to reduced access. The challenge is to obtain comparable estimates of this marginal value for different types of fishers.

Techniques for calculating these marginal values are described briefly below.

Estimating marginal values for recreational fishing

Several studies (for example, Dominion Consulting (2005), EY (2015) have identified expenditure on recreational fishing, and these have been used by proponents to estimate the economic worth of recreational fishing (and, consequently, argue for a greater allocation of total catch). However, total expenditure figures are of limited use for reallocation decisions because they provide a measure of the total value recreational fishers place on access, rather than the marginal value they would place on more access.

A more accurate method to estimate marginal value for recreational fishers is a valuation technique known as the travel cost methodology (Hundloe 2002; Mazur and Curtotti 2016). This methodology provides a way of estimating how much more recreational fishers would pay for an additional trip to a recreational fishing destination (box 2.5). This can then be compared with the value other groups obtain from changes in access to fishery resources.

Another method of estimating the marginal value of recreational fishing is to survey how much recreational fishers would be willing to pay for more access to fishery sites (so-called contingent valuation methods).

Box 2.5 Travel cost methodology

Travel cost methodologies use the cost that people pay to travel to a particular site (in this instance, a fishing ground) to estimate the value they obtain from visiting that location. Surveys are used to collect data on the costs that people incur, which is used to determine a relationship between travel costs and the number of times people visit the fishing site. This allows researchers to estimate the demand curve for access to the fishery ground.

The value that recreational fishers derive from accessing the fishery is the difference between how much fishers are willing to pay for access to the fishery ground compared to how much they do (that is, their consumer surplus).

The travel cost methodology can provide an estimate of how much a group of recreational fishers would value from an additional fishing trip (that is, the marginal change). One reason why recreational fishers might go fishing more is if they have access to more fishery resources. The marginal value that recreational fishers obtain from the change in allocation can be obtained by comparing their original consumer surplus to the surplus obtained after the reallocation.

While travel cost approaches are useful to inform allocation decisions, they are not always easy to apply, including where travel is undertaken for multiple purposes (not just to fish), as it is challenging to disentangle expenditure incurred for the purposes of fishing from other reasons.

Sources: Baker and Ruting (2014), Ward et al. (2012).

Estimating the marginal values for commercial fishing

Valuing commercial fishing involves consideration of the producer surplus derived by the commercial fisher (the difference between how much they sell a fish for and the costs of production) and the consumer surplus of the buyer in obtaining commercially-produced fish. These two components can be summed to ascertain the value obtained from commercial fishing. As fish are bought and sold on a market, and prices are therefore observable, this value is to an extent revealed by market prices.

Changes to the allocation for commercial fishers can affect the quantity of catch commercial fishers can sell, and the costs they face in catching these fish. Large changes in allocation may also affect the prices at which fishers sell their produce. The interaction of these factors changes the value commercial fishers obtain from accessing the fishery. The difference between the value obtained under the new allocation and the previous allocation represents the marginal value arising from the change in allocation.

Estimating the marginal values for customary fishing

Fishing undertaken for Indigenous customary purposes should be considered as a separate sector in an allocation process. The value of customary fishing is difficult, if not impossible, to measure because some of the benefits accruing to the fisher are derived from his or her connection to country and their cultural heritage. As Campbell (2002) describes:

Difficulties exist in valuing the rights of Aborigines and Torres Strait Islanders to fisheries resources because the intertwining of material uses (consumption of seafood) with a community's culture, spiritual laws and custom means that these two (or more) sources of value are difficult to disaggregate. (p. 176)

This necessitates a pragmatic approach to determining allocations, such as setting aside a proportion of allocation for customary purposes that allows Indigenous Australians to maintain their traditional customs. These issues are discussed more fully in chapter 5.

Developing allocation policies

Allocation decisions can have significant impacts on fishers. Governments should have a policy stating how access to resources will be reallocated when competition between groups arise. This will help to minimise adverse impacts, promote the best use of fishery resources, provide greater certainty for stakeholders, and improve accountability for decisions.

The Commission accepts that calculating marginal values (as described above) can be complex, and may not be a cost effective approach across the board. It is important, in all circumstances, that governments be transparent and consistent in how they approach allocation decisions and seek the best use of fishery resources. Ultimately, the objective should be to establish a common and soundly-based approach to identifying and assessing the value of access based on the principles outlined above. Allocation policies should ensure decisions are evidence based.

Allocation policies should indicate how policy objectives will be interpreted and prioritised when making allocation decisions. And at a minimum, allocation policies should specify:

- the circumstances in which a change in allocation will be considered (such circumstances could include major changes in the use and circumstances of the fishery)
- the processes to be followed when a change in allocation is being considered, including consultation with stakeholders and target timeframes for decisions
- the key factors that will guide decisions, being ones that would maximise the value of access to the community (in accordance with jurisdictions' policy objectives)
- how decisions will be communicated.

Other matters that policies could cover include evidence to be used in decision making and processes for appeal and/or compensation for reduced access.

The Commission envisages that an allocation policy would work in concert with a harvest strategy policy to promote effective fisheries management. Both serve different but valuable functions:

-
- A harvest strategy policy outlines the level of catch of that will be pursued across fisheries in a jurisdiction and therefore helps to define a level of utilisation consistent with the long-term sustainability of stocks.
 - An allocation policy outlines how allowable catch limits will be shared across different fisher groups with a view to maximising the value that can be obtained.

An allocation policy will only work if regulators are willing and able to hold sectors to their allocated share or access rights.

What jurisdictions do now

The processes used to allocate access to different groups varies across jurisdictions and, at times, within them. Broadly speaking, jurisdictions appear to be much less advanced in making effective allocation decisions than they are in setting overall limits.

In some instances, decisions on the allocation of resources appear to be made, at best, in an arbitrary way without due consideration of the most valuable use of these resource. For example:

- commercial net fishing is being phased out in several areas in Victoria because of an election commitment by the Andrews Government to increase the number of recreational fishers to one million by 2020. The Government has argued that increasing the number of recreational fishers will create jobs, support local businesses and strengthen rural and regional communities (Andrews 2015)
- the Queensland Government has acknowledged that some fishing grounds are closed simply to reduce conflict between recreational and commercial fishers (sub. 60, p. 1)

Four jurisdictions — South Australia, Western Australia, New South Wales and the Northern Territory — have allocation policies. The policies vary, but each outlines how a review will be triggered and the process that will be undertaken when making allocation decisions (box 2.6).

Box 2.6 A summary of allocation policies

South Australia's allocation policy builds on requirements in the *Fishery Management Act 2007*, which requires a share of aquatic resources be allocated to different sectors when a fishing plan is undertaken. The policy identifies the triggers against which an adjustment in allocation may be considered, and the process by which a review is undertaken. This process is tiered, beginning with an initial assessment, before moving to a full, more comprehensive, evaluation if required. Preferred and other methods to implement an adjustment are outlined.

In **Western Australia**, an allocation committee provides advice to the Minister on allocation decisions. The triggers that will initiate the review are set out, along with the process that will be followed (including when the submissions from the public will be accepted).

In **New South Wales**, stakeholders can (for a fee) apply to have an allocation assessed, with the onus being on the stakeholder to provide evidence that supports the case a change in allocation. The application is considered by a working group, who provides advice to the Minister of whether the allocation should be changed. The Minister makes the ultimate decision.

In the **Northern Territory**, the Minister is able to direct the Management Advisory Committee of a fishery to consider allocation issues. In the event that an agreement is not able to be reached, an expert panel is appointed to advise the minister, with opportunities for public submissions.

Sources: PIRSA (2011); DoF WA (2012b), Department of Industry (New South Wales) (2015), DPIF (2015a).

There is no overarching policy for the allocation of marine fishing resources across sectors in the Commonwealth, Victoria, Tasmania or Queensland (although the Green Paper on Fisheries Management Reform in Queensland has proposed one (DAF Qld 2016b)). That said, allocation decisions are still made in some fisheries. For example:

- the Victorian Rock Lobster Fishery Management Plan provides a Total Allowable Recreational Catch of five to ten per cent of the Total Allowable Commercial Catch, although the plan notes 'limiting recreational take to the Total Allowable Recreational Catch has, to date, not occurred because there is no agreed method for estimating and regulating take' (DPI Vic 2009).
- likewise, Tasmania has nominated roughly 14 per cent of the Total Allowable Catch (TAC) for Rock Lobster in 2016-17 to the recreational sector. The remainder of the TAC is for commercial fisheries (DPIPWE Tas 2016).
- in agreement with the commercial tuna industry, charter operators and game fishers, the Australian Government has banned the take of blue and black marlin for commercial purposes.

Making allocations when evidence emerges of a high degree of competition is preferable to not making an allocation at all. However, without the anchor of an overarching, publicly available policy, the process lacks transparency, is likely to be less consistent across fisheries and reduces the accountability of policymakers.

DRAFT RECOMMENDATION 2.2

The Australian, Victorian, Tasmanian and Queensland Governments should develop a policy to guide the allocation of access to fisheries stocks between different sectors.

The allocation policies of all governments should seek to promote the best use of fishery resources and provide certainty in relation to the processes involved in determining resource shares. At a minimum these policies should outline:

- triggers for review of existing allocations between sectors
- the review process, including how consultation will occur
- key considerations that will guide decisions.

These policies should be publicly available.

The ability of jurisdictions to make effective allocation decisions is severely constrained by the lack of rigorous and regular data on recreational and customary fishing — for example, in some jurisdictions, recreational fishing surveys have only been undertaken once in the last decade (chapter 4).

The lack of information on recreational and Indigenous fishing means that current allocation decisions are, in many cases, being made on arbitrary or pragmatic bases. The collection of better information to inform access and allocation decisions should be a high priority for governments, particularly in highly-contested fisheries. Chapters 4 and 5 deal with these issues at a sector level in more detail.

DRAFT FINDING 2.1

Decisions by governments on the allocation of fishery resources are severely constrained by a lack of comprehensive and current data on the participation and take of the recreational and customary fishing sectors.

Paying for access rights — a longer term solution?

The determination of allocations between sectors is, at present, most practically undertaken by governments. Over time, consideration should also be given to allowing recreational fishers to purchase and trade access rights. Customary rights should not be tradeable or transferrable, recognising the unique characteristics of the associated cultural benefits and that these benefits are exclusive to the community concerned.

All jurisdictions use transferable catch/effort quotas to manage commercial activity to some degree. Transferable quota systems set limits on the total amount of allowed effort or catch for a particular fishery within a set time period, and apportion tradeable entitlements to fish out of these limits.

The major advantages of price-based mechanisms for allocating access across sectors include the avoidance of subjective decisions and the facilitation of access to those who value it most.

Transferable quota systems are more costly to administer because of the need to establish systems to monitor take, and enforce strict trading rules. Given the higher costs involved, not all fisheries will be suited to quota management – for example, those that have low levels of exploitation, or are of low value or risk.

Major prerequisites for inter-sectoral trading include a common basis for valuing access to the resource and the existence of representative organisations in the recreational sector to hold and deal with collective rights. No country has met these conditions and, in Australia, this would be a longer-term goal. However, there have been moves by the recreational sector in some states to better organise in recognition that current arrangements for contested fish are not adequate. Such developments may offer a means for organising recreational fishers to participate in an auction for fishing allocations, or to negotiate with commercial fishers to purchase some or all of their allocation.

Transferable quota systems are therefore worth considering as a longer-term goal for suitable high-value fisheries.

DRAFT FINDING 2.2

A move to inter-sectoral trading of access rights is worth considering in the longer term for suitable, high value fisheries.

Resource rents

Fisheries are a publically owned resource, and fishers of all types access fisheries for private gain. Resource rent charges allow governments to capture some (or all) of this value on behalf of the public. Resource rent can take several forms, including:

- an output based charge, where a charge would be levied on fish taken (similar to a mining royalty).
- a profit based charge, where the charge would be based on the profitability of fishers (the ‘profit’ for recreational fishers would represent the value they obtained from access beyond the price they paid for access).

Resource rent charges are currently not used in Australian fisheries, with the exception of the abalone fishery in Victoria (where a royalty is used), and are not common practice worldwide. While attractive in principle, they are in most cases impractical or unsuitable, at least at the present time.

As all sectors obtain value from accessing fishery resources, any resource rent charges should, in theory, be placed on all users. The effective application of resource rent charges requires a number of preconditions which are not present in most fisheries in Australia — such as clear (and strongly enforced) access rights and consistent and robust data on take.

Even if resource rent charges were only applied to the commercial sector, there are a range of practical problems that make it unfeasible in the medium term. Many commercial fishing operations are marginal, and it is unlikely that they would earn consistent surplus value that could be extracted by rent charges. There are also challenges with calculating an accurate charge in multi-species fisheries, where profit can be earned from a range of different stocks.

Given this, the Commission does not consider that resource rent charges can be effectively applied in most fisheries at the present time. It is also worth noting that rent charges are not the only way to return the value of fishery use to the wider community — taxes on income and profit can do so as well.

3 Commercial fishing

Key points

- The commercial fishing sector's output, value and employment has been in decline for more than a decade. In part, this trend reflects constraints on activity due to past overfishing, but also outmoded fishery management policies, including the use of input controls as the predominant method of constraining catch. This has suppressed productivity improvement and slowed structural adjustment.
- The focus of regulatory reform should be on moving to individual transferable quota systems for fisheries. Transferable quotas enable harvest controls to be met efficiently, and minimise constraints on innovation and productivity improvement.
 - Where individual transferable quota systems are not technically feasible or cost-effective, governments should use market-based input controls (individual transferrable effort systems).
- Governments should regularly review their commercial fishing regulations to ensure they are the minimum required to meet policy objectives. In conjunction with recommendations elsewhere in this report, including providing a clearer and more certain basis for decisions on access to fisheries (chapter 2), rationalising or streamlining cross-jurisdictional fishery management (chapter 6) and on environmental regulatory costs (chapter 7), this will help to minimise regulatory inefficiency and cost 'creep'.
- There is scope to improve land planning practices and marine resource policies to reduce unintended impacts on commercial fishing.

There are around 165 commercial fisheries in Australia and around 200 species caught and traded commercially. The vast majority of catch (85 per cent) is concentrated in 60 species (Finn et al. 2015, pp. 54–56) with rocklobster, prawns and abalone accounting for around two thirds of the value of production (Savage and Hobsbawn 2015 Table S2). Some species are prized and command a premium in overseas markets. The majority of wild caught fish is for domestic consumption, increasingly in competition with imports and fish produced through aquaculture.

There has been a decline in the sector's value of production over the past decade, reflecting constraints on catch and limited price growth. The evidence available shows that the majority of catch value is taken by a small proportion of fishing businesses, and profitability in the higher-value fisheries is flat at best. These point to the need for consolidation in the sector, but this is occurring only in a limited way. Many state fisheries are predominantly input-controlled, which is impeding structural adjustment.

Regulatory arrangements need to enable better resource allocation, innovation and investment, including through increased scale. In turn, this highlights the need for best

practice management techniques and regulatory frameworks for commercial fisheries if the sector and community are to derive maximum returns.

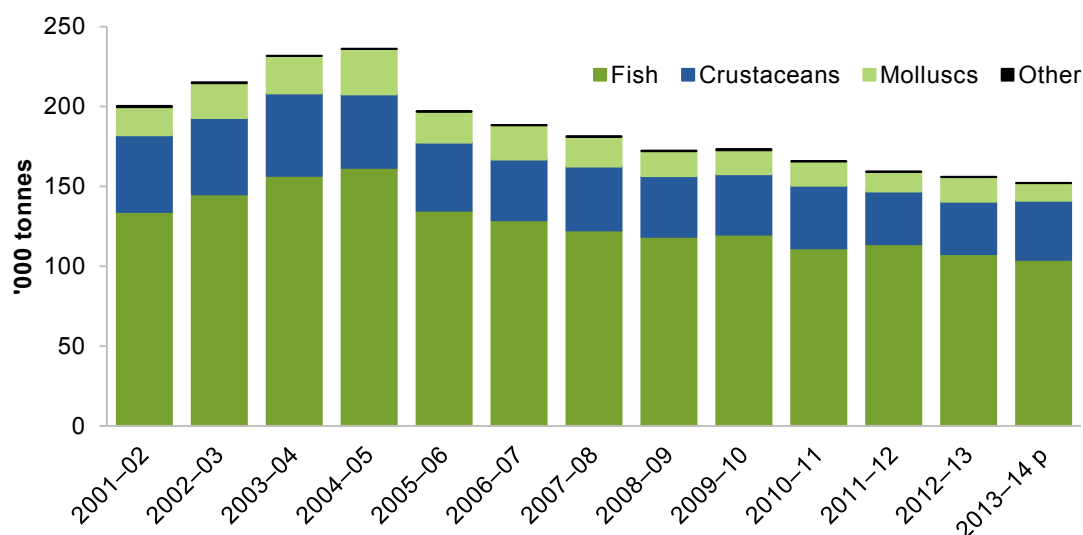
This chapter considers key trends in and features of the commercial sector, how regulation is affecting productivity, and other policy issues that were raised in the course of the review, including food security and the regulation of worker safety.

3.1 The commercial fishing sector

Output, value and employment

The output of the commercial fishing sector and prices for fish are inherently variable due to changes in fish abundance and demand. That said, there has been a trend decline in output over the past 10 years, largely due to policies to correct over-fishing (figure 3.1). And the average price of fish has declined by 20 per cent since 2001-02, although this has been almost entirely due to changes in the mix of species produced. Together, this has resulted in a steady decline in the value of wild caught fish over the past 15 years (figure 3.2).

Figure 3.1 Weight of wild caught fish



P Preliminary estimate.

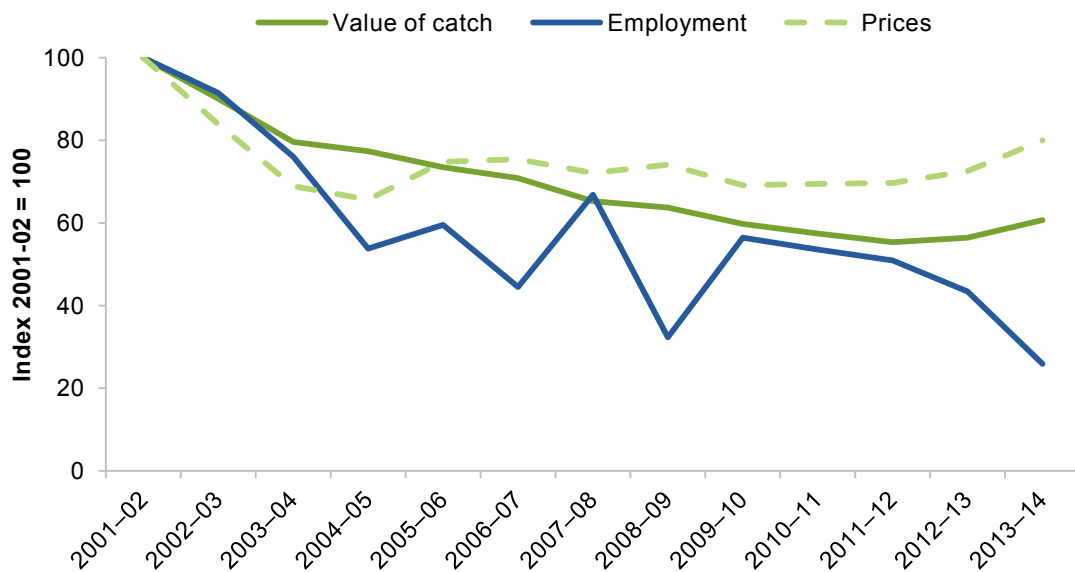
Data source: Savage and Hobsbawn (2015).

Employment has also declined, more than halving since 2001-02 (figure 3.2). There were around 6500 people in Australia in 2015-16 whose main job was with a commercial fishing

business. People working in commercial fishing are on average older than other workers, and the average age is increasing.

Given the ageing of the commercial fishing labour force, there is some concern that critical fishing knowledge (especially localised knowledge) will be lost, whether through fishing sector reform or as fishers retire (for example, NSW Wild Caught Fishers Coalition, sub. 41 and Seafood Industry Victoria, sub. 44).

Figure 3.2 Decline of commercial sector value and employment
Index of employment^a, value of catch^b and prices^c



^a Average of quarters for each financial year for the fishing, hunting and trapping sub industry grouping. ABS employment data is based on survey data, and estimates for disaggregated groups can suffer from volatility. ^b Value of catch in 2013-14 prices. ^c Average price per kg in 2013-14 prices.

Data sources: Commission estimates based on Savage and Hobsbawn (2015) and ABS Labour Force, Australia, Detailed, Quarterly, 6291.0.55.003, table 06, May 2016.

Other things being equal, it is likely that allowable catch levels⁹ in some fisheries will be increased when fish stocks recover, but this is likely to remain below historic levels. There is scope for catch (tonnage) to increase, as the target catch rates for most species are usually not reached.

⁹ The allowable commercial catch limits will be referred to as catch limits or total allowable catch in this chapter. Where they exist in Australian fisheries, this will relate to explicit total allowable catch limits, total allowable commercial catch, total allowable take or total allowable commercial take. It could also relate to target or limit catch levels for fisheries where explicit catch or take limits are not set.

The commercial sector's capacity to produce economically viable yields will depend on the degree to which it can differentiate its product and ensure efficiency in production, given competition from other countries and aquaculture (FRDC and Ridge Partners 2015).

Demand

The quantity of seafood consumed per person in Australia (from wild capture and aquaculture) increased by about one per cent a year in the six years to 2013-14 (Savage and Hobsbawn 2015, p. 1). Australian per capita consumption of fish appears to be at about the world average (FAO 2014).

Domestic seafood consumption was concentrated in canned tuna, prawns, salmon (canned and fresh) and squid, as well as crumbed and battered fish (Danenberg and Mueller 2011 tables 2 and 3). The majority of consumption — 69 per cent in 2013-14 — is sourced from imports (Savage and Hobsbawn 2015, p. 4).

There has been a shift in the types of fish eaten and the source of fish over recent decades, with a growing reliance on imported fish and aquaculture production. A major change in fish consumption in Australia has been the increase in salmon consumption — which has risen from 1.5 to 2.5 kilograms per person in the five years to 2014. This increase has principally been sourced from Australian aquaculture, but also includes imported canned and smoked product.

The value of Australian seafood exports increased from \$1144 million in 2008-09 to \$1293 million in 2014-15. This reflects an increase in the price received for seafood exports, with the volume of exports generally flat. The increase in export values has predominantly been driven by crustaceans, which have made up at least two thirds of the value of Australia's exports every year for the past decade (ABARES 2015a table 92). Almost all of the crustacean export earnings came from rocklobster. The main markets for crustaceans were in East Asia.

Sector composition and profitability

Wide dispersion of catch among fishing businesses

The commercial fishing sector comprises large, vertically integrated food companies through to small family businesses, with the majority being small businesses.

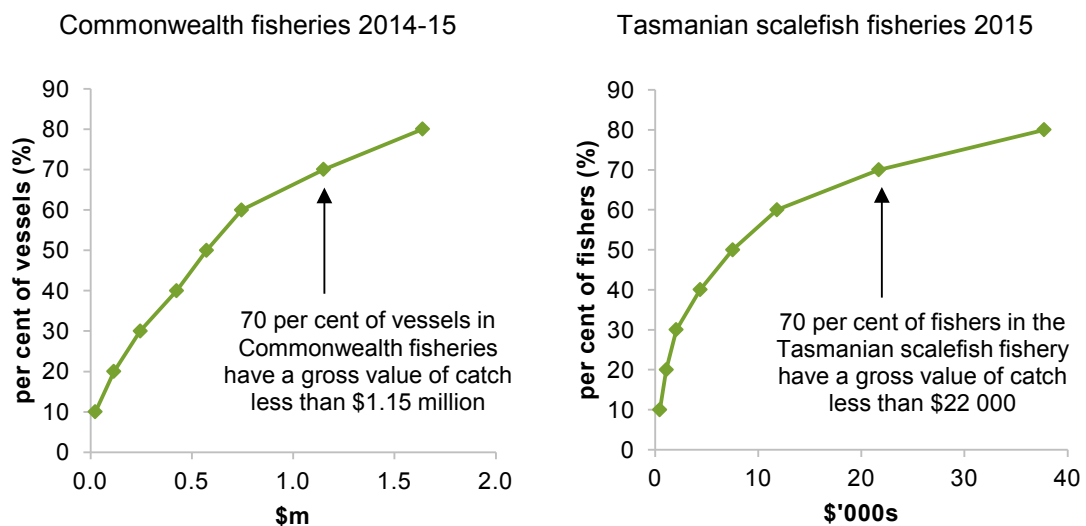
This disparity can be seen in the dispersion of catch values. An analysis by the Fisheries Research and Development Corporation has found that a small proportion of fishing businesses takes the majority of the catch value (FRDC and Ridge Partners 2015, pp. 74–75 interim analysis). Data available to the Commission on the Commonwealth and Tasmanian fisheries (figure 3.3) confirms the disparity:

- In the Commonwealth, 70 per cent of vessels produced a gross catch value of less than \$1.15 million in 2014-15, slightly lower than the average for all fisheries.
- In the Tasmanian scalefish fishery, 70 per cent of commercial fishers had a below average gross catch value of \$22 000 or less in 2015.

Information available on other states and the Northern Territory suggests that smaller fishing businesses in these jurisdictions have small average values of catch.

Figure 3.3 Distribution of catch value among fishers operating in two jurisdictions

Cumulative frequency of vessels or fishers with gross value of catch at or below a given value.



Data source: Data supplied by the Australian Fisheries Management Authority (AFMA) and Tasmanian Department of Primary Industries, Parks, Water and Environment.

Commercial fishing can be highly seasonal in many fisheries, which can affect the value of catch by fishing businesses. One way that fishers manage the impact of seasonality is to have rights to fish in more than one fishery. GA and MJ Stevenson note that fishers:

... may have multiple endorsements to allow seasonal access to a variety of fisheries. Some fishers may draw 40 per cent of their income from net fishing and 60 per cent from crab fishing. (sub. 26, p. 14)

In Queensland, it appears fishing businesses on average operate in three fisheries in the state (Queensland Government, sub. 60, p. 1). In contrast, fishing businesses rarely operate in multiple Commonwealth fisheries.

Another reason for low catch by some businesses is that they may combine fishing with one or more other jobs. GA and MJ Stevenson elaborated that 'commercial fishing may be one of many sources of income or the sole income of some fishermen' (sub. 26, p. 14).

Reliance on employment outside of commercial fishing does not mean the fishing business is unviable. As The Fishermens Portal noted:

One fishing family may be able to maximize their profits by fishing at optimum times and having other forms of income to fall back on when the fish are not running. This family would show as a low volume producer yet in fact may be better off than a fisher who fishes every day and burns up his profits through increased running costs. (sub. 17, p. 5)

However, combining commercial fishing with non-fishing employment may mean that sufficient income cannot be generated from fishing to justify new investment.

Profitability

There is limited evidence available on the profitability of commercial fishing businesses in Australia. Estimates of profitability are available for an ‘average boat’ operating in some Commonwealth and South Australian fisheries (figure 3.4).¹⁰ This data suggests that profitability of an ‘average boat’ in these fisheries is in the order of \$100 000, which has been relatively flat at best over the past decade.

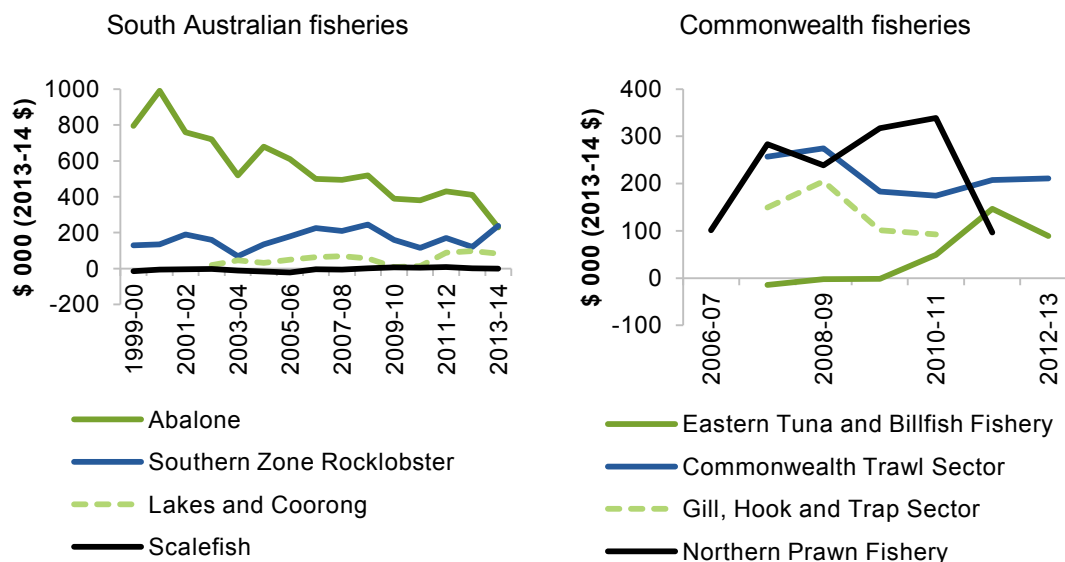
Such data need to be used with caution, however. The published estimates for the Commonwealth and South Australian fisheries do not represent an accurate picture of individual businesses within those jurisdictions or across Australia because:

- profit estimates are only generally available for fisheries with the greatest value of catch
- a number of fishers operate in more than one fishery, so the information will not always reflect the full profitability of fishing businesses
- the estimates are for an ‘average boat’ operating in the fishery, which is unlikely to reflect the situation of many boats operating in the fishery as catch may vary markedly.

¹⁰ Profit at full equity is derived by taking business income (typically value of catch plus payments for fishing rights leased or sold to other fishers) and then subtracting costs and a return on capital.

Figure 3.4 **Profitability of Australian fisheries**

Profit at full equity: average per boat



Data sources: Bath, Skirtun and Green (2015); George and New (2013); George, Vieira and New (2012); Perks and Vieira (2010); Skirtun and Green (2015); Skirtun, Stephan and Mazur (2014); Vieira and Perks (2009); and Econsearch (2015a).

Given the disparity in value and volume of catch by fishing businesses and the predominance of small businesses, the profits earned by the majority of fishing businesses are likely to be below the quoted average boat profit. These estimates will of course understate the level of profits for the most successful fishing businesses.

3.2 Primary management techniques

In order to be able to catch and sell fish, commercial fishers in Australia need to hold fishing rights or entitlements. The nature of entitlements varies between jurisdictions and between fisheries in each jurisdiction. They usually specify who can fish, what vessels can be used, how much fish can be taken and/or the fishing methods that can be used, depending on the type of fishery.

The nature of rights or entitlements can affect both the level of fish caught and the degree and nature of effort invested in ‘landing’ (producing) the allotted catch. They are therefore an important tool for meeting environmental goals and have a significant influence on the productivity of fishers and the economic performance of the commercial fishing sector.

The controls used to manage fishing entitlements are usually classified as ‘input’ or ‘output’ controls.

Input controls regulate how fishing occurs, such as vessel size, length of nets, number of hooks or the amount of time that can be spent fishing. They are an indirect means of limiting the catch of fish. In Australia, input control-based entitlements can, in most instances, be used, leased or sold to other fishers as a single entitlement.

Some jurisdictions employ individual transferable effort systems (ITEs). ITEs set out, for example, the number of days that a fisher can fish, with the number of days based on the size of their boat and/or length of the nets that they use. Fishers are able to trade (in full or part) their entitlement of fishing days, and this better facilitates utilisation of entitlements (entitlements may not be fully utilised, for example, where fishers have problems with their vessel or gear).

Output measures directly control the amount or weight of fish that can be caught. Limits may be set at the fishery level, with regulators halting the fishing season once the catch limit is reached. More commonly, quotas are determined for individual fishers from the total allowable catch limit that is established for a fishery and/or species in a fishery. Individual quotas can be set by weight or number of fish, but are usually determined as a share of total allowable catch. Catch limits can be accompanied by restrictions on fishing methods if necessary to limit impacts on the environment.

A common form of output control used in developed countries is individual transferable quotas (ITQs). ITQs entitle each fisher to a share of the total allowable catch for the season, and can be traded in full or part.

Best and current practice

There is general agreement among researchers, policy makers and fishery management authorities that output controls and, in particular, ITQs, are the best way of meeting ecological goals for most commercial fisheries while maximising their economic value (box 3.1).¹¹ The advantages of ITQs include:

- that ITQ management arrangements generally do not specify how fishing is to occur (other than to meet environmental concerns), so they allow fishers greater scope for innovation and efficiency improvement
- the ability to trade entitlements (either in full or part) means that entitlements are more likely to be fully utilised and purchased by those who are likely to generate greater returns. This facilitates improvement in the value of fisheries, as well as structural adjustment
- that the setting of quota as shares allows their automatic adjustment when any changes occur to total allowable catch limits

¹¹ Here, the Commission is referring to the predominant method of controlling harvest. Output controls may be supplemented by other regulatory restrictions or requirements to address sustainability concerns (chapter 1).

-
- as quotas are secure and much less likely to be subject to regulatory intervention due to concerns about breach of catch limits, fishers can attempt to time their catch to take advantage of market conditions regardless of the actions of other fishers.

In contrast, input controls indirectly limit catch and constrain the ability of fishers to choose the best/most efficient methods of catching fish as these evolve over time.

ITQ systems are, however, relatively expensive to administer, requiring the ability to monitor who owns and has leased quota, and the levels of catch against allocated quota. Monitoring generally necessitates vessel monitoring systems and onboard observers, or video monitoring. As the Queensland Government notes (sub. 60), without monitoring and controls, the use of ITQs can provide financial incentives for fishers to adopt practices that can harm sustainability.

Unrecorded catch and ‘high grading’ (where smaller fish or less valuable quota species are dumped overboard and fishing continues) can be major problems where output controls are used. (p. 7)

The use of ITQs can also be problematic for fisheries with multiple target species (multi-species fisheries), where the target species are short lived or where there is highly variable recruitment (the addition to the biomass from spawning). In multi-species fisheries, ITQ systems can constrain the overall level of catch to the sustainable take level of one species in the fishery. In fisheries with variable recruitment, ITQs can limit catch to substantially below sustainable levels in years of abundance. The use of ITEs in these instances may be more efficient and allow for a greater proportion of any sudden increases in biomass to be sustainably fished.

ITQs are currently used in about a quarter of the fisheries in Australia (figure 3.5). ITEs are also used at very low levels. The New South Wales Government announced reforms in May 2016 to move most fisheries in that state to either ITQs or ITEs by December 2018. Input controls will nevertheless remain the dominant technique for managing fisheries in Australia.

Most ITQ-managed fisheries in Australia involve high-value species. ITEs are largely used in fisheries targeting prawns and squid, species with short life spans and with very variable recruitment (table 3.1).

Box 3.1 **Output controls vs input controls**

Evidence available on Australian ITQ-managed fisheries indicates that environmental and commercial outcomes are positive.

- In Commonwealth ITQ-managed fisheries, stocks are not subject to overfishing, and where stocks had previously been overfished, there is evidence of recovery. For example, flathead, gemfish and orange roughy stocks in the Southern and Eastern Scalefish and Shark fishery recovered after the introduction of ITQs (Department of Agriculture and Water Resources (attachment to sub. 56, pp. 22–23).
- ITQs have promoted investment. For example, greater certainty over catch shares contributed to decisions to invest in processing facilities in the rocklobster industry. Improved sustainability outcomes achieved under ITQs also increased confidence to invest in the better targeting of species that are in recovery (such as orange roughy).
- A study of the Tasmanian southern rocklobster fishery found that after the introduction of ITQs, fishing effort moved to areas where the catch had attributes that were more highly valued by the export market — in particular, moving to shallower waters where the colour of lobsters caught is more likely to attract a price premium on international markets (Hamon et al. 2009, p. 554).
 - Previously in the fishery, effort controls created perverse incentives to catch as many rocklobsters as quickly as possible rather than catching those that would bring the greatest profit.

Input control arrangements can allow higher economic returns in some circumstances. For example, they can reduce wastage of fish as fishers are often allowed to keep and sell any fish they catch that meet size and species specifications.

However, similar provisions to supplement quota arrangements could also reduce wastage. Moreover, the use of input controls often leads to fisheries regulators modifying the controls to ‘cancel out’ any productivity improvement achieved by fishers. The Queensland Government noted (sub. 60):

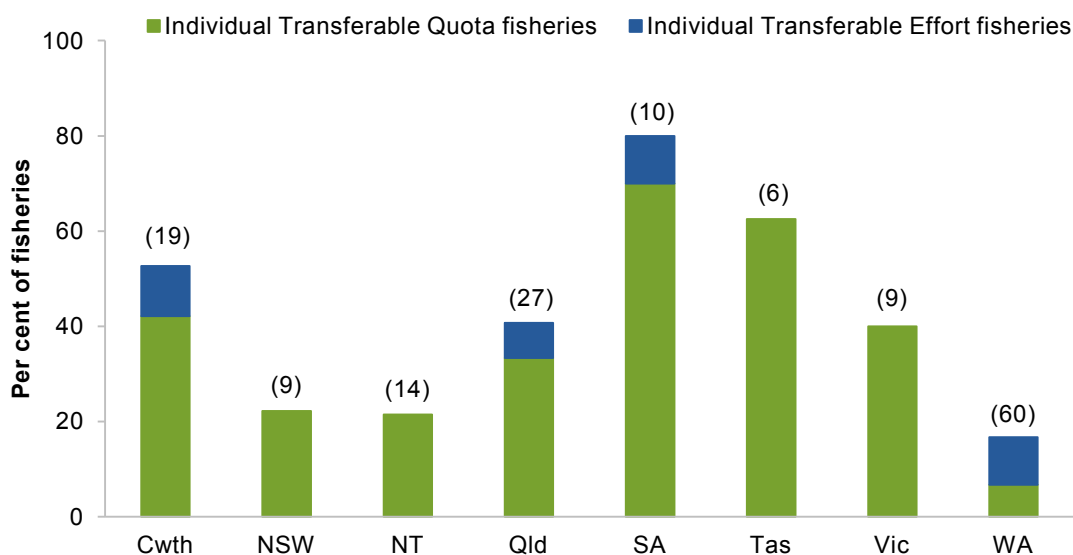
If a fishery is managed primarily by input measures there must be a mechanism for continually reducing total fishing effort, since the fishing effectiveness of each individual boat invariably improves over time and results in threats to sustainability as well as reduced economic efficiency. Usually the reduction in fishing effort is achieved by a regular tightening of input controls, which further exacerbates problems of overcapitalisation and economic inefficiency. (p. 6)

Similarly, the Northern Territory Seafood Council noted ‘innovation and efficiency gains lead to tighter controls to mitigate the catch’ (Northern Territory Seafood Council nd, p. 1).

The inability to directly control catch also creates greater regulatory risks and related uncertainty for fishers. For example, if a fishing season must close upon reaching a limit, this can encourage fishers to try to catch as many fish as possible as early in the season as they can (known as the ‘race to fish’).

The Queensland Department of Agriculture and Fisheries noted that ‘[t]he management arrangements currently in place for [some of its input-controlled] ... fisheries do not have sufficient capacity to control total catch’ (DAF Qld 2016b, p. 25).

Figure 3.5 **Use of individual transferable quota and individual transferable effort in fisheries by jurisdiction^a**
Per cent of fisheries^b



^a Based on publicly available documents as of June 2016. This does not include the recently announced NSW reforms which will be implemented over the next three years. ^b The number of fisheries per jurisdiction is in brackets above the bar. The number of fisheries by management control method includes double counting as a small number of fisheries have both transferable effort and quota arrangements.

Table 3.1 **Examples of Australian fisheries by management approach**

<i>Individual Transferable Quota systems (ITQs)</i>	<i>Individual Transferable Effort systems (ITEs)</i>	<i>Other input controlled</i>
Small Pelagic Fishery (Cwth)	Northern Prawn (Cwth)	Prawn (Torres Strait)
Lobster (NSW)	Southern Squid jig (Cwth)	Marine Aquarium (Qld)
Tropical Rocklobster (Qld)	East Coast Otter Trawl — Prawn (Qld)	Deep water fin (Qld)
Abalone (NSW, Vic, SA, WA and Tas)	Gulf St Vincent Prawn (SA)	Sea Urchin (Vic)
Southern Rocklobster (Vic, Tas, SA, WA)	Pilbara trap (WA)	North Coast Crab (WA)
Demersal (NT)	Gascoyne Demersal Scalefish (WA)	Offshore net and line (NT)

Why are ITQs (or ITEs) not used more frequently?

The jurisdictions that have been at the forefront of implementing output-based controls in Australia have tended to be those where the impacts of overfishing were largest and the characteristics of fisheries made them more amenable to reform. These include fisheries with high catch volumes/prices, one main target species, and a small number of fishers

operating out of a limited number of ports. The Commonwealth and South Australia now also use ITQs in fisheries targeting lower-value fish.

Most states and the Northern Territory were not part of this cohort and so have a higher proportion of input-controlled fisheries. Queensland has recently released a green paper exploring reform options for fisheries management (DAF Qld 2016b) that may change the management methods used in that state.

All jurisdictions retain some input-controlled fisheries because of the perceived value (on the part of fishers) attaching to existing entitlements.

Other impediments to the take up of ITQs include concerns about costs, including the need for more detailed stock assessments and monitoring systems, and the potential economic and social impact on fishers and fishing communities (for example subs. 16, 17, 44, 60).¹²

Undoubtedly, the management method for commercial fisheries should be cost-effective. The higher cost of administering ITQs suggests that they are more suited to high-value fisheries, but the experience of the Commonwealth and South Australia suggests suitability should be determined on the basis of a cost-benefit appraisal for individual fisheries.

On the adverse impacts of ITQ systems on fishers and communities, the Seafood Industry Victoria considered that the introduction of ITQs:

... can ... lead to unintended consequences, such as establishing a monopoly ... (and) redistribution of the economic benefits of commercial fishing from the (mostly) rural communities in which the fishing takes place to the urban-based investors (sub. 44, p. 5)

ITQs involve transitional costs, including the revision of business models for fishers because ITQ systems require the imposition of explicit, usually lower, limits on catch and dissolve existing rights to fish in favour of new, tradeable, rights. This may have flow-on impacts on supplier businesses, local employment and local communities.

To an extent, these impacts are necessary and unavoidable. The alternative is continuing decline in the efficiency and competitiveness of the sector. The retention of input controls is inimical to managing pressure on commercial fishing from rising input costs and competition from imports. It is important for the ongoing viability of the sector that fisheries be managed in a way that does not unnecessarily stymie fishing operations or innovation, including choosing more cost-effective methods of fishing over time.

Moving to best practice management controls

The Commission considers that there is a case for moving to ITQs where cost-effective (and technically feasible). The hindrances to greater use of ITQs where this is likely seem

¹² Sub. 16, Gardner and Ogier; sub. 17, The Fishermens Portal; sub. 44, Seafood Industry Victoria; sub. 60, Queensland Government.

to be ones relating to implementation, rather than fundamental concerns about their suitability.

A major impediment to take-up of ITQs is the cost of buying out existing entitlements to fish. The efficient and effective implementation of ITQs has also been hindered by the processes of allocating new rights.

The Commission has been advised that, at a practical level, reform without buying out at least some existing entitlements will be unworkable in many cases. Notwithstanding a range of complex issues that must be considered in determining the nature and extent of any compensation (discussed below), the task of instituting reforms could be made easier by:

- removing or reducing latent effort (under-utilised entitlements to fish), which inflates the ‘demand’ for the fishery and complicates the allocation of new entitlements
- improving the way that rights are allocated under the new ITQ system to better match fishing entitlements with that necessary to operate viably.

The Commission understands that fishery policy and management authorities are undertaking further work to reduce the transitional impacts of moving to ITQs and ITEs and improve the feasibility of the former for multi-species fisheries.

Addressing latent effort

The most common way rights have been reassigned in the past has been to allow a short period of trading in historical catch or effort entitlements in order to enable businesses to exit the industry or adjust their business models. Such market mechanisms tend to be very complex, and the level of sophistication required to effectively participate in such a system has been beyond the capacity of some commercial fishers.

The process has also usually been made more complicated by the existence of un- or under-utilised fishing entitlements (latent effort) (box 3.2). Latent effort increases the likelihood that active fishers will receive allocations that are below the level required to keep fishing or below the level required for them to fish viably. This shortfall in allocation arises because the level of allowable catch under ITQs is often below implied catch levels under the preceding input management arrangements, and the distribution of new rights based on prior holdings. Also, where allocations are based on past fishing practices, those allocations will typically reflect average activity in the fishery. If a fisher’s catch differs from the average for the fishery, it is likely that their quota allocation will not suit their business model.

Significant latent effort also makes it difficult to determine what settings should be used for ITEs. This is because, at any time, the amount of fishing actually occurring might significantly vary from what managers assume.

Removing latent effort would simplify the process of allocating new entitlements and lead to fewer fishers receiving insufficient entitlements to allow them to continue their existing fishing practices. In cases when fishers receive entitlements that would require a reduction of fishing, the extent of any shortfall is likely to be smaller.

The experience of Australia and overseas suggests that a better approach would be to separate the process into two steps: 1) first either rescind all fishing rights or reduce latent effort through a bidding system; 2) once the level of entitlements has been reduced (or removed), fishing businesses would be permitted to participate in a market process to purchase and trade new rights.

Box 3.2 Sources of latent effort

Latent effort refers to the non or under-utilisation of entitlements. This may arise for a number of reasons:

- people want to fish less than they previously did (for example, as a transition to retirement) or have exited the industry, but have not sold or leased their entitlements
- they may be holding multiple endorsements, which allows them to choose when to fish based on market prices and abundance; or
- people may be holding onto unused fishing entitlements as an asset in anticipation (hope) of buy-outs if governments undertake reforms.

Improving the allocation process

Even where latent effort has been removed or reduced in a fishery, the initial reallocation of rights may not provide all fishing businesses with a combination of rights that would be optimal or viable for their business (box 3.3). For some fisheries, a minimum number of entitlements may be needed before fishing is permitted, and fishing businesses that were entitled to fish before the allocation of new rights may have insufficient rights to fish afterwards.

When fishing businesses are allocated too few rights, they will need to trade to obtain a better set of entitlements. This may be through an initial trading system that the fisheries managers establish as part of the allocation process, or using private trading arrangements.

To participate in an initial trading system, fishers have to identify viable combinations of fishing rights. That desired combination may reflect past fishing practices, or fishers may try to use the reform process as a means of altering their business model. But some fishers may be unsuccessful in obtaining an optimal combination, or even a combination that permits fishing to occur.

These risks can be lessened through the use of conditional bidding arrangements. Conditional bidding arrangements allow fishers to specify threshold conditions to buy or

sell — for example, a fisher may stipulate the purchase of rights if 10 type A rights and 5 type B rights can be purchased; otherwise, the fisher will sell all their rights.

Without the ability to make conditional offers, commercial fishers may fail in their objective (whether that be to purchase enough entitlements to support the viability of their business, or to fully exit the industry). Both situation risks an increase, or continuation, of latent effort and inefficiencies in fishing effort (at least in the short run).

Conditional bidding systems have been established in other markets, for example trading environmental offsets in Victoria (Nemes, Plott and Stoneham 2008). *BushBroker* allows developers to find people who are willing to sell rights to their land for enduring native vegetation offsets. For a development to proceed, a combination of native vegetation offsets needs to be secured, often requiring rights to be sourced from a number of potential providers. This system has been operating effectively for a number of years.

Governments implementing fisheries reforms that fundamentally alter the nature and mix of entitlements for commercial fishers could consider establishing a trading system that allows some conditional bidding arrangements.

Box 3.3 Reallocation of rights — concerns and practical considerations

Stakeholders expressed concern about the need to buy additional licences to maintain current fishing practices:

Smaller operators who do not wish to invest everything into the industry and who perhaps have been bringing up families or investing in other industries should not face the prospect of having to sell their house to stay in this industry. (Commercial fisher comment 1)

The need to borrow huge sums of money to buy up other fisher's entitlements to stay in business. (Commercial fisher comment 6)

The complexity of allocating new rights can be seen with the recently announced reforms in New South Wales. One of the fisheries being moved to quota is the Ocean Trap and Line – Line East fishery. That fishery will have quotas for four species of fish and a fifth quota that covers three fish. It is likely that quota allocations will be based on average catches for fishers operating in each fishing zone in the state.

The new quota rights will be transferable across the state. As such, if a fisher does not have similar catch shares to other fishers in their zone, they will need to trade to achieve their preferred mix of rights. There are likely to be numerous combinations of rights that would satisfy the fisher's desired outcome. The fisher will need to determine what those favourable combinations might be and how to achieve them. The most favourable combination will depend on the prices for quota rights from each zone, which will not be known ahead of the need to trade. The possible combinations will be complex.

Given that some fishers operate in multiple fisheries, quota trading between some fisheries is allowed, and some fisheries require a minimum number of entitlements to be held to use fishing rights, determining a usable combination of rights could be complex for some fishers.

Ideally, fishing businesses going through an adjustment process should seek advice about their financial options. The recently announced reforms to the New South Wales fisheries

have included grants for fishers to seek independent financial advice (DPI NSW 2016a). The experience in New South Wales should be helpful for other jurisdictions in deciding if subsidising financial advice would be beneficial.

The question of compensation

There are many complicating factors associated with determining whether and the extent to which compensation should be paid (box 3.4). Some fishers were historically given, or paid very low fees for, their entitlements, while others have recently purchased rights at closer to their full value.

For fishers who have newly acquired rights (particularly if they borrowed to buy the rights or purchased vessels and equipment to use those rights), they would likely demand compensation that covered all of their expenditure and the present value of future earnings. Fishers who have held their rights for an extended period may feel entitled to compensation for surrendering their entitlements.

It is also sometimes difficult to differentiate between ‘active’ and truly dormant rights, which factor into questions of value. Rights may not be fully utilised at any point in time, for example, because of illness or injury, or because of a run of years when target stocks have been too low.

Some governments are required to provide compensation for rescinding or removing some types of rights (such as in New South Wales) while the rights to compensation in others depends on the reason for the change (such as in Queensland, where no compensation is required if rights are removed so as to protect animals other than fish).

Many governments have been reluctant to fund compensation without a hypothecated funding source (such as an industry levy).¹³ Accepting that compensation is often needed to progress reform, the sector needs to also be realistic about future prospects and the need for reform to enable improved sustainability, productivity and profitability.

There may be scope to reduce the need to compensate for fisheries reforms in the future. Ideally, future fishing rights should not be perpetual, and should be provided for a limited number of years (sufficient to encourage investment in the industry). The greatest scope for time-limited rights is in new fisheries, but there may also be scope when adopting ITQs or ITEs.

¹³ One of the attractions for governments of moving straight to a market based mechanism is that, under such a mechanism, the industry itself needs to partially fund the adjustment.

Box 3.4 **Should current fishers be compensated for loss of fishing entitlements?**

The legal basis of fishing rights varies in Australia. Most fishing rights either bestow perpetual rights to fish, and even in instances where perpetual rights are not granted, current holders are protected from having their rights assigned to other fishers.

In many instances, commercial fishers are legally entitled to be compensated if their rights to fish are revoked. But what should they be compensated for?

There are two types of losses that commercial fishers could make if their fishing rights are revoked:

- the loss of value of their fishing right
- the loss of potential future earnings.

One of the problems with input controlled fisheries is that the value of fishing rights tends to be very low. Compensation based on the value of fishing rights is, therefore, often opposed by commercial fishers.

One of the challenges with compensating for the loss of future earnings is determining a fair basis for the compensation. For example, should fishers receive the same level of compensation even if they paid vastly different amounts to obtain the rights?

Pragmatically, reform of commercial fisheries management is likely to be delayed if compensation is not provided (even to those who are not legally entitled to compensation).

A range of structural adjustment packages have been used in Australia. Some of the practical problems that have arisen include that:

- fishers have not exited the industry, but moved to other fisheries — potentially adding to sustainability and viability issues in other fisheries
- concerns have been raised about viability impacts when part of the funding of compensation packages have been raised through industry levies (Shark Bay Prawn Trawlers Association, sub. 55)
- compensation schemes have established expectations about the generosity of future schemes
 - when generous compensation is provided, it can encourage people to enter fishing in the hope of a buyout.

Multi-species fisheries

Evolving management techniques are overcoming some of the limitations associated with management of multi-species fisheries. For example:

- the Australian Fisheries Management Authority (AFMA) is developing an approach that would set the total allowable catch (TAC) for lower-value fish in multi-species fisheries differently to high-value fish. The TAC for high-value fish would be set at levels that would generate the maximum economic yield (an approach designed to maximise the value of the extracted fish over time — see chapter 2). For lower value fish, the TAC would be set according to maximum sustainable yield, which would

allow higher levels of catch. This approach would make it less likely that the catch of lower value fish will constrain overall catch in multi-species fisheries

- the Western Australian Government has applied a tradeable quota to one species in the Gascoyne Demersal Scalefish fishery — pink snapper. The catch of other fish is based on ITEs that are linked to each fisher's quota for pink snapper.

While multi-species fisheries are likely to continue to present challenges, the work of AFMA and the Western Australian Government indicates that the scale of problem can be reduced.

Next steps

The Commission considers that the problems asserted in relation to the implementation and operation of ITQs are not insurmountable. The overwhelming view on best practice fisheries management favours the use of ITQ systems where technically feasible and cost effective.

Given this, the Commission considers that all governments should move each of their fisheries to ITQ management unless it is demonstrated that this is technically impractical or not cost effective for the individual fishery. A policy directive in these terms is already in place for Commonwealth fisheries managed by AFMA (Macdonald 2005, p. 3). In instituting reforms, governments should first remove latent effort, and address hindrances to moving to or operating efficiently under the new arrangement. Such steps should reduce the scope for unintended adverse outcomes from moving to ITQs, and lessen the adjustment costs faced by commercial fishers.

If individual transferable quotas are not used, fisheries should be managed using individual transferable effort systems, which would at least provide a market-based mechanism for ensuring that entitlements are used, and used by the most efficient fishers.

DRAFT FINDING 3.1

Output controls, in particular, individual transferable quota systems, provide a more effective and efficient way of managing commercial fisheries than controls over methods of fishing (input controls).

There is scope to improve the implementation of individual transferable quota systems and increase their take-up.

Fisheries that are not amenable to aggregate catch limits due to highly variable fish stocks would be more efficiently managed through individual transferrable effort systems than current input controls.

DRAFT RECOMMENDATION 3.1

The Northern Territory and all state Governments should move each of their fisheries to an individual transferable quota management system unless it is demonstrated that this is technically impractical or not cost effective. If individual transferable quotas are not used, fisheries should be managed using individual transferable effort systems.

The Australian Government should complete the move of its fisheries to either individual transferable quota or individual transferable effort systems.

Governments should publicly release reasons for the approach taken to each fishery.

If an individual transferable effort system is likely not to be cost effective, policy makers should examine the scope for reducing other regulatory costs and the fundamental viability of the fishery over the longer term.

3.3 Scope for improvement in other management and regulatory arrangements

This section considers whether there are any impediments to the establishment of new fisheries and the scope for reducing other regulatory costs and imposts.

Trial fisheries

Opening new fisheries is one means available to government of raising the landed value of commercial fishing. For a new fishery to be viable, a previously unfished stock with potential commercial value needs to be identified.

Each jurisdiction has clear policies that explain the process that commercial fishers need to follow to apply for consideration of new fisheries. The onus for identifying potential new fisheries rests, as it should, with the commercial fishing industry.

Examples of trial or exploratory fisheries include:

- the Kimberly Developing Mud Crab fishery in Western Australia
- Patagonian toothfish, Antarctic toothfish and mackerel icefish in the ocean areas covered by the Commission for the Conservation on Antarctic Marine Living Resources.

There may be scope for unexploited (or lightly exploited) species to be developed into a larger commercial market. For example, some of the success of commercialising orange roughy has been attributed to changing the name of the fish from slimehead (Jacquet and Pauly 2008). Similarly, promotion campaigns could aim to highlight the benefits of species

that are known to exist in exploitable densities, or even species that are expanding in biomass or spreading into jurisdictions because of climate change.

Other areas for improvement

Greater use of technology

Compliance activities are being undertaken more comprehensively and efficiently through the use of technologies such as electronic vessel monitoring systems, electronic data lodgement systems and onboard video surveillance. Increased mobile phone coverage and satellite broadband services will increase the number of fisheries where electronic systems can be used. In addition, advances in miniaturisation technology and/or further reductions in the price of such electronics will make it more feasible to use these systems on smaller commercial boats, including boats without cabins.

At present, the use of these technologies involves substantial upfront costs, and may not be warranted (or practical) in all fisheries. However, there is scope for greater use in higher-value/risk fisheries and streamlining of arrangements where fish stocks cross multiple jurisdictions (chapter 6). For example:

Although the scallop fishery is based on a single stock ... the fishery is managed by three agencies ... and two [of those] agencies running Vessel Monitoring Systems (VMS) to track vessels in the fishery. All this for a fishery that has 1012 dedicated vessels and an annual Gross Value of Production of less than \$6 million. (Richey Fishing Co., sub. 30, p. 2)

Reducing other regulatory costs and imposts

Keeping regulations and costs in check

Commercial fishing is an activity that has been closely regulated in Australia for over thirty years. Over that time, the regulatory challenges and objectives have altered. For example, the impact of fish take on the wider ecosystem is better understood, the scale and locations of recreational fishing, diving and other marine activities have increased and the abundance and location of threatened and endangered species have changed.

The regulatory response to these changes has typically been to overlay new requirements onto existing fisheries management practices. The Queensland Department of Agriculture and Fisheries observed:

Queensland's current fisheries management arrangements are based on approaches developed in the late 1970s. They are cumbersome, costly to administer, inflexible and increasingly less effective in ensuring the sustainability of the resources and the economic viability of the existing industry sectors. (DAF Qld 2016b, p. 3)

Specific concerns raised with the Commission included:

-
- the failure to remove historical controls as they are replaced with new regulatory controls (Wildcatch Fisheries SA, sub. 10, comments, 3 and 10)
 - inconsistencies in administrative arrangements between fisheries in the same jurisdiction (Northern Territory Seafood Council, sub. 43)
 - the lack of review of the effectiveness of previous reforms (Wildcatch Fisheries SA, sub. 10)
 - inconsistent or duplicative management practices where responsibility for a fish stock or expanses of water are shared by two or more governments (chapter 6)
 - seemingly arbitrary decision-making, including on resource access and allocation (chapter 2).

In addition to statutory reviews of fisheries laws, fisheries regulators should regularly review whether the specific controls and management arrangements applying to fisheries are still appropriate for each fishery. There seems scope for some streamlining and simplification – as noted, new technologies (including electronic data collection systems) allow more efficient monitoring of fisheries and market mechanisms, as described above, require less prescriptive arrangements.

Some specific suggestions for regulatory improvement from stakeholders are outlined in box 3.5. It would be prudent to review fishery-specific management controls in conjunction with reviews of harvest strategies (that is, at least every five years). The latter should also review the specific objectives of the fishery in any re-setting of harvest controls. Reviews should invite public input and publish results.

As discussed elsewhere in this report, improving the basis for, and transparency of, fishery access decisions and rationalising government responsibility for the management of cross-jurisdictional fish stocks should also reduce costs and improve certainty for commercial fishers.

Box 3.5 Participant suggestions on areas for improvement

Fishers suggested that the following be reviewed:

- in Western Australia, the requirement that catch and effort reports must be submitted on paper forms instead of electronically. This raises costs and could reduce the timeliness and usefulness of the information for fisheries managers.
 - one participant requested that, so long as paper forms are used, the number of fields for reporting each species caught should be increased to allow full and accurate reporting (comment. 8)
- the notification arrangements for state-run regional harbours in Western Australia — in particular, the need to provide proof of insurance for vessel survey certificates for each facility used (comment. 8)
- in Queensland, requirements that fishers have to report on compliance matters that are not related to their fishery or the gear they use (comment. 1).
- in Tasmania, in individual transferable quota systems, agreement has been reached to allow some under-catch to be rolled over to the following year's quota, but information management systems have not been amended to recognise this (comment. 9).
- in the Northern Territory, the electronic lodgements system could be made more efficient by preloading common species names that fishers catch (comment. 5).

DRAFT RECOMMENDATION 3.2

The Australian, state and Northern Territory Governments should ensure that commercial fishing regulations are reviewed regularly to ensure they remain 'fit for purpose' against clearly articulated policy objectives. At minimum, reviews should occur when harvest strategies are revised.

Cost recovery arrangements

Several stakeholders have questioned the transparency of cost recovery decisions (for example, Southern Rocklobster Limited, sub 22; South Australian Rock Lobster Advisory Council, sub. 28 and Seafood Industry Victoria, sub. 44) or expressed concern about the lack of clear reasoning behind the provision of some services.

The fees have continued to rise and with full cost recovery planned it would seem there is an urgent need to justify why we should pay to have ourselves continually removed, restricted, reformed and reviewed (NSW Wild Caught Fishers Coalition, sub. 41, p. 9)

In fisheries that are cost-recovered, information should be readily available on the services for which costs are recovered and the rationale for them. While this is essential for allocative efficiency, industries have a financial incentive to identify and alert regulators to potential savings, and so can contribute to improving the cost efficiency of management. Chapter 10 further discusses cost recovery arrangements.

Impact of land planning and marine infrastructure

Commercial fishers have raised concerns about the impact of coastal planning arrangements and shore based developments on fishing businesses (Queensland Seafood Industry Association, sub. 29 and NSW Wild Caught Fishers Coalition, sub. 41), notably that development proposals do not have to consider the impacts they will have on commercial fishing.

Western Australia and Queensland require coastal development proposals to consider their impacts on commercial fishing. In all other states and the Northern Territory, there are requirements to consider the impacts of land-based developments on marine ecosystems, but these are often limited to examining the impact on threatened and endangered species. Such provisions are unlikely to address all the ways that land based developments can adversely impact on commercial fishing. Other states and the Northern Territory should implement similar provisions to those in Western Australia and Queensland.

Concerns have also been raised about marine planning and infrastructure in several states¹⁴, including:

- the impact of changed effluent outflows on fish and the quality of marine environments
- closure of commercial fishing areas to establish new marine reserves or recreation-only fishing grounds (see chapter 2)
- the location of artificial reefs designed to improve the amenity of recreational fishing or to reduce the impact of storm surges on coastal erosion.

Small changes in chosen locations can significantly affect the operating costs of commercial fishers. For example, they can increase the distance commercial fishers have to travel before they can start fishing, or if the locations are in the middle of existing trawl runs, it may require fishers to haul and reset their nets to avoid the new obstacle, or may make them abandon using the entire trawl run. In a similar way to coastal development, proposed marine developments should take into account their potential impacts on commercial fishers.

DRAFT RECOMMENDATION 3.3

State and territory governments should take into account any impacts of proposed planning and land/marine use developments on the commercial fishing sector.

¹⁴ GA and MJ Stevenson, sub. 26; Queensland Seafood Industry Association, sub. 29; NSW Wild Caught Fishers Coalition, sub. 41 and Western Australian Fishing Industry Council, sub. 45.

3.4 Food security, sufficiency and worker safety

Several stakeholders raised concerns regarding food security and self-sufficiency goals for wild caught seafood. Commercial fishers also raised concerns about the poor safety record of the commercial fishing industry and uncertainty about which agencies have regulatory responsibility for reviewing workplace safety for commercial fishers. These are discussed below.

Food security

A number of participants raised concerns about ‘food security’ in Australia.¹⁵ While there is some commonality in views, there are major differences in both perceptions as to the nature of the problem and suggested solutions.

Wildcaught Fisheries SA argued for a change in fisheries management practices, in part on the basis that the seafood industry plays a role in ensuring food security. In this instance, ‘food security’ appears to mean placing a high value on the consumption of seafood, as well as ecological sustainability.

Core objectives for fisheries management should not just be based on stock sustainability but must be driven by effectively generating economic and social benefit to the owners of the resource and in providing for the production of a key food source that underpins food security. (sub. 10, p. 6)

Several participants considered that political and climatic instability would affect the stability of food supply and sought intervention to support the seafood production industry.

Food security is a necessity in a world suffering food shortages and facing the effects of climate change. The commercial harvesters of sustainably caught or grown foods (sea and land) require protection via government mandates to ensure future production for domestic and global demand. (NSW Wild Caught Fishers Coalition, sub. 41, p. 11)

A change of political priorities is urgently needed with regard to fisheries management. Long-term food security is a significant concern for the future. (Queensland Seafood Industry Association, sub. 29, p. 4)

Political, economic and climatic instability places greater importance upon the need for food security policies to be in place. In consequence of this need, the service provided by commercial fishermen in supplying food for the public at large needs to be valued much more and commercial fishermen should have priority of access to fisheries resources ... (GA and MJ Stevenson, sub. 26, p. 10)

The most commonly cited definition of food security comes from the most recent World Food Summit.

¹⁵ National Aquaculture Council, sub. 2; Wildcatch Fisheries SA, sub. 10; GA and MJ Stevenson, sub. 26; Queensland Seafood Industry Association, sub. 29; Australian Barramundi Farmers Association, sub. 34 and NSW Wild Caught Fishers Coalition, sub. 41.

Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (FAO 1996).

Based on the World Food Summit definition, Australia is not at risk of food insecurity as there is no lack of fish availability. Fish production globally is outstripping population growth and international seafood prices are declining. In addition, Australia has strong links to international seafood suppliers.

The growth in global seafood production has almost exclusively arisen from increased aquaculture output. The scope for aquaculture to bridge the gap between demand for fish and the capacity of the wild caught sector (both domestically and globally) to meet that demand was noted several industry participants (National Aquaculture Council, sub. 2 and Australian Barramundi Farmers Association, sub. 34).

The impacts of climate change on food production systems will vary, not only based on the food being produced, but with the location of production. Fish production is no different. For example:

- it has recently been estimated that the wild stocks of cephalopods have been increasing in recent years (a trend that is likely to continue with rising water temperatures)
- reports indicate that the location of fish stocks in Australian waters have changed in recent years
- for aquaculture, production of temperate zone stocks has been hampered by higher water temperatures — including salmonoids in Australia
- but climate change is likely to expand areas suitable for warmer water aquaculture practices.

Concerns have been raised about the safety of imported seafood, and the lack of consumer knowledge as to the source of their seafood purchases. Chapter 9 examines issues of labelling and food safety. The Commission is satisfied that the current food safety system applying to both domestic and imported seafood provides sufficient protections, including for imported seafood.

Self sufficiency

Concerns have been raised with the Commission that current fisheries regulation undermines self-sufficiency in wild caught seafood.

As noted previously, Australian wild caught seafood production has declined and the level of imported seafood has increased.

It is unlikely that Australian wild caught seafood production could be expanded sufficiently to achieve self-sufficiency without creating unacceptably high risks of overfishing. As in trade generally, it is also often more efficient to purchase fish from

foreign producers who can fish at lower costs. Even if the concept of food self-sufficiency was accepted, there is little integrity to an argument that a country be self-sufficient in every food type.

Safety in commercial fishing

Commercial fishing involves a range of activities that present inherent personal safety risks. These risks include the use of gears, winches and electrical systems in a marine environment. Marine and weather conditions also raise the potential for accident and injury.

Internationally, commercial fishing is generally considered to be the most dangerous occupation (FAO 2014; OECD 2015). In Australia, safety statistics for commercial fishing are generally not reported on their own, but rather data is aggregated across agriculture hunting, fishing and aquaculture together. That aggregate group typically has the highest reported rate of workplace fatalities of any industry grouping; around 13 fatalities per hundred thousand workers (Safe Work Australia 2015). The average rate for all industries is under two fatalities per hundred thousand workers.

While not routinely published, the number of work-related fatalities in the commercial fishing sector is recorded in health and safety statistics. The two to nine fatalities per year that occur in commercial fishing (table 3.2) is a small percentage of total work related fatalities for the country (which have varied between 188 and 310 over the same period) (Safe Work Australia 2015, p. 7). However, the standardised rate of fatalities per worker is well above the national average.

Table 3.2 **Reported commercial fishing work related fatalities**
2004-2014

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Fish trawling, seining and netting	5	5	5	0	2	2	0	2	0	2	1
Line fishing	0	0	0	0	0	0	1	0	0	2	0
Other fishing	3	1	0	3	1	0	0	2	2	1	1
Prawn fishing	1	0	0	0	4	5	0	0	0	2	0
Rocklobster and crab potting	0	0	0	0	2	0	0	1	0	0	0
Total	9	6	5	3	9	7	1	5	2	7	2

Source: Data supplied by Safe Work Australia.

The Commission has been informed of some fishing regulations that either discourage the adoption of safer commercial fishing practices or require actions that can place the safety

of commercial fishers at greater risk. For example, limits on ‘soak time’ (the length of time nets or traps can be left in the water) can require fishers to retrieve gear in dangerous conditions.

The Commission has also been informed of the safety concerns commercial fishers have when operating on their own. In particular, where fishing rules restrict the number of fishers who can be on board vessels when fishing occurs. This concern was most commonly raised in New South Wales, although the Commission has been informed that the recently announced reforms will address this issue.

Commercial fishers and regulators should work closely together to ensure regulations are regularly reviewed so that they remain practical and effective at reducing the risks of injury and fatality in the sector.

Regulatory responsibility for workplace health and safety in commercial fishing is unclear. Based on the investigation of fatalities that have occurred in commercial fishing, lead responsibility is sometimes taken by maritime safety authorities, sometimes by fisheries authorities and sometimes by workplace health and safety regulators.

The current transfer of maritime safety responsibility for commercial fishing from the states and territories to the Australian Government has exacerbated the uncertainty over regulatory responsibility. Governments should seek to ensure that there are good linkages between work health and safety and maritime regulators (including in relation to the sharing of information on incidents) and make clear which agencies are responsible for different types of incidents.

4 Recreational fishing

Key points

- There are millions of recreational fishers, and the rising sophistication and affordability of scanning technology and vessels has increased fishers' ability to fish further offshore and more intensively. Harvest and management strategies need to reflect this trend.
- Implementation of a well-designed licensing system is a key step for better managing recreational fishing (and would extend arrangements already in place for some jurisdictions). Licensing would provide:
 - a better basis for monitoring effort and allocating access to resources
 - a means to better target information and educational resources
 - a means for directly conveying and enforcing access conditions, especially for high-risk fisheries
 - a source of revenue for recreational fishing management, research and facilities for recreational fishers
 - a sampling frame for surveys to monitor catch, gear used, expenditure, social impacts and the value derived from recreational fishing.
- Controlling take is more difficult for recreational fishing than for commercial fishing given the diversity and dispersion of recreational activity.
 - When bag, size and gear limits are ineffective, alternatives such as tagging should be considered before more stringent controls, such as area bans.
 - More research on the effectiveness of catch and release methods in deep waters is warranted.
 - Penalties and the resources employed for enforcement should be proportional to the level of risk to the sustainability of fisheries.
- The existing ad hoc jurisdictional and regional surveys do not provide adequate information for understanding, managing and developing Australia's recreational fisheries. Regular and systematic collection and collation of evidence on recreational fishing is required.
 - A national survey co-funded by all jurisdictions, including the Australian Government, should be conducted in 2017-18 and followed up by five yearly surveys, whether at the national level or on a coordinated jurisdictional basis.

Recreational fishing is fishing for personal consumption, sport or other enjoyment. Fish that are caught may be retained (consumed or shared) or released, but legally may not be sold. Recreational fishing is sometimes, but inaccurately, seen as an inconsequential adjunct to commercial fishing. This neglects that the community places a large social value on recreational fishing, with millions of Australians fishing each year. Moreover, recreational catches can now rival or exceed commercial catches for some species, and

recreational fishing practices can have adverse effects on non-target species (by catch) and ecosystems (Recreational Fishing Advisory Committee 2010 and section 4.1).

Concerns about the impact of recreational fishers have heightened with population growth (and hence growth in the number of fishers) and the greater sophistication and affordability of scanning technology and vessels. For example, sonar-based fish finders incorporating GPS are enabling fishers to reach a broader range of species, and fish more intensively. Improvements in navigational and safety equipment and vessels themselves have also resulted in more recreational fishers venturing into Commonwealth waters.¹⁶

Demand for access to certain fishing areas or species by the recreational fishing sector has also contributed to significant tension in some states. The extent of competition for resources is difficult to assess as there is little information on shifts in activity and catch. This limits the scope for regulators to objectively reflect demand for recreational fishing in decisions on access to resources, and/or in the provision of additional services for recreational fishers.

It is probable that the recreational sector's impact on fisheries will grow with population growth and utilization of new fishing technologies. In catch-constrained management regimes, it is not practical or consistent with policy aims for the regulatory approach to be one of ad-hoc intervention or neglect.

The recreational fishing sector as defined for management purposes comprises a diverse range of people with different incentives for, and patterns of, fishing. They fall into three groups:

- independent recreational fishers, who are more likely to fish from shore or in smaller boats
- game and sports fishers, who tend to use sophisticated vessels and gear, and target large pelagic fish, such as marlin, sailfish, tuna, wahoo and giant trevally
- charter vessel operators, who provide fishing experiences and expertise on a commercial basis.

The rest of this chapter discusses the importance of recreational fishing (section 4.1), the need for a licensing system to efficiently manage and sustain the relevant fisheries (section 4.2), the distinctive regulatory and enforcement requirements for this part of the fishing sector (sections 4.3 and 4.4), and the imperative for more accurate, timely and comprehensive data on recreational fishing (section 4.5).

¹⁶ For example, Reefish Australia (2010) reported that in some regions such as Narooma and Bermagui, 47 per cent of fishing trips occurred in Commonwealth waters.

4.1 Current estimates of participation and catch

Recent state and territory wide studies indicate that a significant proportion of Australians fish, with the majority of jurisdictions estimating participation rates of around 20 per cent (table 4.1).

Table 4.1 Most recent estimates of statewide participation in recreational fishing

<i>Jurisdiction</i>	<i>Survey/study</i>	<i>Participation</i>
NSW/ACT	2013-14 NSW survey of recreational fishing	Nearly 850 000 NSW/ACT residents aged five years and older fished at least once in Australian waters in the twelve months prior to June 2013, representing a participation rate of 12 per cent.
Victoria	2013-14, Ernst and Young Economic Study of Recreational Fishing	In 2013-14, almost 840 000 adults participated in recreational fishing in Victoria representing a participation rate of 22 per cent.
Queensland	2013-14 Statewide Recreational Fishing Survey	An estimated 642 000 Queenslanders, or 15 per cent of the Queensland population aged 5 years or older, went recreational fishing in Queensland in the 12 months prior to November 2013.
South Australia	2013-14 SA Recreational Fishing Survey	An estimated 277 000 SA residents aged 5 years or older fished at least once, representing a participation rate of 18 per cent of the SA population.
Western Australia	The National Recreational and Indigenous Fishing Survey 2000-01	An estimated 480 000 or 29 per cent of the population of Western Australia (aged 5 years or older) fished in the 12 months prior to May 2000.
Tasmania	2012-13 survey of recreational fishing in Tasmania	About 98 000 Tasmanian residents aged five years or older fished in Tasmania at least once in the 12 months prior to October 2012, representing a participation rate of almost 22 per cent.
Northern Territory	2009-10 survey of recreational fishing in the Northern Territory	In the 12 months prior to April 2009, an estimated 32 000 non-indigenous NT residents aged five years and older fished at least once in the NT, representing a participation rate of 22 per cent or more than one in five residents.

Sources: West et al. (2015); EY (2015); DAFF (2015c); Henry and Lyle (2003); Giri and Hall (2015); West et al. (2012).

A small number of fishers account for the majority of fishing effort, with recent data from New South Wales/Australian Capital Territory, South Australia, Tasmania and the Northern Territory showing that around 20 per cent of fishers in each of these jurisdictions accounted for between 55 and 60 per cent of total fishing days (effort).

Boat-based recreational fishing accounts for about 50 per cent of catch and effort for the recreational sector in several states.

- 53 per cent of recreational catch was from boat-based fishing in Queensland in 2013-14 (DAF Qld 2015c).

- In New South Wales, boat-based and shore-based fishing accounted for equal proportions of the total catch (kept and released) of all organisms taken by New South Wales/Australian Capital Territory recreational fishers during 2013-14 (West et al. 2015).
- In South Australia in 2013-14, boat-based fishing effort (60 per cent of fishing effort) was higher than the shore-based effort (Giri and Hall 2015).

Surveys are undertaken on an ad-hoc basis and there is therefore little information on shifts in fishing activity and catch. Relatively recent data indicates, however, that the total catch from recreational fishing is often less important than recreational catch of a particular species. For some species, the recreational take rivals or exceeds that of the commercial sector (box 4.1).

Box 4.1 Significant recreational catch of key species

Many species are harvested by recreational and commercial fishers and in some instances recreational catch is estimated to exceed commercial catch.

- The 2013-14 New South Wales survey of recreational fishing estimated recreational harvest weights for 10 key species and compared these with commercial fisheries data. It found that recreational catch exceeded commercial landings for five of the 10 species - dusky flathead, sand flathead, mulloway, tailor and yellowtail kingfish (West et al. 2015).
- Queensland's 2013-14 recreational survey estimated that the recreational harvest of snapper and yellowfin bream are similar to the commercial harvest, whereas the recreational harvest of dusky flathead is more than twice the commercial harvest (DAF Qld 2015c).
- The 2013-14 South Australian Recreational Fishing Survey estimated that the recreational harvest exceeded commercial production for King George whiting (58 per cent of the total harvest) (Giri and Hall 2015).
- The 2012-13 survey of recreational fishing in Tasmania estimated the annual recreational harvest of flathead at 236 tonnes, almost six times the commercial take. The shares of key species taken by the recreational sector in the Tasmanian commercial scalefish fishery were similar to or larger than that taken by commercial fishers for blue warehou, flathead, flounder, mullet, cod, barracouta, jackass morwong, jack mackerel, striped trumpeter, and southern calamari (Lyle, Stark and Tracey 2014).

Beyond survey evidence, some states have licensing arrangements that provide information on the number of independent recreational fishers (table 4.2). However, these provide a partial and inconsistent picture because of incomplete coverage of certain types of fishing and significant exemptions. In Victoria, for example, only one third of the number of people who fish are licensed.

All jurisdictions except Victoria and Tasmania have licensing arrangements for charter boat operators. Jurisdictions with licensing require the collection of catch and effort data through the keeping of logbooks (as does Tasmania, though on a voluntary basis), but limited information was available to the Commission on charter fishing activity. Data for Queensland and South Australia show that participation in charter fishing and the rate of

catch has been declining over the past 10 years (box 4.2). In New South Wales, 204 charter boat licences were issued in 2014 out of a total cap of 276 (which was set in 2000).

Table 4.2 Recreational fishing licensing — independent fishers

<i>Jurisdiction</i>	<i>Licensing</i>	<i>Number of licences^a</i>	
New South Wales	Licence required for all types of recreational fishing activities, but with exemptions for: people under 18 or over 60 years of age; an adult assisting a person under the age of 18 years; an Aboriginal Australian; and the holders of pension or veterans affairs concession cards.	197 793	3 day licences
		70 921	1 month licences
		131 388	1 year licences
		103 716	3 year licences
		503 818	total licences
Victoria	Licence required for all types of recreational fishing activities, but with exemptions for: people under 18 or over 70 years of age; holders of a seniors card, veterans affairs card; some Commonwealth pensioner concession cards; and members of traditional owner groups.	34 699	3 year licences
		122 692	1 year licences
		28 791	28 day licences
		102 316	48 hour licences
		288 498	total licences
Queensland	No licence required for marine fishing.	NA	
South Australia	No licence required but registered rock lobster pots must be used to catch southern rock lobster for personal use.	4 261	registration holders
		7 533	registered pots
Western Australia	Licensing is oriented to valuable species and to certain methods of fishing. Licence required for abalone, rock lobster, marron, net fishing and fishing from a boat. Half fee concession for: people under 16 years of age; the holders of a seniors card; recipients of the age, disability support or widows pension; a pension under the Coal Industry Superannuation Act; and recipients of a Veterans Affairs entitlement.	139 855	fishing from boat
		52 013	rock lobster
		17 064	abalone
		16 738	net fishing
		10 962	marron
		236 632	marine licences
Tasmania	Licensing is oriented to valuable species and to certain methods of fishing. Licence for saltwater rod and line fishing not required. Recreational sea fishing licence required for abalone, rock lobster dive, rock lobster pot, rock lobster ring, scallop, graball net, mullet net, beach seine nets and any type of set line (including dropline or longline).	16 232	rock lobster pot
		12 100	abalone
		8 745	rock lobster dive
		7 887	graball net
		4 585	rock lobster ring
		3 354	scallop dive
		4 510	set line
		1 118	beach seine net
		855	mullet net
		59 386	total licences
20 792	licenced fishers		
Northern Territory	Licence not required except for a temporary licence for fishing on and over Indigenous land and adjoining waters.	NA	

^a New South Wales, Victoria, South Australia and Tasmania licence numbers in 2014-15 and Western Australia licence numbers as at May 2016.

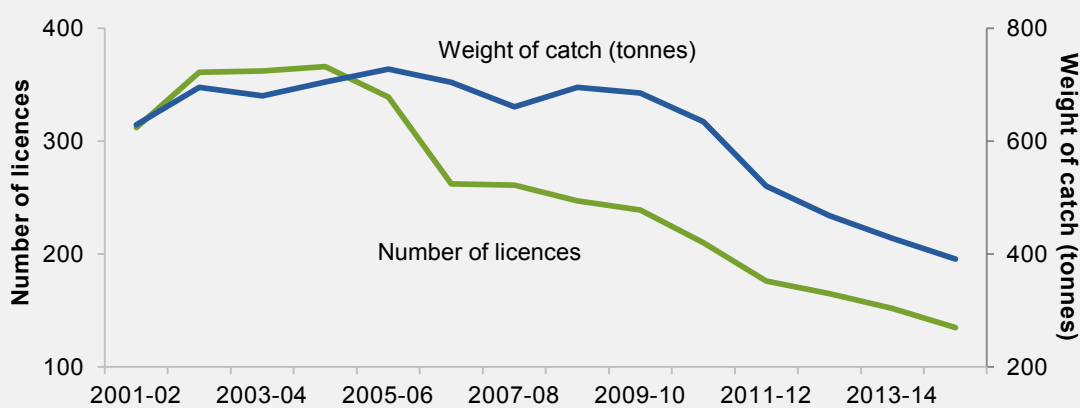
Source: Information supplied by state and territory governments.

Box 4.2 Charter fisheries licensing, Queensland and South Australia

Queensland

Un-capped licensing for all charter fishing operations was introduced in 1995. In 2006-07 licencing arrangements were changed to require only offshore charter boats to be licenced and, accordingly, licence numbers fell (from 339 in 2005-06 to 262 in 2006-07). Catch nevertheless remained relatively stable (727 tonnes in 2005-06 and 704 tonnes in 2006-07). In the past decade the number of licences purchased has progressively fallen (to 135 licences in 2014-15). This has corresponded with a fall in catch (to 391 tonnes in 2014-15 — see chart below).

Licences and catch, Queensland charter boats



Source: Information provided by the Queensland Government.

South Australia

Charter boat fishery licences are issued for the term of periodic charter boat fishery management plans. The current plan is effective from August 2011 until June 2021. In 2014-15 there were 105 licences. No new licences are currently being issued, but licences may be purchased from existing holders. In recent years, there has been a decline in active licenses, and considerable decrease in the number of clients, trip days and catch.

Charter boat fishery, South Australia, data summary

	Number of licences	Number of active licences	Number of clients	Number of trip days	Number of fish retained
2007-08	108	78	21 960	3 640	143 276
2008-09	108	79	21 431	3 561	147 991
2009-10	109	77	21 846	3 552	147 984
2010-11	109	77	20 095	3 322	136 611
2011-12	109	77	23 711	3 566	153 468
2012-13	109	75	23 532	3 391	132 721
2013-14	105	74	19 227	2 830	113 842
2014-15	105	61	15 129	2 388	94 917

Source: Tsolos and Boyle (2015).

4.2 Towards better management

A well-designed licensing (or permit) system for all recreational fishers (including independent fishers, charter fishing operators and sports fishers) is a key step for managing recreational fishing. While some states have a licensing system in place these could be better used to collect more comprehensive information, and manage and support activity. The licensing of fishers is used as a key strategy in the management of many recreational fisheries worldwide.

Registration systems would be another option for collecting information, but do not have the benefit of clarifying the rights and responsibilities associated with access to marine fisheries. In contrast, licensing provides:

- a direct means of communicating to recreational fishers their role and responsibility in the stewardship of fish and marine resources and links this to access conditions (allowed duration of fishing, fishing methods, and/or bag, species or size controls)
- a basis for more targeted education
- a mechanism for recovering costs from recreational fishers
 - cost recovery provides a means for better linking services provided by fishery agencies to those demanded or required by recreational fishers (this is considered further below)
- information on ‘demand’ for fish species and/or fishing, and where people most like to fish
 - licensing would therefore provide Queensland, South Australia and Northern Territory (in regards to independent recreational fishers) and Victoria and Tasmania (in regards to charter fishing) a better basis for monitoring effort, enforcing controls and developing services for recreational fishers
- good sampling frames, therefore enabling better designed and efficient surveys of fishers (box 4.3; surveys are further discussed in section 4.5).

For charter boat operators, a condition of licensing in most states is the maintenance of logbooks recording both catch and effort data, which appropriately reflects their greater incentives to maximise take.

The adoption of licensing systems by all states and the Northern Territory would support consistency in cross-jurisdictional fisheries, where currently only some recreational fishers are licensed.

In sum, licensing provides a practical and proportional way of better incorporating recreational fishing into harvest and other management strategies. Taking this action will reduce the risk and likelihood of more draconian measures to manage and mitigate the impacts of the sector down the track. The Commission considers that all jurisdictions should require recreational fishers to obtain licences (or permits) to fish. The Australian

Government should consider licensing if it takes on greater responsibility for the management of recreational catch (chapter 6).

Box 4.3 Licensing and sample frames for surveys

The scale and diversity of recreational fishers makes it difficult to identify and target a representative sample of the recreational fishing population for survey. Where recreational fishing licences have been introduced, benefits have included a reduction in the cost of screening surveys, an increase in the speed with which surveys are completed, and greater confidence in the outcomes (Griffiths et al. 2014). For example, in Western Australia the Recreational Fishing from Boat Licence was primarily designed to generate a database to target surveys and more precisely determine recreational catch and effort (DoF WA 2012a).

In the absence of a license system, a survey sampling frame is generally established through telephone screening. This involves randomly phoning households in order to obtain information on those fishing, or intending to fish, and to recruit a selection of fishers to a longitudinal diary survey to obtain trip-specific catch and effort data.

Telephone screening can be costly and time consuming. Further, the efficiency and effectiveness of telephone surveys has been decreasing over time because of a rising rate of non-response due to the increasing prevalence of telephone marketing, and lower usage of traditional landlines (Griffiths et al. 2014). The CSIRO has found that:

The required large-scale surveys involve estimating participation from general population telephone surveys ... are becoming increasingly inefficient. This is due to incomplete sampling frames, non-response and non-contact issues associated with increasing use of mobile phones and unlisted numbers. The result is highly uncertain participation and effort estimates that are required by scientists to estimate the total catch of particular species by the recreational fishery. (sub. 61, p. 13)

Benefits of sampling from a list of licence holders include reduced cost for the initial screening survey, high response rate, a reduction in non-response bias and improved precision in estimates.

Promoting efficient management through cost recovery

There are compelling grounds for recreational fishers to contribute to the cost of fisheries management. Licensing provides a means for recovering some of the costs from those who generate the need for, and benefit from, regulation, including fishers (the broader principles for cost recovery are discussed in chapter 10).

Recovering suitable costs may also help to ensure that key services can be provided over time, and that they are well targeted and efficient, as those who pay rightly expect services to meet their demands and to do so in a cost-effective way.

The costs that should be recovered relate to government spending that confers benefits solely or largely to recreational fishers, noting that many benefits cannot be attributed to particular individuals. These may include costs or a separable part of the costs involved in monitoring fishing effort and undertaking stock assessments and research for high-risk fisheries (which will help to ensure that regulations are well-targeted and proportionate).

Some stakeholders noted that the lack of licensing arrangements in some jurisdictions has compromised resourcing and effective fisheries management, and led to unjustified cross-subsidies from commercial fisheries. Wildcatch Fisheries SA commented:

Where recreational fishers don't pay licence fees, funds must be provided from general revenue to cover the budget for management, compliance and stock assessment. In South Australia, there is no transparency as to how much money is provided and without such it is alleged that considerable cross subsidisation takes place from the cost recovered fees paid by the commercial sector.

The failure to have a robust funding base to ensure that there is investment in research, management and compliance for and by recreational fishers has seen the ability to support effective fisheries management compromised for over a decade. (sub. 10, p. 5)

In addition to providing a means for recovering the costs of essential services, licensing may provide a means for funding additional services and facilities (such as ramps and fish cleaning tables) for fishers. Several stakeholders considered that this would be beneficial (for example: VRFish, sub. 25; and Merimbula Big Game and Lakes Angling Club, sub. 27).

Licensing charges need to be carefully designed and implemented. The price of licences is a secondary objective to their use to gather information on and manage resource use. The cost of administering current licensing systems on a per fisher basis is currently relatively low, at around \$4 per licence a year.¹⁷ Ultimately, licences should be readily available at low cost for the majority of fishers.

Transparent reporting of costs and services

There is a considerable degree of dissatisfaction with how funds are currently raised and used in some jurisdictions. Stakeholders argued that spending is ad hoc, unpredictable, inefficient and ill-disciplined. For example, Sunfish Queensland noted that in Queensland:

A Recreational Use Fee (RUF) paid by each registered boat owner ... goes to Fisheries - it raises approximately \$4.5 to \$5 million per annum. Originally this fee was for recreational fishing enhancement & covered actions such as Kids Fishing Days, fresh water stocking, tagging, extension, publications, specific enforcement, commercial buy back, advisory committees, liaison officers, grants etc. This was held in a 'trust' fund and the use discussed with recreational fishers. In 2012 the Government decided that the monies would be used at the discretion of Fisheries & added into their budget. Many of the programs were stopped and no consultation with recreational fishers now occurs. Much of this fee is now used for 'core Government business'. (sub. 3. p. 2)

¹⁷ In 2014-15 the Victorian Government reported that it incurred a cost of \$1.06 million in the administration of recreational fishing licences (Victoria State Government 2015) — or a cost of \$3.66 per licence sold. The New South Wales Government incurred a cost of \$2.08 million for recreational fishing fee administration in 2014-15 (DTIRIS NSW 2016) — or \$4.13 per licence sold.

Without explicit cost recovery attached to licensing, and transparency on the level of funding necessary and links to the services provided, it is unsurprising that stakeholders are dissatisfied.

New South Wales and Victoria have established trust funds to distribute the fees collected from recreational fishers. While the expenditure of trust funds is transparent (box 4.4), governance arrangements can limit the timeliness of decision making and they are best suited to the funding of irregular investments in the sector. They are less appropriate for the recurrent expenditures associated with cost recovery such as core management and regulatory services.

Box 4.4 Licence fee disbursement in Victoria and New South Wales

Victoria

Every year the Victorian Government, through the Recreational Fishing Licence Trust Account, disburses revenue derived from the sale of recreational fishing licences to projects that will improve recreational fishing in Victoria. In 2014-15 recreational fishing licence revenue contributed over \$6 million to the Victorian Recreational Fishing Licence Trust Account. Major disbursements from the fund included:

- \$2.2 million to the Recreational Fishing Grants Program which included payments to 83 individual projects including research programs, access and facilities, workshops and come and try fishing days
- \$2 million to fisheries enforcement and education including the deployment of 13 fisheries officers
- \$860 000 in river fish stocking
- \$425 000 to VRFish
- \$186 000 to Fishcare Victoria Inc.

New South Wales

All money raised by the New South Wales recreational fishing fee is placed into the Recreational Fishing Trusts and spent on improving recreational fishing in New South Wales. These trusts are regulated by law and overseen by two committees made up of recreational fishers — one for saltwater and one for freshwater. In 2014-15, about \$15.1 million was raised from licence fees. It was used to fund:

- aquatic habitat protection and rehabilitation (\$1.1 million)
- enforcement of fishing rules (\$2.3 million)
- fishing access and facilities (\$835 000)
- fishing fee coordination and payment network (\$2.6 million)
- education (\$2 million)
- recreational fishing enhancement programs (\$3.4 million)
- recreational fishing haven loan repayments (\$2 million)
- research on fish and recreational fishing (\$2.1 million).

Source: Victoria State Government (2015) and information provided by the NSW Government.

Design and implementation of licensing

Establishing a recreational fishing licensing system will involve some transitional costs, including set-up and ongoing administration, and enforcement costs.

The experience of jurisdictions with licensing systems shows that they need not entail significant regulatory burden or high costs for fishers (for example, permits can be obtained online for a low fee and issued for short or longer-term periods).

For maximum efficiency, licensing systems should have high coverage rates. Governments may exempt certain groups (young children or welfare recipients) from the payment of fees, but there should be few exemptions from being ‘counted’. (Although in some instances, exemptions may be unavoidable, for example in isolated regions where licences are difficult to obtain.)

Many countries adopt relatively simple fee structures involving:

- different fees for different periods of licenses (a crude way of differentiating between users making modest compared with higher demands on fisheries)
- variations in fees for certain concessional groups (predominantly seniors and juniors). Such fee structures can be justified on various grounds, such as capacity to pay, the value of encouraging community-wide participation, and recognition that lower-income people are often more sensitive to prices
- differences in charges for residents compared with non-residents. A jurisdiction may wish to subsidise fishing by local residents for community and social purposes (benefits the local community would not obtain for non-residents).

The Commission considers that fees should be simply structured, with state and Northern Territory Governments choosing fee structures and limited exemptions to suit their economic, social and management goals for recreational fishing.

Given charter boat operators’ incentive to fish for commercial gain, it is reasonable that a condition of their licensing be a requirement to keep records of catch and effort to support fishery management (similar to commercial fishers). Record-keeping requirements should be mandatory given that voluntary logbook programs are unlikely to provide the same robust data and, in particular, will suffer from self-selection bias. Records should be the subject of compliance review to provide assurance on the accuracy and reliability of data.

Inquiry stakeholders reported that, in some jurisdictions, charter boat customers did not understand or objected to the requirement to obtain an independent licence before fishing on a paid charter. As charter boat operators are responsible for charter trips it would make sense to permit them to purchase licenses for their customers.

Tailored licensing for high-risk activity or fisheries

Licensing should play a wider, more significant role in the management of high-risk fisheries. Licensing systems can be tailored (across different species or locations), through variations in fees or conditions, or caps on the number of licenses issued, to manage the demand for vulnerable species. Further, where sectoral allocations are applied to high-risk fisheries, licensing can offer a tool to help ensure recreational catch matches the allocation for the sector.

Next steps

A reasonable timeframe for the introduction of licensing and recalibration of arrangements to expand coverage is at least within the next three years. This will enable licensing to be used as a sampling frame for national or coordinated surveys from 2022-23 (as discussed in section 4.5).

The introduction of a compulsory licence for marine recreational fishing is likely to face some resistance. The Commission notes, however, that in some jurisdictions (such as South Australia and the Northern Territory), licensing has the support of some recreational fishing groups. More generally, submissions to this inquiry indicate that there is increased recognition that recreational fishers need to be better recognised and incorporated into fisheries management strategies.

DRAFT RECOMMENDATION 4.1

Within the next three years:

- the Queensland, South Australian and Northern Territory Governments should introduce licensing for independent recreational marine fishing, and the Victorian and Tasmanian Governments for marine fishing charter boat operators
- governments should minimise license exemptions.

4.3 Control mechanisms

The management of recreational fisheries is an evolving area of policy that is being shaped by changes in knowledge and community expectations. In Australia, recreational fishing is primarily managed by the states and territories (box 4.5).

The Australian Government has scope to intervene through general powers of the *Fisheries Management Act 1991* (relating to fisheries management plans) and the *Environment Protection and Biodiversity Conservation Act 1999*, but to date has not directly managed recreational fishing. In Commonwealth waters, the state or territory immediately adjacent to the Commonwealth waters has responsibility for managing recreational fishing. The Government recently announced that it would seek to ensure that the Australian Fisheries Management Authority considers the interests of all fishers (including recreational fishers) in its decision making (Ruston 2016).

Box 4.5 **Jurisdiction and management for recreational fishing**

Jurisdiction over fishing falls to the states and Northern Territory within three nautical miles of the low water mark and to the Commonwealth beyond that point. However, while the *Fisheries Management Act 1991* (Cwlth) gives AFMA the power to 'prohibit or regulate recreational fishing' no such regulations are in place. In practice, the states and Northern Territory manage recreational fishing in the Commonwealth waters adjacent to their respective coasts. The reason for this arrangement, as posited in the 2005 Memorandum of Understanding between the jurisdictions — *Proposed Resource Sharing Arrangements for Commonwealth Fisheries* — is that the states and Northern Territory are 'best placed to do so'.

State and Northern Territory reliance on extra-territorial powers

s. 2(1) of the *Australia Act 1986* (Cwlth) gives the states and Northern Territory 'full power to make laws for the peace, order and good government of that State that have extra-territorial operation'. The states and Northern Territory are reliant on the preparedness of the courts to confirm these extra-territorial legislative powers in order to regulate recreational fishing in Commonwealth waters. The test established by the courts for this purpose is that there must be 'sufficient connexion' between the legislation and the interests of the state/territory. *The Port MacDonnell Professional Fishermen's Association* case showed that the fact a fishery was being exploited by South Australians and a source of trade and employment for the state was sufficient for state laws to have effect out to 200 nautical miles.

The reliance on the court's determination for the extent of their powers is recognised in the fisheries legislation of New South Wales, Victoria, South Australia, Western Australia and Tasmania wherein recreational fishing laws apply to any waters to which the legislative powers of the state may extend. The extent of the extra-territorial legislative power of the states and Northern Territory is, however, limited by Commonwealth fisheries laws — under s. 109 of the Constitution, Commonwealth law prevails if there is any inconsistency with state/territory laws.

Sources: *Pearce v Florenca* (1976) 135 CLR 507; *Port MacDonnell Professional Fishermen's Association Inc. v South Australia* (1989) 168 CLR 340.

The effectiveness of controls

Managers of recreational fisheries around the world generally seek to control the harvest of targeted fish species and prevent the harvesting of juvenile fish to promote sustainability. The number of participants, diversity in activity, a large and often remote coast-line, and the capacity for fishers to rapidly respond to available fish stocks makes controlling recreational take more difficult than for commercial fishers, who usually fish in more defined areas and predictable ways.

Current management approaches vary, but can include size, bag, boat and possession limits; restrictions on the types of gear that may be used; and temporal and spatial closures. The efficiency of controls can vary depending on the fishery and species. There is no 'one size fits all' approach to management. As noted by the Australian Marine Conservation Society:

To determine the appropriate mix of controls an assessment of the risks associated with catching the target species, the impact of this catching on non-target species and the broader ecosystem will be needed. This is within dynamic ecosystems where the abundance of target and non-target species change and innovation by fishers mean that arrangements need to be continuously monitored and adjustments made in response to these changes (sub. 33, p. 12).

Bag, possession, size and gear limits

Bag, possession, size and gear limits are the most widely used control mechanisms in recreational fisheries. They are typically well understood by recreational fishers as necessary to protect fisheries resources for future generations.

- Bag and possession limits (also boat limits in some states) aim at sharing catch equitably between recreational fishers as well as constraining overall catch for sustainability reasons.
- Size limits are regulated to protect young fish in order to minimise the chance of overfishing.
- Limits are also placed on the gear (such as the number and type of lines and hooks and the prohibition of some equipment such as gill nets) to limit catch and minimise the impacts of some methods on the marine environment.

In many fisheries size, bag and gear limits appear to be effective. Indeed, in many fisheries average fishers may rarely reach a bag limit (CSIRO, sub. 61). TARFISH said:

Bag and possession limits are an imprecise measure used to indirectly control the take of fish species and in general, over time, appear to provide the required degree of biological control.

Size limits are a direct biological control being set at a level above the sexual maturity of fish species to ensure they are contributing to future stocks. They would appear to be effective and in most cases are set at a scientifically justifiable level. (sub. 42, p. 6)

Moreover, as many recreational fishers are likely to fish to enjoy the activity itself — as much as ‘landing’ a fish — controls over methods rather than catch are also apt.

However, some stakeholders observed that some recreational fishers appear to be quasi-commercial — fishing four or five times a week and harvesting more fish than they could reasonably be expected to consume themselves. Several were of the view that daily bag limits are only effective for recreational fishers who fish once a week (or less on average).

It is difficult to be definitive about the effectiveness of controls because of data inadequacies. Ideally, management controls should be developed with an understanding of the status of the targeted species and their ecological systems, and recreational catch activity levels and methods. The data collection systems recommended in section 4.5 should help to identify and more effectively manage the risks associated with highly-fished areas.

It is clear that, for some key species and fisheries targeted by both recreational and commercial fishers, bag, size and gear restrictions are not effective management tools. For example, the Tasmanian Rock Lobster Fishermen's Association submitted that bag limits set for Tasmanian Rock Lobster are not sufficient to meet stock rebuilding objectives.

The Tasmanian rock lobster east coast stock rebuilding strategy highlights the difficulties associated with managing recreational fisheries. This 10 year strategy aims to rebuild lobster stocks on Tasmania's east coast by limiting the amount of lobsters harvested each year. The commercial catch is constrained using an east coast catch cap, which is monitored under a Quota Management System.

The preliminary control on recreational catch was a reduction in the daily bag limit from 5 to 3. As stocks rebuilt, the recreational catch increased above their resource allocation limit. In response, bag limits were decreased to 2 per day. As stocks continue to rebuild on the east coast, it is projected that the recreational take will continue to increase, even with the 2 per day limit. Subsequently, further alternative mechanisms to constrain recreational take must be implemented to ensure the 10 year rebuilding strategy is maximised. (sub. 37, p. 9)

The essential problem is that the overall pressures of fishing on vulnerable fisheries cannot be contained by bag limits or other limits per fisher when overall fishing is not controlled. If sectoral allocations (as recommended in chapter 2) are applied to high risk fisheries, measures will be needed to enforce the aggregate allowance for the recreational sector.

Other control mechanisms

When bag, possession, size and gear limits are ineffective in achieving fisheries sustainability objectives, fishing areas are often closed (whether on a temporary, seasonal or permanent basis) to protect fishery stock. Area closures may be established, for example, where:

- a population of endangered species or threatened species live
- fish congregate before or during spawning
- species have been overfished or are susceptible to overfishing
- there is a need to separate incompatible uses of the marine environment, such as a spearfishing area from a swimming area.

Most recreational fishing closures are seasonal and implemented to protect fish during spawning periods. While recreational fishers generally understand the need for seasonal closures to protect fish stock, many oppose blanket 'no-take' permanent closures. Submissions to this inquiry indicate that access to fishing opportunities is a major concern for recreational fishers. Poorly targeted area bans can impose unnecessary costs and restrict the value of fisheries to the community.

Harvest tags provide an alternative management strategy to cap recreational fishing while avoiding the imposition of complete bans. Harvest tags (or documents) authorise the harvest of a specified number of a species over a particular period. Tags are attached to the

harvested animal as a condition for its legal possession and cannot be reused. Tags can be allocated through a range of methods such as a set allocation with each licence, lottery rationing and auctioning. There are a few examples of tag programs, including Shark Bay snapper (box 4.6), salmon and sea trout in Ireland, cod in Newfoundland, and game and freshwater species in many states of the United States (Ford and Gilmour 2013).

Box 4.6 Shark Bay snapper fishery, Western Australia

Shark Bay pink snapper has long been an iconic species valued by both recreational and commercial fishers. The three separate stocks found in the Eastern Gulf, Denham Sound, and the Freycinet Estuary are particularly vulnerable to over-exploitation because the snapper aggregate to spawn during winter when recreational effort is greatest.

In the 1980s and early 1990s the intense harvesting of large, spawning snapper in Shark Bay (mostly by recreational vessels) resulted in significant stock depletion. Management measures were progressively introduced from 1998 to limit the harvest of pink snapper. These included increases in minimum fish size; the introduction of a maximum length; reductions in the daily bag limit; a total ban on the taking of pink snapper for almost 5 years (June 1998 to March 2003) in the Eastern Gulf; and a seasonal closure in the Freycinet Estuary (Jackson et al. 2005).

In 2003, to ensure the sustainability of the stock a Total Allowable Catch (TAC) was set for both commercial and recreational fishers of which 75 per cent was allocated to recreational fishers. A conventional management approach was adopted in the Eastern Gulf (slot size limit, bag limit, and a 4 month spawning season closure) and Denham Sound (slot size limit and bag limit only), to control catch. In the Freycinet Estuary a more output-based approach — a limited issue of management-tags — was used to enforce the recreational quota (Jackson et al. 2005).

Tags were available on an annual basis through a lottery system managed by the Department of Fisheries. Fishers were able to receive a maximum number of two tags per year. The tags were inserted through the mouth and out of the lower jaw of the fish, and locked in place to ensure the tag could not be reused.

The management tags were viewed as highly successful in limiting the catch of pink snapper. While the introduction of the management-tags was not initially well received by recreational fishers, partly due to their cost, acceptance improved over time (Jackson et al. 2005). In January 2016, after 12 years of enforcement, the tag lottery was abolished. The Government of Western Australia explained:

Pink snapper stocks in Shark Bay's inner gulfs were overfished in the 1990s, prompting a major long-term recovery program. After two decades of intensive stock monitoring and strong management measures, with support from recreational and commercial fishers, the stocks have now recovered to above the program's targeted levels. As a result, the recreational fishing rules have been relaxed to give more fishers access to this iconic fishery and a better chance of taking a 'trophy' pink snapper, while ensuring the stocks remain at above sustainable levels. (DoF WA 2016c)

The lottery was replaced with a possession limit of 5 kg of fillets of fish or one day's bag limit of whole fish or fish trunks (applying to all fish, not just pink snapper).

Harvest tags can help improve accountability and efficiency in recreational fisheries management by:

-
- setting a definite upper bound on harvest and therefore offer a means of directly controlling allocated levels of catch
 - granting clear property rights to recreational fishers
 - providing a means of equitably distributing harvest opportunity
 - allowing access to marine areas that would otherwise be protected by stringent area closures.

However, harvest tags can be administratively costly and logistically challenging to administer and enforce (especially in large fisheries with many fishers and multiple entry points). Based on 1200 quota tags per year, the cost of administering the Shark Bay management-tags, was estimated at about \$15 per tag (not including the cost of compliance). However, the cost was estimated to fall to \$5 per tag if 5000 snapper tags had been issued (Jackson et al. 2005).

Any tagging system should be based on full recovery of management costs (including administration and related assessments and research) and reserved for highly-valued, at-risk species. In particular, several stakeholders suggested that southern bluefin tuna could be more effectively managed through tagging arrangements.

DRAFT RECOMMENDATION 4.2

Governments should consider implementing harvest tagging management systems for valuable at-risk species when conventional management controls (such as bag and size limits) are ineffective in achieving sustainability goals.

Jurisdictional inconsistencies

Some recreational fishers are frustrated by the inconsistencies in regulatory controls between jurisdictions, particularly along state and territory borders. Inconsistency can increase the complexity and uncertainty of regulatory requirements. Particular examples of inconsistencies raised by stakeholders include:

- east coast snapper size limits are 28 cm in Victoria, 30 cm in New South Wales, and 35 cm in Queensland. Bag limits are 10 in New South Wales and Victoria, and 4 in Queensland
- minimum sizes for rock lobster are 98.5 mm in the southern zone of South Australia, 105 mm in the Northern Zone of South Australia and for females in Victoria, and 110 mm for males in Victoria
- regulators allow the take of female mud crabs in New South Wales and the Northern Territory, but apply different size restrictions. Queensland prohibits the taking of female crabs, and this prohibition has been in place since the late 1800s. While there

have been attempts to resolve this discrepancy (the most recent in 2011), there is a strong desire within the Queensland community to preserve the existing policies. (Queensland Government sub. 60, p. 10)

- the sand whiting size limit in New South Wales is 27 cm and the bag limit is 20 compared with a size limit of 23 cm and bag limit of 30 in Queensland.

Inconsistencies can reflect regulators' different management goals and the fact that migratory fish may enter jurisdictions at different stages of their lifecycles. For example, TARFISH commented:

Bag/possession limits that underpin fish stock levels in Tasmania can be vastly different to other states for a number of reasons. Fishing pressure can be vastly different between the states due to population, different sub species can exist that vary markedly across states, fish size can be dramatically different across states, ie Southern Bluefin Tuna reach Jumbo size (larger than 100kg) in Tasmania but do not show up in South Australia or New South Wales etc. (sub. 42, p. 7)

Where inconsistencies in regulation are justifiable, jurisdictions should be transparent about the scientific basis or management objective behind the regulatory requirement.

In some circumstances — such as where jurisdictions are using different scientific methods to set size and bag limits — inconsistencies may be less justifiable. However, participants in this inquiry have indicated that, on the whole, inconsistencies are minor and do not present a major impediment to their enjoyment of fishing (for example: Amateur Fishermen's Association of NT, sub. 20; VRFish, sub. 25; and TARFish, sub. 42).

As discussed in chapter 6, policy makers should collaborate to ensure more consistent management approaches to fisheries and fish stocks that cross borders. The relative costs and benefits of moving to more consistent approaches should be considered on a case by case basis. As the Tasmanian Government commented:

Projects, working towards cross jurisdictional arrangements seeking savings also need to be rigorously assessed. Generally, processes and negotiations etc. involving multiple jurisdictions are resource intensive and do not provide quick outcomes. Indeed cross jurisdictional processes can lead to additional levels of bureaucracy that is counterproductive to aims of efficiency. Any focus on harmonisation and savings purportedly through cross jurisdictional arrangements need to be considered on a case by case basis. (sub. 48, pp. 1–2)

Catch and release in recreational fisheries

Catch and release fishing (returning a live fish to the water after capture) is common practice in recreational angling. For example:

- in New South Wales in 2013-14, 56 per cent of finfish were released after capture (West et al. 2015)

- in South Australia in 2013-14, just under 30 per cent of marine finfish and 40 per cent of marine shellfish were released after capture (Giri and Hall 2015)
- the 2013-14 survey of boat licence holders in Western Australia found that 56 per cent of total catch was released (DoF WA 2013)
- in Tasmania in 2012-13, 44 per cent of finfish were estimated as released after capture (Lyle, Stark and Tracey 2014).

Catch and release may occur voluntarily (for example, by recreational fishers who are concerned about conservation, and sports fishers who are fishing for sport rather than for food), or be mandated by regulation (for example, if a fish is undersized or a bag limit is exceeded). The 2012-13 Survey of Recreational Fishing in Tasmania found that small size (under legal size or ‘too small’) was the major motivation for fishers to release flathead, whiting, Australian salmon, and silver trevally. Poor eating qualities were identified as important factors for the release for cod, leatherjacket and gurnard. Catch and release (sport) fishing was important for black bream (Lyle, Stark and Tracey 2014). As such, release rates vary considerably between species. For example, in South Australia in 2013-14, release rates varied from 11 per cent for southern garfish, to 33 per cent for Australian salmon and 80 per cent for mulloway (Giri and Hall 2015).

Survival rates can vary by depth of capture, species, type of hook used, where the fish is hooked, and how long a fish is out of the water. Overall, Australian and international research largely shows that most inshore fish and crustaceans survive after release, and that catch and release fishing is effective for managing and conserving stocks. Table 4.3 provides a snapshot of saltwater fish survival rates (DPI NSW 2013b).

Table 4.3 Saltwater fish survival rates

<i>Species</i>	<i>Survival (per cent)</i>	<i>Influences on mortality</i>
Yellowfin bream	72-92	Deep hooking and removal
Eastern sea garfish	46	Deep hooking, scale loss and extended air exposure
Dusky flathead	91-97	Deep hooking
Southern sand flathead	92	Deep hooking
Luderick	99	None identified
Mulloway	73-81	Deep hooking and removal
Sand mullet	96	Bleeding from hook wounds
Sand whiting	97	None identified
Snapper	67-92	Deep hooking and removal
Tailor	92	Deep hooking and removal
Yellowtail kingfish	85	Deep hooking

Source: DPI NSW (2013b).

There is less known about the effects of catch and release fishing on fishing stocks in deep water, but emerging research suggests that these methods are associated with higher mortality rates.

Deep sea fishing involves fishing at depths greater than 30 metres and is often called offshore boat fishing, sport fishing, or big game fishing. Barotrauma has been found to be a significant cause of mortality for line-caught demersal fish. Barotrauma results from the expansion of gases in the swim bladder and other organs when fish do not have time to adjust to the rapid changes in water pressure as they are pulled towards the surface.

A study on maximum survival of released undersize west coast reef fish found that:

- the post-release mortality rate of dhufish increased with depth of capture from a 21 per cent mortality rate at depths of less than 14 metres to a mortality rate of 86 per cent at depths of 45-59 metres¹⁸
- the post-release mortality rate of snapper increased from about a 3 per cent mortality rate at depths of less than 30 metres depth to a rate of 69 per cent at depths of 45 and 65 metres (Lenanton et al. 2009).¹⁹

Several techniques have been developed to treat barotrauma, including venting whereby the swim bladder of a fish is punctured with a needle to remove excess gas. While venting can help the fish to return to the deep water, it can injure other organs and lead to death. Agencies in Australia and the United States generally recommend the use of various forms of cages or weights to return fish to their capture depth (McLennan, Campbell and Sumpton 2014). For example, in Western Australia it is compulsory to possess a release weight for fishing for demersal fish (such as dhufish) in the West Coast Bioregion (DoF WA 2016a). In the United States, work is underway to develop recompression devices to improve the survival rates of deep sea fish. However, testing of such devices is in its infancy (NOAA 2014).

The existing evidence suggests that catch and release may not be an effective management strategy for recreational catch of deep-sea fish and that alternative approaches may be needed. Nevertheless, the evidence on the mortality rates of released deep-sea fish and on the effectiveness of interventions to reduce these rates is still incomplete. More research is warranted in this area.

DRAFT RECOMMENDATION 4.3

The Australian, state and Northern Territory Governments should sponsor more research on the survival rates of catch and release methods in deep water fisheries.

¹⁸ The study reported that the highest proportion of dhufish are caught at depths between 40 and 59 metres.

¹⁹ The study reported that the highest proportion of snapper are caught at depths between 20 and 59 metres.

4.4 Regulatory enforcement mechanisms

Enforcement mechanisms are a key aspect of any regulatory system. Fisheries officers in each state and territory undertake a range of compliance activities, including inspections, surveillance patrols and intelligence operations. Compliance options across the jurisdictions generally include education, verbal and official warnings, infringement notices, prosecution and cancellation of licenses or permits. For example:

- in 2014-15 in New South Wales about 3300 offences were recorded in the marine recreational fishery sector; penalties included cautions (58 per cent), penalty notices (40 per cent) and prosecutions (2 per cent)
- in 2014-15 in Victoria about 35 000 inspections were undertaken in the marine recreational fishery sector; about 3600 offenders were detected; and penalties included verbal and written warnings (65 per cent), infringement notices (34 per cent) and prosecutions (1 per cent)
- in 2015 in Queensland about 1000 offences were recorded in the marine recreational fishery sector; and offences were penalised with a caution (49 per cent), fine (49 per cent) or prosecution (2 per cent)
- in 2015 in South Australia about 860 offences were recorded in the recreational fishing sector; penalties included cautions (53 per cent), expiations (42 per cent) and prosecutions (5 per cent).²⁰

Submissions to this inquiry suggest that many recreational fishers follow regulations. At the same time, there is concern that the vast expanse of Australia's marine fisheries provides significant opportunities for non-compliance, and these are difficult to detect. For example, high-value fish stocks, such as abalone, can be found in isolated marine environments where surveillance is difficult. Accordingly, for some recreational fishers, the rewards of non-compliance can be high and the risks low. Areas viewed as particularly problematic include illegal take of key species, the selling of recreational catch, non-compliance with bag and size limits and fishing without a licence.

The scale and scope of non-compliance with recreational fishing laws is difficult to judge given the number, dispersion and diversity of participants and activity.

Regulatory compliance may be improved by increasing the number of compliance officers. During consultations it was suggested that while 24 hour hotlines were established in jurisdictions to report fisheries offences, in most instances there were not enough fisheries officers to respond in a timely manner to reports of non-compliance.

The setting of priorities in enforcement is important to ensure sufficient resources are directed to the right compliance risks. Some stakeholders claimed that regulators targeted enforcement at 'soft targets', such as enforcement of recreational fishing licences, rather

²⁰ Information supplied by the New South Wales, Victorian, Queensland and South Australian Governments.

than at illegal take of key species and the sale of recreational catch where the risks to sustainable fisheries are higher.

Given the challenges of policing activity, some participants suggested that more expenditure should be directed at regulatory education and changing attitudes to compliance (for example: Amateur Fishermen’s Association of NT, sub. 20; VRFish, sub. 25; and RecFish SA, sub 35). However, this would only reduce offences committed through ignorance of regulatory requirements rather than deliberate non-compliance.

In any case, jurisdictions already appear to be delivering information to the recreational fishing sector in an effective manner. Education campaigns on fish size limits over the past decades appear to have been highly effective in increasing compliance with regulation (CSIRO, sub. 61). And all jurisdictions are currently providing information on recreational fishing and its regulation in a range of locations and formats, such as hard copy publications, signage at targeted recreational fishing spots, documents on websites and smartphone applications. The onus rests with recreational fishers to seek this information and understand their regulatory responsibilities.

The Commission considers that when regulatory enforcement is difficult and the risk of being caught for non-compliance is low — as is the case for most recreational fishing — penalty regimes should be strong to deter non-compliance. In strengthening penalty regimes, jurisdictions should consider both the adequacy of current financial penalties and the merit of others that are likely to increase the level of deterrence. For example, in discussions some stakeholders suggested that penalties for non-compliance in the recreational fishing sector should include the temporary seizure of recreational fishing gear and boats.

Assessment of costs and likely benefits should be undertaken before any new compliance measures are introduced. Penalties should be set consistent with regulatory aims and proportionate to the level of risk to the sustainability of the fishery. For example, penalties for failure to hold or carry a licence should not be punitive for first offences, and regulatory aims may be better served by education, warnings or small fines (especially in the first few years of a new licensing regime). This would recognise that the aim of licensing is not to punish people when they offend per se, but to increase awareness and compliance with rules. In contrast, strong penalties should be applied in instances of knowing and persistent breaches, such as in the illegal take of key species and the selling of recreational catch.

DRAFT RECOMMENDATION 4.4

State and territory governments should review and strengthen penalty regimes for recreational fishing to deter regulatory non-compliance.

Penalties should be proportional to the level of risk posed.

4.5 Improving the information base

Estimating catch and effort to incorporate recreational fishing into stock and marine management is significantly more difficult than for the commercial sector because of the number and diversity of participants.²¹

Existing information — often based on sporadic surveys undertaken by state and territory governments — provides a limited, unreliable and out-of-date picture of recreational fishing effort, catch and value across Australia (box 4.7).

For instance, there may be other, unrecognised species where recreational catch is exceeding sustainable levels, suggesting greater regulatory controls are warranted. Conversely, inadequate information may sometimes prompt poorly targeted or unjustified limits on access and methods of fishing. Moreover, differences in methodologies and survey years between the jurisdictions make it difficult to compare and use data for managing species and fisheries that cross jurisdictional boundaries. Improved information would help understand, manage and develop Australia's recreational fisheries.

Better information on the wider social aspects of recreational fishing is also important. Understanding why people fish and the benefits they receive can help determine the value of recreational fishing to the community and facilitate better engagement with fishers as a regulated group. Better data would also:

- indicate the different categories of people who fish recreationally and their fishing behaviours (such as where and how they fish)
- enable improved communication between researchers, managers and fishers
- facilitate more detailed assessment of the regional impacts of recreational fishing
- allow governments to assess any divergence between the unintended and realised effects of policy decisions (for example, as in the creation of marine sanctuaries)
- enable more tailored management plans and policy.

Five yearly surveys of recreational fishing in Canada (which have been undertaken since 1975) have demonstrated that they can be useful in achieving such objectives (Fisheries and Oceans Canada 2010).

Both governments and industry stakeholders have recognised a need for a more systematic and coordinated approach to the collection of recreational fisheries data across jurisdictions. The Australian Government's policy for a *More Competitive and Sustainable*

²¹ Given the relevant populations of recreational fishers there are large trade-offs between the costs of surveys and their completeness, accuracy and sampling precision. For example, surveys of boat based fishing in Western Australia are cost effective (largely because the recreational fishing from a boat licensing register provides a sample frame for surveys), but they exclude shore-based recreational participation, catch and effort.

Fisheries Sector (August 2013) included an objective to conduct recreational fishing surveys every five years (Georgeson et al. 2015).

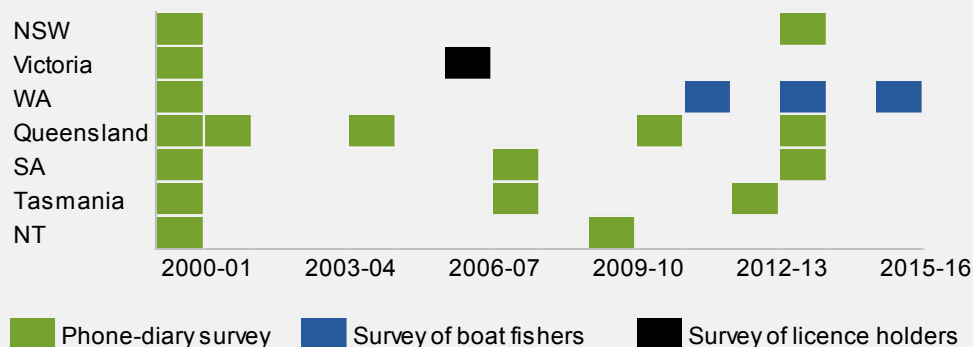
Box 4.7 A turbulent sea of numbers: surveys of recreational fishing

In Australia, the first and only national survey (the National Recreational and Indigenous Fishing Survey or NRIFS) was undertaken in 2000-01. The NRIFS provided information on participation, effort, catch, social benefits and expenditure at the jurisdictional and national levels. Such information was invaluable in guiding recreational fisheries species and decision-making processes (Griffiths et al. 2014).

The NRIF data are out-dated, particularly for species whose abundance is subject to large temporal variations, and in view of the changes in regulation, fish stocks and likely fishing patterns over the past 15 years.

State and territory governments have conducted surveys to address specific concerns, such as the management of key species targeted by recreational and commercial fishers including flathead, snapper and whiting. Western Australia conducts a regular two-yearly state-wide survey of recreational fishers with boat licences. Other jurisdictions undertake surveys of recreational fishing on an ad hoc basis (as shown in the chart below). Some targeted regional surveys have also been undertaken to improve understanding of recreational catch and effort, as well as the economic and social contribution of recreational fishing (Georgeson et al. 2015).²²

Jurisdictional-wide surveys of recreational fishing^a



^a The majority of state and territory surveys have used the phone-diary method. The exceptions are Victoria, which has used its licensing register as a sampling frame, and Western Australia, where surveys are conducted of recreational fishers with boat licences.

Source: Georgeson et al. (2015).

To date, the states and the Northern Territory have been reluctant to commit to undertaking coordinated surveys, in part because of a lack of resources. Based on the estimated cost of a national survey, \$6.8 million in 2017-18 (Georgeson et al. 2015), this would entail just over \$2 per recreational fisher every five years (or about 40 cents annually).²³

²² Targeted information is also collected for charter boat catch and effort, and from game fishing competitions and tag and release programs.

²³ Assuming there are currently 3.2 million recreational fishers (based on the most recent estimates of participation — table 4.1).

The Commission proposes a two-step approach to address the pressing need for survey information from the recreational sector.

- The Australian Government should undertake a national survey at the earliest opportunity - 2017-18 - using a comparable method to the 2000-01 national survey. This would avoid all jurisdictions having to be administratively involved in this task. The cost of the 2017-18 survey should be met by all jurisdictions.
- From 2022-23, all jurisdictions should conduct regular surveys (ideally at five yearly intervals), whether this be on a jurisdictional or coordinated national basis. If at the jurisdictional level, the surveys should coincide in time and be largely consistent to support cross-jurisdictional fishery management and get an accurate national picture (jurisdictions may otherwise choose to include additional questions to address state-specific issues).

As discussed above, the surveys should focus on recreational fishing participation, total catch and effort, the identification of recreationally-important species, and the value of fishing to recreational fishers to provide an up-to date basis for decisions on resource allocation and management.

Population-based surveys are only one approach for gathering systematic information for fisheries management. Other methods are more suited to particular locations where there are concerns about the impacts of recreational fishers. These include creel surveys (surveys undertaken at given fishing locations), aerial surveys and the use of remote cameras (Smallwood et al. 2011). These are relatively costly measures and have various deficiencies, but are likely to be an important element in the portfolio of methods for managing recreational fisheries. State and territory governments should use such approaches as they deem appropriate, but should share their findings on their effectiveness, as well as diffusing any new innovative information-gathering methods.

DRAFT RECOMMENDATION 4.5

The Australian Government should conduct a national survey of recreational fishing in 2017-18, using a comparable approach to the 2000-01 national survey. The cost of the survey should be shared by all governments.

From 2022-23 all governments should undertake five yearly surveys of recreational fishers, whether at the national level or on a coordinated basis.

Surveys should be consistent across jurisdictions and focus on participation, catch and effort, identification of species important to recreational fishers and information on the value of recreational fishing.

5 Indigenous customary fishing

Key points

- Customary fishing is culturally significant for many Indigenous Australians, providing unique benefits associated with the maintenance of traditional customs.
- Customary fishing is given special recognition consistent with native title rights more generally. However, there is limited clarity about what these rights entail for catch limits, which is an outcome of customary fishing being generally exempted from fishery management regimes. There is also relatively poor input from Indigenous people into fishery management decisions.
- Effective incorporation of customary fishing into management systems would help resolve these issues. To this end:
 - the customary fishing sector should be recognised in its own right in fisheries management regimes.
 - in resource sharing arrangements, governments should provide allocations for customary fishing sufficient to cover use by the local Indigenous community(ies) in accordance with its traditional laws and customs.
 - customary fishing activities, as for other sectors, may be subject to restrictions to ensure the sustainable use of fisheries.
- As recognised in recent case law, fishing in accordance with traditional laws and customs sometimes including fishing for the purposes of trade within and between Indigenous communities. Consistent with intentions underpinning the recognition of customary fishing rights, the definition of customary fishing should provide for fishing for commercial purposes where this is consistent with proven traditional laws and customs.
- To ensure that the customary allocation and any controls over customary fishing activities are culturally sensitive and do not infringe on native title rights, it is important they be developed in consultation with Indigenous communities.
- There is scope to increase the application of Indigenous traditional knowledge in fisheries management, including through Indigenous ranger programs.

The terms of reference for this inquiry direct the Commission to investigate ‘the extent to which fisheries management regimes support greater participation of Indigenous Australians, provide incentives to Indigenous communities to manage their fisheries, and incorporate their traditional management practices in the fishing industry’.

This chapter considers how customary fishing is currently regulated and how this might be changed to support greater participation by Indigenous people in fishing and fisheries management. The Commission has focused on common issues across jurisdictions and related improvements to regulatory frameworks, rather than on particular jurisdictions.

5.1 Overview of customary fishing

In Australia, customary fishing generally refers to Indigenous people ‘fishing in accordance with relevant Indigenous laws and customs for the purpose of satisfying personal, domestic or non-commercial communal needs’ (National Native Title Tribunal 2004). While the formal definition adopted by jurisdictions varies, customary fishers are also usually required to have a traditional connection to the area being fished. It is these features that set customary fishing apart from other fishing activities that Indigenous people may engage in and that non-Indigenous Australians may equally pursue and enjoy (box 5.1).

Box 5.1 Indigenous fishing is not necessarily customary fishing

Customary fishing refers to the distinct activity of fishing in accordance with traditional customs. However, Indigenous fishers may participate in customary, recreational and/or commercial fishing depending on both the intent and circumstances of the activity. For example, if an Indigenous person is fishing outside of a jurisdiction’s definition of a customary fisher, they are classified as a recreational fisher and subject to recreational gear, catch and bag restrictions.

Similarly, fishing for commercial purposes is generally not considered customary fishing. However, some jurisdictions, such as Western Australia, allow for the non-commercial barter or exchange of fish provided: it occurs between Aboriginal communities; does not involve money; and is consistent with traditional practices.

Sources: DoF WA (2009); Fisheries Research and Development Corporation and Ridge Partners (2015).

Customary fishing does not necessarily involve the use of traditional techniques and may encompass a range of species, including more obscure species such as rays (Kleisner et al. 2015) and marine animals such as turtles and dugongs — although management of the latter species is usually not handled by fisheries managers. The *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) provides for Indigenous Australians to hunt otherwise protected marine species, including sea turtles and dugongs, in enjoyment of native title rights.

Cultural significance of fishing

Indigenous Australians have fished and used fisheries products for a range of purposes for many thousands of years (Calogeras et al. 2015, p. x; Roberts and Schilling 2010). The significance of customary fishing varies between communities, but fish is usually an important food source, and fishing activities can carry deep social and cultural significance (Roberts and Schilling 2010).

The nature of these cultural values is community-specific. Particular fish species may be ceremonial totems, with special meaning, or fishing itself may form part of rituals (Feary 2015, pp. 47–61). Through maintaining these traditions, customary fishing can

provide benefits beyond consumption to both individuals and the particular Indigenous community, as in Hundloe (2002, p. 8):

... the value of seafood when harvested by Indigenous people is, or can be, greater than the value obtained from eating the food. The additional value has to do with the relationship — in a religious or cultural sense — of the Indigenous fisher and his or her clan to the environment.

In some parts of Australia there is a long history of Indigenous communities using fisheries for commercial purposes (ATSISJC 2008, pp. 217–218). The Yolgnu people of Arnhem Land granted Macassan traders from Indonesia the right to fish in their waters in exchange for traded goods (Museum Victoria 2010). Similarly, there is a long tradition of inter-island trade of harvested marine resources amongst Indigenous communities within the Torres Strait Islands (Brennan 2012).

Customary fishing today

While customary fishing catch is thought to be relatively small in comparison to other sectors, many Indigenous communities maintain their cultural attachment to the sea through fishing. Customary fishing takes place across Australia, but is most concentrated in the northern states (Kleisner et al. 2015, p. 15). More than 90 per cent of surveyed Indigenous people in northern Australia (across the Northern Territory and the northern areas of Queensland and Western Australia) engaged in customary fishing during 2001 (Henry and Lyle 2003). The majority of fishing was shore-based and took place in marine waters.

Available information suggests that most customary fishing take is consumed by households. In New South Wales, 70 per cent of customary fishing catch was used by the fisher's household and the majority of the remaining share was distributed to the fisher's immediate and extended family (Schnierer and Egan 2015). The remainder was either given to the fisher's community, bartered, sold or released. A similar focus on subsistence household consumption was observed in Western Australia, although distribution within the community was also prominent (Wright and O'Neill 2013).

5.2 How customary fishing is regulated

Customary fishing is managed by the states and the Northern Territory, with the exception of the Torres Strait (box 5.2). All coastal state and territory governments have legislated for some form of customary fishing rights within their respective fisheries acts.

Box 5.2 Fishing in the Torres Strait

Fishing regulations in the Torres Strait are unique because of the Torres Strait Treaty between Australia and Papua New Guinea. The treaty defines how responsibility for the region is shared between the two countries, while placing emphasis on protecting and maintaining the customary practices of Torres Strait Islanders.

The *Torres Strait Fisheries Act 1984* (Cwlth), which regulates the Australian area of the Torres Strait fishery, established the Protected Zone Joint Authority (PZJA). The PZJA comprises the Australian and Queensland Governments and the Torres Strait Regional Authority (TSRA). The PZJA manages commercial and customary fishing, while the Queensland Government has responsibility for recreational fishing.

The *Torres Strait Fisheries Act* reinforces the objective of protecting the traditional way of life of Torres Strait Islanders (which includes customary fishing), as well as promoting economic development for traditional inhabitants. These objectives are supported by the provision of Traditional Inhabitant Boat (TIB) licences for commercial fishing. TIB licences, which are not limited in number, allow traditional owners to fish in all commercial fisheries except for the prawn fishery.

As a result, Torres Strait Islanders are more engaged in commercial fishing than many other Indigenous Australians. From 1985, the TSRA has targeted 100 per cent of licences to be owned by traditional inhabitants, and all new fisheries access is limited to Torres Strait Islanders. Following licence buybacks commencing in 2007, TIB licences account for all commercial fishing entitlements in the finfish, bêche de mer, trochus and crab fisheries. Torres Strait Islanders also own most of the licences in the pearl fishery and more than half of licences in the tropical rock lobster fishery.

The PZJA is currently transferring the tropical rock lobster fishery to a quota management system, replacing the input restrictions currently enforced.

Sources: MRAG Asia Pacific (2014); Torres Strait Regional Authority, sub. 9.

The precise definition of customary fishing and nature of access afforded to customary fishers varies between jurisdictions (table 5.1). For management purposes, most jurisdictions exempt customary fishers from the need to obtain licences to fish but impose some possession limits or gear restrictions. The criteria used to determine who may fish for customary purposes differs between jurisdictions.

Native title and land rights legislation

Native title can confer a right to fish

Indigenous people's access to fisheries resources can be established by determinations under the *Native Title Act 1993* (Cwlth). Where native title is found to exist, native title holders may be afforded access to land or waters to carry out traditional activities, including fishing. The nature of rights and interests afforded by native title may be either exclusive or non-exclusive — that is, native title holders may or may not have the right to

control access to the area. Similarly, use of resources may be permitted either for personal and community use only or for any purpose (including commercial uses).

Table 5.1 Customary fishing regulation in Australian jurisdictions

	<i>How customary fishing is defined in fisheries laws:</i>	<i>Customary fishing provisions apply to:</i>	<i>How customary fishing is regulated:</i>
NSW	Fishing activities and practices carried out by Aboriginal persons for the purpose of satisfying their personal, domestic or communal needs, or for educational, ceremonial or other traditional purposes, and which do not have a commercial purpose.	All Indigenous Australians.	Exempt from recreational licences and subject to less stringent bag limits than recreational fishers.
Vic	No specific definition.	Traditional owners recognised under state non-fisheries legislation.	Exempt from recreational licences but subject to recreational bag limits.
Qld	<ul style="list-style-type: none"> • An Aborigine acting under Aboriginal tradition, or a Torres Strait Islander acting under Island custom; and • The taking, using or keeping of the fisheries resources, or the using of the fish habitats, was for the purpose of satisfying a personal, domestic or non-commercial communal need of the Aborigine or Torres Strait Islander; and • The fish was taken using a prescribed apparatus or in a manner consistent with Aboriginal tradition or Island custom. 	All Indigenous Australians acting under tradition or custom.	Exempt from fisheries laws but subject to gear and spatial restrictions.
SA	Fishing engaged in by an Aboriginal person for the purposes of satisfying personal, domestic or non-commercial, communal needs, including ceremonial, spiritual and educational needs, and using fish and other natural marine and freshwater products according to relevant aboriginal custom.	Native title groups recognised under a traditional fishing management plan.	As provided under a traditional fishing management plan.
WA	Fishing by an Aboriginal person that: <ul style="list-style-type: none"> • is in accordance with the Aboriginal customary law and tradition of the area being fished; and • is for the purpose of satisfying personal, domestic, ceremonial, educational or non-commercial communal needs.^a 	Indigenous Australians with a traditional connection to area being fished. ^b	Exempt from recreational licences, while other regulations differ for some species. ^c
Tas	<ul style="list-style-type: none"> • The non-commercial use of the sea and its resources by Aborigines; and • The taking of prescribed fish by Aborigines for the manufacture, by Aborigines, of artefacts for sale. 	All Indigenous Australians undertaking 'an aboriginal activity'.	Exempt from recreational licences, but subject to recreational restrictions.

(continued next page)

Table 5.1 (continued)

	<i>How customary fishing is defined in fisheries laws:</i>	<i>Customary fishing provisions apply to:</i>	<i>How customary fishing is regulated:</i>
NT	Use of the resources of an area of land or water in a traditional manner.	Aboriginals who have traditionally used the resources of an area of land or water in a traditional manner.	Exempt from fisheries laws.

^a This does not preclude bartering of fish within or between Aboriginal communities for items other than money. The barter must be of a limited nature and consistent with the traditional practice of those communities. ^b The *Aquatic Resources Management Bill 2015 (WA)* proposes that this definition change to 'a person who is wholly or partly descended from the original inhabitants of Australia'. ^c The bill further proposes this be changed to 'not requiring a licence if fish are taken for the purposes of the person or the person's family and not for a commercial purpose'.

Sources: DEDJTR Vic (2015a); DoF WA (2009, 2015b); DPI NSW (2016b); DPIF NT (2016); DPIPWE Tas (2015a); *Fisheries Act 1994* (Qld); PIRSA (2011); *Fisheries Management Act 1994* (NSW); *Fisheries Act 1994* (Vic); *Traditional Owner Settlement Act 2010* (Vic); *Fisheries Regulations 2009* (Vic); *Fisheries Act 1994* (Qld); *Fisheries Management Act 2007* (SA); *Fish Resources Management Act 1994* (WA); *Aquatic Resources Management Bill 2015* (WA); *Living Marine Resources Management Act 1995* (Tas); *Fisheries Act 1988* (NT).

The rights afforded by native title depend upon both the nature of traditional practices within the community claiming title and whether these rights have been fully or partially extinguished. The granting of freehold title over land extinguishes all native title rights and interests over that area, for example. Legislation that *unconditionally* prohibits certain activities, such as hunting of a particular species, also has potential to extinguish the native title right to undertake that particular activity. The legislation of some jurisdictions (such as Tasmania) includes savings provisions to avoid inadvertent infringement of native title rights.

In the event of any inconsistency, native title rights are considered to 'yield' to other common law rights. Consequently, exclusive native title rights over sea country cannot be recognised because it would conflict with the right of innocent passage, as found in the *Yarmirr*²⁴ case (box 5.3).

If recognised, a native title right to fish may permit practices that would otherwise violate state fisheries laws. As a federal law, the *Native Title Act* overrides state legislation to the extent of any inconsistency. Following the results of *Karpany*²⁵, fishing restrictions may not be applicable to native title holders if those restrictions conflict with native title rights to fish for personal, communal or other non-commercial uses (if such restrictions do not constitute a prohibition on the activity) (box 5.3). In contrast, the judgment in *Akiba*²⁶ found that regulation of a native title right to fish in an area is not inconsistent with the

²⁴ *Commonwealth v Yarmirr* (2001) HCA 56.

²⁵ *Karpany v Dietman* (2013), HCA 47.

²⁶ *Akiba v Commonwealth* (2013) HCA 33.

continued existence of that right, implying that Indigenous fishers may continue to be subject to general commercial fishing laws, as long as these laws adequately provide for traditional customary fishing rights.

Box 5.3 Selected case law influencing native title rights to fish

***Commonwealth v Yarmirr* (2001) HCA 56**

In 1998, a number of clan groups claimed native title over the sea around Croker Island in the Northern Territory. While rights over the island itself were previously granted to the communities by the *Aboriginal Land Rights (Northern Territory) Act 1976* (Cwlth), the Act did not confer rights over the seas.

The Federal Court determined that non-exclusive native title rights existed over the claimed sea area. The claimants appealed to the High Court, arguing that their rights and interests should confer possession of the area to the exclusion of all others. The appeal was rejected by the High Court, on the grounds that exclusive rights over the area conflicted with common law rights to navigate and fish. In the event of an inconsistency between a native title right and other rights, the native title rights were found to 'yield' to other rights. The case set a precedent effectively precluding the recognition of exclusive native title rights over areas of the sea.

***Akiba v Commonwealth* (2013) HCA 33**

In 2010, the Federal Court of Australia made an initial determination concerning native title rights for waters in the Torres Strait. The ruling afforded the native title holders the right to access and take resources for any purpose in the native title areas. This allowed the native title holders to take fish from the area for commercial or trading purposes. The initial determination was subsequently appealed and amended in 2012 by the Full Federal Court, which found that any right to take fish for commercial purposes had been extinguished by successive fisheries legislation from the Queensland and Australian Governments.

The Full Federal Court's decision was then appealed to the High Court of Australia in 2013. The High Court overturned the Federal Court decision, finding that the native title holders had a right to fish for any purpose — a right that had not been extinguished by legislation which prohibited fishing without a licence. The High Court noted that regulation of a native title right to fish in an area is not inconsistent with the continued existence of that right.

***Karpny v Dietman* (2013) HCA 47**

In 2009, two Indigenous fishers were charged with violating the *Fisheries Management Act 2007* (SA) by possessing undersized abalone in excess of the recreational bag limit. The defendants were native title holders over the area they were fishing on, and argued that they were exercising their native title rights to fish for non-commercial purposes. While initially cleared, the prosecution appealed and the acquittal was overturned by the Supreme Court of South Australia. The defendants were granted leave to appeal to the High Court in 2013.

The defendants cited the 'native title defence', which, under section 211 of the *Native Title Act 1993* (Cwlth), means laws do not prohibit or restrict the fishing activities of native title holders, if fishing for non-commercial purposes. The High Court agreed, judging that the defendants were not subject to recreational fishing restrictions in the enjoyment of their native title rights to fish for non-commercial use.

Indigenous land use agreements as a management tool

The *Native Title Act* sets a framework for the Australian, state and territory governments, as well as other parties, to negotiate Indigenous land use agreements (ILUAs) with Indigenous communities over a particular area — whether or not native title has been found to exist (National Native Title Tribunal nd). ILUAs are voluntary and legally binding between the parties and set rules about the use of land, water and resources within the prescribed area.

ILUAs are an important part of customary fishing management in South Australia. An ILUA must be in place with a given native title group (as defined under s. 24CD of the *Native Title Act 1993* (Cwlth)) in order to develop a traditional fishing management plan, which is then necessary for customary fishing to be recognised for that group. In 2011, South Australia stated an aim to negotiate ILUAs with each Indigenous community wanting to undertake customary fishing by 2016 (PIRSA 2011). To date, only one ILUA has been put in place.

The use of ILUAs roughly mirrors the Canadian approach to customary fishing management, whereby customary fishing for Canadian Aboriginals is only permitted through agreements between the government and each recognised community (Fisheries and Oceans Canada 2012). These agreements allow management controls to be specific to the community while allowing consultation and prospects for co-management, but can be time consuming to negotiate.

Land rights legislation can affect access to fisheries

In some jurisdictions, Indigenous Australians have been granted freehold ownership of areas of land and intertidal waters through land rights legislation. Unlike native title, ownership can provide traditional owners with exclusive rights over areas of water, including the ability to prohibit access to other parties. Rights afforded by land rights and fisheries laws may overlap, as occurs most prominently in the Northern Territory (box 5.4).

To account for complexities arising from land rights, the Northern Territory has undertaken consultation with Aboriginal land councils to secure access for commercial and recreational fishers to Indigenous waters. This process has, so far, delivered outcomes that maintain most access for other sectors but also provide benefit for the Indigenous land owners — including providing greater powers for Indigenous rangers to enforce fisheries rules on their waters.

Box 5.4 Fishing rights in the Northern Territory

The *Aboriginal Land Rights (Northern Territory) Act 1976* (Cwth) created a system of recognising and providing land rights to Indigenous Australians in the Northern Territory. The process established freehold land rights for traditional owners over the intertidal land (between the low and high tide marks), but not for the overlying waters. By 2007, the Act had granted rights to traditional owners over more than 55 per cent of the Northern Territory's land area, including more than 80 per cent of its coastline.

In 2007, the Federal Court extended land rights to include exclusive ownership of the intertidal waters adjacent to granted land. This decision was confirmed by the High Court on appeal in the 'Blue Mud Bay' case. Consequently, access to these waters for any purpose, including fishing, is only permitted with approval from the traditional owners. This decision was significant as the intertidal waters in the Northern Territory are key habitats for important recreational and commercial target species, including mud crab and barramundi.

Access to the intertidal waters has since been subject to interim access arrangements, with permits issued by the Aboriginal land councils required to enter those waters. However, the ruling does not provide ownership over fisheries resources, with the Northern Territory Government maintaining the authority to regulate fishing.

Sources: DPIF NT (n.d.); *Gumana v Northern Territory* (2007) FCAFC 23; *Northern Territory v Arnhem Land Aboriginal Land Trust* (2008) HCA 29.

5.3 Proposed reforms

The three major regulatory issues are:

- a lack of clarity on the rights and responsibilities of Indigenous customary fishers
- few formal allocations of catch for customary use within fisheries
- inadequate consultation with, and participation of, Indigenous people in fisheries management.

In addition, a number of inquiry participants considered the level of participation by Indigenous Australians in the commercial fishing sector to be inadequate. This matter is considered in section 5.4.

Lack of clarity on customary fishing rights and obligations

Current regulatory approaches are viewed as problematic in that they often do not explicitly define the rights and responsibilities of Indigenous Australians when fishing for customary purposes and can create associated uncertainty for customary fishers and other parties.²⁷ These approaches do not support the collection of information on customary

²⁷ Northern Land Council (sub. 39); Federation of Victorian Traditional Owner Corporations (sub. 40); Fisheries Research and Development Corporation Indigenous Reference Group (sub. 57).

fishing, and complicate the management processes of engagement, consultation and enforcement.

No explicit allocation for customary fishing in most jurisdictions

Customary catch is understood to be relatively small and the absence of an explicit allowance for customary ‘take’ in fisheries where there are controls over aggregate catch (or effort) is unlikely to compromise sustainability objectives. However, this may not be the case where fishing pressure on the resource is more intense (for example, abalone). In such cases, formal resource allocations to the customary sector may be required.

Several jurisdictions have or have proposed allocation policies that treat customary fishing as a unique sector. South Australia provides a specific allocation for customary use in each of its fisheries management plans (PIRSA 2011). Customary use is given priority in allocations in the Northern Territory (DPIF NT 2015a) and will be granted priority under forthcoming legislative changes in Western Australia (Department of Fisheries (Western Australia), sub. 21). In these cases, customary catch is not measured and the allocations are generally not binding.

A constraint on allocating and enforcing catch shares to customary fishers is the lack of data on the levels and nature of customary catch. With the exceptions of the 2001 National Survey (which only covered northern Australia) (Henry and Lyle 2003) and community-specific work in New South Wales (Schnierer and Egan 2015) and Western Australia (Wright and O’Neill 2013), there is little information on the number and location of customary fishers, the levels of catch or the species targeted — although the Fisheries Research and Development Corporation is currently funding a number of projects to overcome this information gap.

Information on customary practices and demand of the local Indigenous community needs to inform any allocations for customary fishing.

Scope to improve involvement in the management of fisheries

The degree to which governments consult with and include Indigenous Australians in the management of fisheries varies. In some jurisdictions, such as New South Wales and the Northern Territory, Indigenous people are involved through bodies such as advisory councils and consultative committees. In other jurisdictions, there appears to be no established processes or bodies in place to ensure consultation with Indigenous people on fisheries management (Wright and O’Neill 2013).

Some traditional owner groups have noted that consultation mechanisms have not been sufficient to markedly improve the participation of Indigenous Australians in the design

and implementation of fisheries regulations.²⁸ A related concern is that jurisdictions do not incorporate Indigenous people's traditional fishing knowledge into fisheries management.²⁹

Generally, there are few systems in place to formally recognise traditional knowledge and management practices over marine resources. Some exceptions include the resource management agreements in some marine parks, including the Great Barrier Reef Marine Park (Dobbs 2007), and Indigenous ranger programs.

Reform has been slow

The issues detailed above have been previously identified in several reviews (Borthwick 2012; FRDC 2012; National Native Title Tribunal 2004). The 2004 Principles Communiqué from all state governments and the Northern Territory set out several high-level principles for the management of customary fishing (National Native Title Tribunal 2004) (box 5.5). Further guidance came from the Fisheries Research and Development Corporation Indigenous Reference Group in 2012, which identified 11 research priorities for formally integrating Indigenous Australians into fisheries frameworks (Calogeras et al. 2015).

While progress has been made toward the implementation of the 2004 Principles Communiqué, it has come slowly and the principles are yet to be fully adopted in most jurisdictions. A lack of information on customary practices has made it difficult to determine appropriate management, while ongoing developments in native title case law have created uncertainty over the terms of coverage and the nature of native title rights.

How should jurisdictions proceed?

Recognise customary fishing as a sector in its own right in fisheries management frameworks

Customary fishing by Indigenous Australians should be recognised as a sector in its own right in fishery management regimes. While the scale and scope of customary fishing will vary between communities and by jurisdiction, there should be consistent recognition of what customary fishing includes and incorporation of their interests and potential impacts (as for other fishing sectors) into management regimes. This would support the better meeting of policy objectives and Indigenous people's participation in management.

To avoid any inconsistencies, the definition of customary fishing should be consistent with native title. Thus the definition should provide for fishing by Indigenous Australians in

²⁸ Northern Land Council (sub. 39), Federation of Victorian Traditional Owner Corporations (sub. 40).

²⁹ Northern Land Council (sub. 39), Fisheries Research and Development Corporation Indigenous Reference Group (sub. 57 — attachments 1 and 2).

accordance with their traditional laws and customs.³⁰ The specific rights enjoyed by a customary fisher (for example, what species can be targeted and for what purposes) will stem from traditional practice in that fisher's community.

Box 5.5 The 2004 Principles Communiqué on Indigenous Fishing

Following the 2003 conference on Indigenous fishing rights, all states and the Northern Territory formally endorsed a set of non-binding principles to guide management of Indigenous fishing, known as the 2004 Principles Communiqué on Indigenous Fishing.

The principles are:

1. Indigenous people were the first custodians of Australia's marine and freshwater environments: Australia's fisheries and aquatic environment management strategies should respect and accommodate this.
2. Customary fishing is to be defined and incorporated by governments into fisheries management regimes, so as to afford it protection.
3. Customary fishing is fishing in accordance with relevant Indigenous laws and customs for the purpose of satisfying personal, domestic or non-commercial communal needs. Specific frameworks for customary fishing may vary throughout Australia by reference, for example, to marine zones, fish species, Indigenous community locations and traditions or their access to land and water.
4. Recognition of customary fishing will translate, wherever possible, into a share in the overall allocation of sustainable managed fisheries.
5. In the allocation of marine and freshwater resources, the customary sector should be recognised as a sector in its own right, alongside recreational and commercial sectors, ideally within the context of future integrated fisheries management strategies.
6. Governments and other stakeholders will work together to, at minimum, implement assistance strategies to increase Indigenous participation in fisheries-related businesses, including the recreational and charter sectors.
7. Increased Indigenous participation in fisheries related businesses and fisheries management, together with related vocational development, must be expedited.

Source: National Native Title Tribunal (2004).

Currently, the requirements for proof to claim entitlement to undertake customary fishing differ by state, for example:

- in New South Wales and Tasmania, a person must have Aboriginal ancestry, identify as an Aboriginal person and be accepted by the Aboriginal community
- in Queensland, a person needs to prove they are an Aborigine (no criteria for that proof is specified)
- in South Australia, identification is established through the development of traditional fishing plans.

³⁰ Consistent with *Native Title Act 1993* (Cwlth) s. 223(1).

The Commission welcomes views on the best way of proving entitlement. Informal recognition, such as being vouched for by the community, may be sufficient in many areas but is vulnerable to challenge, particularly when there is strong competition for a fishery. Limiting access to, say, native title claimants or holders is not desirable as this would exclude communities that do not pursue native title claims because of the time and cost involved. Some formal means of identification may, however, provide a more ready and efficient way of identification, especially for customary fishers operating in high-demand fisheries.

A clear and practical means for Indigenous people to prove their right to fish for customary purposes is desirable. Ideally, this should be consistent across jurisdictions given the proposed consistent recognition of customary fishing rights in fisheries regimes.

DRAFT RECOMMENDATION 5.1

Customary fishing by Indigenous Australians should be recognised as sector in its own right in fisheries management regimes.

The definition of Indigenous customary fishing should be consistent with native title.

INFORMATION REQUEST 5.1

What is the best way for individual Indigenous Australians to prove their entitlement to undertake customary fishing?

Determining allocations to the customary fishing sector

In circumstances where there is competition for fisheries resources between fishing sectors that necessitate sharing arrangements (and intertidal waters are not effectively owned by an Indigenous community³¹), a portion of the allowable catch should be available to customary fishers.

As discussed in chapter 2, the Commission considers that the allocation or reallocation of fisheries resources should be based on the principle of maximising benefits from access. In principle, determining an allocation to customary fishers would therefore be based on comparing the benefits arising from the activity with the benefits arising use by competing sectors. However, this approach is difficult to apply in practice as the benefits of customary fishing include unique cultural benefits obtained through the fisher's participation in his or her traditional practices that are challenging (if not impossible) to quantify.

³¹ In this case, any resource allocation arrangement would need to be negotiated with the community who has the right of ownership.

For this reason, it is not feasible to allocate shares to customary fishing based on a measurement of its relative value.

A proposed approach

Consistent with the principles agreed in 2004 for the management of Indigenous fishing, governments should set aside shares in overall allocations sufficient for local Indigenous communities to maintain their traditional customs. Based on those principles, which state a desire to protect customary fishing, governments should set aside shares sufficient for local Indigenous communities to maintain their traditional customs. This would, in practice, accord priority to customary fishing take.

The amount allocated to customary fishers should, in general, be fixed prior to making allocations to the other sectors. The level should be informed by advice from Indigenous communities themselves on customary demand (especially in the short term), and by data collected on customary use (which can be used to inform subsequent decisions). Both approaches will require good-faith engagement by fisheries managers with customary fishers and preparedness by customary fishers to share information.

Customary fishing rights should not be tradeable or transferrable, recognising the unique characteristics of the associated cultural benefits and that these benefits are exclusive to the community concerned.

The Commission understands that customary fishing would comprise a small share of the total catch in most fisheries. Providing an allocation that covers cultural use by the local Indigenous community(ies) would therefore not materially affect allocations to other sectors in most cases. To the contrary, providing explicit shares of access in managed fisheries will enable better accounting and enforcement of customary take and protection of all sector's shares. That said, this approach will be more contentious in fisheries where there is a high level of competition for a stock (typically for higher value species) or where customary fishing is a larger share of fishing activity. In these cases, fisheries managers should calibrate the customary allocation in consultation with all sectors.

The Commission envisages that, where an allocation is made for customary catch, the relevant leader(s) of the Indigenous community(ies) will be responsible for distributing the allocation among their community.

As discussed in chapter 2, the primary concern of fishery managers is the sustainability of fisheries to enable their ongoing utilisation. This means that the allocation to the customary sector should not be unbounded nor should it exceed the limits required to maintain a sustainable fish stock. Further, controls (such as gear restrictions and minimum fish sizes) may need to be applied as a condition of access. To ensure that controls over customary activities are culturally sensitive and do not infringe on native title rights, it is important they are developed in consultation with Indigenous communities.

Adjusting allocations over time

The Commission envisages that any allocation to the customary sector would change significantly only when there are structural shifts to supply or demand, namely: a significant threat to the sustainability of the fish stock or a change in cultural requirements for Indigenous communities (for example, due to significant population increase or decrease).

In a scenario where a fish stock is significantly reduced — for example, by a natural disaster — fisheries managers will need to reduce the level of catch to ensure sustainability. While it is envisioned that customary fishers would be the last sector to have their allocation reduced (reflecting their priority discussed above), customary catch may reasonably become subject to a lower limit to ensure the sustainability of the stock. While customary use might reduce without prompting (reflecting fish scarcity) the allocated limit would reflect authorities' judgements on the degree required.

In some circumstances a ban on fishing for a particular species may be required. Where applied to other sectors, a ban should also apply to customary fishers. However, legal developments have yet to clearly determine whether any ban would be enforceable on native title holders. A safeguard is to ensure that any bans are temporary in nature and customary fishers understand the need for the ban.

Any changes to allocations to reflect changes in customary needs would not be in response to changes in effort or catch per fisher and, rather, the cultural requirements of the relevant Indigenous community.

The process of adjusting allocations should be transparent, based on clear decision criteria and, as with any regulatory change, be made in consultation with affected fishers.

DRAFT RECOMMENDATION 5.2

The Indigenous customary fishing sector should be afforded a priority share of resources in fisheries where catch or effort is limited. This allocation should be sufficient to cover cultural use by the local Indigenous community in accordance with proven traditional laws and customs.

Customary fishing rights should not be tradeable or transferrable, recognising the unique characteristics of the associated cultural benefits and that these benefits are exclusive to the community concerned.

Customary allocations and any controls over customary fishing activities should be developed in consultation with Indigenous communities.

Cost recovery

The Commission envisions an approach to cost recovery where those that benefit from fisheries management would contribute to costs (chapter 10). While customary fishing has unique attributes, it does not follow that customary fishers should automatically be exempt from any responsibility to contribute to fisheries management costs, insofar as they benefit from management.

For other sectors, costs would normally be recovered through fees. However, practical difficulties may preclude consistent application of such an approach across jurisdictions. As Indigenous people may be afforded access rights by way of native title or other laws, rather than the grant of permits/licences, there may not be an immediate mechanism by which to levy and collect fees. The small number of customary fishers may also make the transaction costs involved in collecting fees higher than revenues received.

Some Indigenous communities may be able to contribute more effectively through non-monetary means; for example, self-management through Indigenous ranger programs (box 5.6). In addition to being a more culturally-appropriate means of enforcement, ranger programs allow application of traditional knowledge and empower Indigenous Australians to be more engaged in fisheries management.

INFORMATION REQUEST 5.2

How should cost recovery be applied to customary fishers?

Box 5.6 Indigenous ranger programs

The Australian Government's 'Working on Country' program currently funds 770 full-time Indigenous ranger positions. Ranger groups undertake environmental work over their country, including protected species conservation, as well as the management of cultural sites and transfer of traditional knowledge. The social benefits for remote Indigenous communities are considerable, including better health outcomes and improved connection to country. Demand for ranger jobs is currently outstripping availability. The Northern Territory, Queensland and Western Australia also operate their own ranger programs.

Indigenous ranger programs are important for maintaining and incorporating Indigenous knowledge into resource management, as well as helping ensure controls are culturally-sensitive. However, few ranger programs currently incorporate fisheries management. Some groups in the Northern Territory sea ranger program have roles that specifically address fisheries issues, such as fish population reporting. Some rangers have also been given limited enforcement powers.

Sources: Northern Territory Government (2011); Synergies Economic Consulting (2015).

Fishing for commercial purposes

Presently, most jurisdictions define customary fishing to preclude the exchange of fish for money. However, as noted in section 5.1, trade has been established as part of customary practice of some Indigenous communities. This presents a question as to whether Indigenous people should be permitted to trade fish as part of their customary fishing practices.

It may be argued that customary fishing rights exist to address unique cultural, historical or spiritual needs; in contrast, commercial activities involve monetary incentives that are not unique to Indigenous people. However, the right to trade has been affirmed by the High Court of Australia in *Akiba* (box 5.3). The claimants in *Akiba* successfully proved a tradition of commercial trade in fish within the Torres Strait, which was subsequently recognised in their native title rights. In considering that case, the Australian Law Reform Commission (2015) recommended that the *Native Title Act* be amended to explicitly define native title rights and interests as potentially including commercial uses, while retaining the need to prove a tradition of commercial fishing.

Customary fishers already hold some expanded rights in Western Australia, where fisheries policy allows for non-monetary barter or exchange of fish for other food or goods (DoF WA 2009). This right is contingent upon the exchange occurring within Aboriginal communities and being consistent with traditional practices.

The Commission considers that allowing trading of fish in accordance with proven traditional customs is consistent with intentions underpinning recognition of customary fishing rights. Customary use in this regard would be limited to trade in fish between and within local Indigenous communities —the right should not, for example, authorise the sale of fish to registered seafood processors. The fisher’s catch would remain subject to other controls over customary fishing (for example, a bag limit) where they apply.

Defining the limits of any ‘commercial customary’ right will depend on the traditions of the community in question and so is difficult to generalise — traditional trade and barter practices will differ between communities.

DRAFT RECOMMENDATION 5.3

The definition of customary fishing in fisheries laws should provide for fishing for commercial purposes, but only where consistent with traditional laws and customs.

Consultation with customary fishers

Consultation by fisheries managers with customary fishers has generally been poor, owing to a number of factors, including the lack of representative bodies for customary fishers in most jurisdictions.

If policies are made that affect access for customary fishers, the interests of customary fishers should be represented in the decision-making process. In the event that restrictions are imposed on customary fishing, consultation will become especially important in ensuring enforcement is culturally sensitive and does not spur conflict.

Use of traditional knowledge in fisheries management

An increased level of engagement with fisheries managers could allow transfer of some management responsibility to Indigenous communities and the integration of this management into broader fishery regimes. Indigenous ranger programs provide an established means to apply traditional management (box 5.6), but there are other options.

The ‘Traditional Use of Marine Resource Agreements’ (TUMRAs), used within the Great Barrier Reef Marine Park, are another example of how traditional knowledge can be applied in the management of fisheries. A TUMRA is an agreement between the marine park authority and a traditional owner group that regulates traditional use of all marine resources through a co-management approach. For example, the TUMRA may set out a hunting limit for dugongs, and the Indigenous community itself is given responsibility on how to allocate and manage to that limit.

While these agreements are quite formal and time consuming to negotiate, they are developed by the community in question, and allow them to apply their own management (Dobbs 2007).

5.4 Participation of Indigenous Australians in commercial fishing

A number of stakeholders have raised concerns about the low number of Indigenous Australians engaged in commercial fishing and suggested that governments should assist this engagement as one way of encouraging participation in fishing.³²

Commercial fishing can provide an opportunity for employment, income and self-determination. However, the economic development of Indigenous communities is affected by a large range of factors, most of which lie outside the scope of this inquiry. It is not clear that providing commercial fishing opportunities would best serve development goals. If it were the best approach, it would likely only be one part of any policy.

This section sets out some considerations in relation to promoting development through commercial fishing opportunities, drawing on the experiences of other countries.

³² Northern Land Council (sub. 39), Federation of Victorian Traditional Owner Corporations (sub. 40).

What are the barriers to engagement of Indigenous Australians in commercial fishing?

Several participants considered that Indigenous Australians are prevented from engaging meaningfully in commercial fishing due to inadequate consultation (discussed above) and the difficulties associated with accessing commercial quota or fishing rights and subsequently developing a viable enterprise.³³

Obtaining access to a commercial fishery is sometimes difficult because fishing rights may be expensive to purchase. However, obtaining access is not the only prerequisite for a viable commercial enterprise. Others include procuring relevant skills and securing finance for investment. These are not confined to Indigenous fishers and communities.

Aquaculture is also considered to be an avenue for Indigenous engagement in commercial activities, as access rights are not constrained as much as in marine fisheries. However, aquaculture ventures have their own challenges, requiring, among other things, specialist technical skills, access to suitable sites and infrastructure and resources for ongoing investment in nutrition, fish and marine health and genetics (chapter 8).

How have overseas jurisdictions encouraged participation of indigenous people?

In other countries with a similar colonial history, Indigenous commercial fishing has developed via a combination of differing legal rights and supportive government policy. In acknowledging their respective Indigenous peoples and the role that commercial fishing can play in their economic development, Canada and New Zealand both have policies aimed at encouraging participation in commercial fishing.

Canada

The right of Canadian aborigines to maintain their traditional access to fisheries is constitutionally recognised. This right can extend to commercial purposes if a community can prove they fished commercially prior to colonisation (Durette 2007, pp. 3–4).

The relationship between Canadian Aboriginals and the government is more formal compared to Australia. The government has treaties in place with most Aboriginal bands — some of which define fishing rights, such as the Nisga'a Treaty in British Columbia (Nisga'a Tribal Council 1998). These treaties influence a range of government policies.

The Canadian Government's aboriginal fishing strategy facilitates engagement of Canadian aborigines in commercial fishing through a number of programs (Fisheries and

³³ Torres Strait Regional Authority (sub. 9), Federation of Victorian Traditional Owner Corporations (sub. 40).

Oceans Canada 2012). For example, the Allocation Transfer Program includes a voluntary buyback of commercial fishing quota by the Canadian Government. This quota is allocated on a communal basis for commercial use by Canadian Aboriginals. Total effort in each fishery is thus unchanged and sustainability objectives are not impaired.

New Zealand

Maori commercial fishing rights were settled by the *Treaty of Waitangi Fisheries Agreement Act 1992*. The Act extinguished all traditional Maori rights to fish for commercial purposes, replacing them with access rights provided by the Act (Durette 2007). Under the Act, 20 per cent of commercial quota for newly developed fisheries is set aside for Maori commercial fishing. The New Zealand Government also funded Maori to buy out the privately-owned Sealord (New Zealand's largest fishing company) and attain its commercial quota. As Maori authorities, companies holding fishing quota on behalf of Maori benefit from preferential tax rates compared with non-Maori organisations (New Zealand Inland Revenue 2011).

Maori now hold about half of New Zealand's commercial fishing quota (Inns 2013). While obtaining quota has provided wealth and a source of income it has not, on its own, led to a commensurate increase in Maori employment in commercial fishing, with Maori making up less than a quarter of those employed in the fishing industry (Nana 2014).

Policy considerations

There are a number of ways in which Australian governments could promote Indigenous commercial fishing. Any policy initiative to do so through the reallocation or setting aside of fisheries resources will, however, be at the cost of access by other fishers.

More fundamentally, experience in Australia has demonstrated that policy initiatives aimed at creating development and employment opportunities for Indigenous communities often fail because they do not incorporate the broader prerequisites for success. These include closely involving the community in designing and implementing initiatives, as well as significant investments in education, training and broader capacity-building. In other words, access to a fishery is only likely to generate positive and sustainable economic benefits and employment for an Indigenous community (presuming that this is indeed the best way of encouraging economic development) if it is part of a broader, multifaceted strategy.

Government purchase of commercial quota for Indigenous fishing operations

Governments could purchase ordinary commercial quota and make it available to Indigenous fishers. This approach would bring Indigenous fishers into the commercial fishing framework.

In addition to the financial costs to government, a key consideration would be determining how to allocate the quota from a fishery. Quota could be granted to individual fishers, or an agreement could be made with a recognised Indigenous traditional owner group. Alternatively, land trusts could serve as the representative body. Under the draft Tropical Rock Lobster management plan, the Torres Strait Regional Authority will initially hold the allocated Indigenous-only quota in trust and determine its allocation (AFMA 2016e).

A community-quota approach could assist the development of commercial enterprises as aggregating quota would assist creation of economies of scale. Allocating to a community, rather than an individual, would also allow the community itself to determine who is permitted to fish the quota.

While community-level rights have been somewhat successful in Canada, the experience in Australia is limited. Allocating community-level licences may also be unworkable in the absence of well-resourced representative groups, or if members of the community have differing ideas on how the entitlement should be used.

Indigenous-only commercial licences or quota

A related option is to allocate Indigenous individuals or communities commercial quota which is only available for Indigenous fishers. The considerations are similar to the previous option, but with the condition that once quota is obtained by an Indigenous operator, it cannot be converted back into general quota. This is the approach applied in the Torres Strait through Traditional Inhabitant Boat licences (box 5.2), where it has contributed to the transfer of licence ownership to traditional owners.

Western Australia, Queensland and the Northern Territory currently offer specialised Indigenous commercial licences. While the details differ, these licences permit an Indigenous fisher to sell their catch, up to a certain limit, in specified species (generally those without significant resource pressure). However, these licences are usually subject to a number of restrictive conditions and have not been widely taken up.

Indigenous-only licensing would progress a fishery towards higher Indigenous participation by restricting access by non-Indigenous participants. As experience shows, the restrictions attached to any Indigenous-only licence require careful consideration. Further, a possible (and rational) response to obtaining quota would be for quota-holders to lease the entitlement to other fishers. New Zealand's experience shows that leasing quota could provide income but may not necessarily improve employment outcomes.

Promoting Indigenous involvement in aquaculture

As noted, aquaculture has been promoted by some as an alternative option. Joint ventures are one way of potentially promoting viable developments (box 5.7).

Box 5.7 The Aarli Mayi aquaculture project

The Aarli Mayi aquaculture project is a proposed joint venture in the Kimberley region of Western Australia. The project aims to obtain a 13 000 tonne quota for finfish farming, and so spur employment and financial benefits for the traditional owners.

Ownership is divided between three traditional owner groups, who own 75 per cent of shares, and the privately-owned Maxima Opportunity Group, which owns the remaining 25 per cent. Maxima Opportunity has experience in commercial fishing and is providing business development expertise. The project is currently awaiting regulatory approval.

Source: Maxima Opportunity Group (2015).

Previous attempts to improve the participation of Indigenous Australians in aquaculture have not been successful. The 2001 National Indigenous Aquaculture strategy, which itself had limited effect, attributed past poor outcomes in Indigenous aquaculture ventures to ‘inadequate planning, support and training processes’ for Indigenous communities (Lee and Nel 2001).

Any government strategy would therefore need to meaningfully help Indigenous participants overcome these technical barriers. Under the Aboriginal Aquaculture in Canada Initiative, the Canadian Government provides targeted funding for proposed aquaculture projects in the development of business and administration skills.

6 Fisheries spanning jurisdictions

Key points

- Marine fisheries that span Commonwealth, state and/or Northern Territory borders are an unavoidable result of the marine jurisdictions defined by the Offshore Constitutional Settlement (OCS).
- Managing fisheries according to jurisdictional borders and the traditional lines of responsibility for fishing sectors can create adverse consequences, including: additional administrative and compliance costs, unequal treatment of fishers, constraints on productivity, high levels of waste through discarding, and sub-optimal management of both target species and bycatch.
 - These costs are likely to increase for fisheries where the movement and composition of stocks are affected by climate change and for Commonwealth fisheries that are subject to increasing fishing by recreational fishers.
- Not all fisheries spanning borders appear to be problematic, with many of the arrangements negotiated by jurisdictions not attracting stakeholder concern. However, the management of 24 stocks has been identified as concerning due to duplicated or inconsistent arrangements. Of these, the degree and nature of detriment varies widely.
- The cost of transferring management of a single stock to one jurisdiction can be significant and has been one of the major impediments to reform. Given limited resources, governments should:
 - focus on fish stocks that are of higher value/risk and subject to inconsistent management arrangements, and hence vulnerable to significant cost escalation or diminution in value if poor management arrangements continue. Stocks in this category include southern bluefin tuna, the east coast snapper stock and those stocks managed in the Commonwealth/New South Wales trawl fisheries
 - consider whether the transfer of management responsibility to one government or better alignment of management arrangements would produce the greatest net benefits.
- The costs and risks of shared management of fish stocks will be minimised if governments adopt known best practice approaches to core fisheries management tasks (such as adopting harvest strategies) and routinely seek to implement reciprocal or consistent arrangements in relation to matters such as catch controls and data collection.
- As in the past, reforms will falter if governments do not make reform of cross-jurisdictional fisheries arrangements a collective priority. This requires the dedication of sufficient resources to implement cost-effective reforms.
 - Governments should issue joint reform strategies for, and regularly review, the management arrangements for cross-jurisdictional fisheries.

Australia has many marine fisheries that span Commonwealth, state and/or Northern Territory borders. Some of these are managed according to jurisdictional borders

(‘cross-jurisdictional fisheries’), rather than as a single fishery, resulting in multiple management systems for that fishery.

The management of cross-jurisdictional fisheries is more costly due to the existence of multiple regulatory systems. Where the rules of those systems are inconsistent or do not sufficiently take each other into account, there are higher risks of over- and under- fishing, unequal treatment of fishers, and administrative inefficiency. Problems with a number of cross-jurisdictional fisheries have been recognised for many years, but reform in this area has generally been limited. This chapter considers how cross-jurisdictional fisheries in Australia are managed as well as reform options and priorities.

6.1 Basis of jurisdictional responsibility

The legal basis for jurisdiction over Australia’s offshore waters has evolved over time to become defined by an agreement between the Commonwealth, the states and the Northern Territory known as the Offshore Constitutional Settlement (OCS — box 6.1). In essence, the OCS provides:

- the states and Northern Territory with legislative powers and title over waters and the seabed up to three nautical miles from the low water mark (referred to as ‘coastal waters’)³⁴
- the Commonwealth with responsibility from the three nautical mile mark to the edge of the Australian Fishing Zone (AFZ), which extends to 200 nautical miles offshore.

These jurisdiction boundaries apply to all marine uses and activities, including fishing, marine parks and offshore petroleum exploration (as well as matters such as crimes at sea). These boundaries were agreed by the jurisdictions and given effect through a package of legislation passed by the state, Northern Territory and Australian Governments. Hence, it is unlikely that they will change unless all jurisdictions agree that they are fundamentally unsuited to the division of responsibilities for all marine uses.

As recreational fishing has historically taken place close to the shoreline, only the states and Northern Territory regulate recreational fishing in marine fisheries, including that occurring in Commonwealth waters adjacent to their respective coasts (further background on responsibility for recreational fishing is contained in chapter 4).

A number of formal arrangements have been established to manage fisheries spanning jurisdictional boundaries. These include 59 OCS fishery arrangements between the Commonwealth and state(s)/Northern Territory, three joint authorities and a Protected Zone Joint Authority for the Torres Strait (details of the Protected Zone Joint Authority are contained in chapter 5). There are also a number of informal arrangements between states

³⁴ There are some cases where coastal waters extend beyond the three nautical mile limit — for example, in South Australia where its large bays and gulfs (including the Gulf of St Vincent and Gulf Spencer) are deemed to be South Australian waters.

and the Northern Territory on specific aspects of fisheries management, such as research and stock assessment methods.³⁵

Box 6.1 How the Offshore Constitutional Settlement came to be

The Constitution did not address jurisdiction over Australia's offshore waters. The question of jurisdiction came into sharp focus in the 1960s when the Australian Government sought to reconcile its powers under the Constitution with its obligations under international law.

The Australian Government claimed sovereignty over all offshore waters from the low water mark with the passage of the *Seas and Submerged Lands Act 1973* (Cwlth). The purpose of the Act was, in part, to give effect to provisions contained in international treaties (the *Convention on the Territorial Sea and Contiguous Zone* (1958) and the *Convention on the Continental Shelf* (1958)) to which Australia became signatory in 1963. The *Seas and Submerged Lands Act* was unsuccessfully challenged by the states in 1975 with the High Court finding that the legislation was a valid use of the Commonwealth's external affairs power (s. 51 (xxix) of the Constitution).

Following a change in the Australian Government in 1975, the Commonwealth, states and Northern Territory commenced negotiations over the jurisdiction for offshore waters. An intergovernmental agreement on the matter, known as the Offshore Constitutional Settlement (OCS), was reached in 1979.

Recognising that the OCS would not negate the need for further negotiation on jurisdictional responsibility over marine waters, the final section of the OCS directs that:

When the Commonwealth and States are each concerned with the same matter, they should channel that concern into paths of cooperation ... The offshore arrangements have *laid the basis* (Commission emphasis) for a permanent workable and beneficial solution of problems that have beset the nation for a decade or more (1980, p. 17).

The jurisdictional boundaries agreed in the OCS align with those assumed by the states, Northern Territory and Commonwealth for the management of fisheries prior to the passage of the *Seas and Submerged Lands Act*. In effect, the OCS formalised prior arrangements that assumed state territorial limits to be three nautical miles from the low water mark.

The OCS was given full effect from February 1983 through Commonwealth and enabling state and territory legislation.

Sources: Bonser v La Macchia (1969) 122 CLR 177; New South Wales v the Commonwealth (1976) 135 CLR 337; Port MacDonnell Professional Fishermens' Association v South Australia (1989) 168 CLR 340; Gullet (2008, 2009); National Oceans Office (2002); White (2009).

In addition to these arrangements, jurisdictions cooperate to jointly undertake tasks or share services. For example, Queensland provides logbook services to the Commonwealth for the aquarium sector in the Coral Sea Fishery and the Australian Fisheries Management Authority (AFMA) provides vessel monitoring system services for Victoria, Queensland and South Australia, as well as observer services for a New South Wales fishery (AFMA,

³⁵ There are few formal agreements between the states/Northern Territory for the management of cross-jurisdictional fisheries. One such agreement is the 2006 Memorandum of Understanding between Western Australia and the Northern Territory to promote the consistent management of the South Sea Pearl industry.

sub. 50). A number of these arrangements exist in fisheries where management responsibility is shared across jurisdictions.

OCS fisheries arrangements

The OCS provides for the making of agreements between the Commonwealth and state/Northern Territory Governments to clarify jurisdiction over fisheries and so ensure an effective management structure for those fisheries (box 6.2). In their early conception, OCS fisheries arrangements were to achieve this objective by having an individual fishery operate under a single law, a single set of management rules and a single licensing regime. From the first OCS fisheries arrangement, however, the ‘single jurisdiction’ model has not always been followed. (The first arrangement was for the Bass Strait Scallop Fishery in 1986, where jurisdiction was shared between the Commonwealth — which was given responsibility for the central portion of Bass Strait — and Tasmania and Victoria, which were given responsibility for areas within 20 nautical miles of their respective coasts. This arrangement remains in effect today).

Box 6.2 OCS fisheries arrangements

The Offshore Constitutional Settlement (OCS) provides that the Commonwealth may make agreements with the states and/or Northern Territory in relation to fisheries. These agreements are known as ‘OCS fisheries arrangements’. Under these arrangements, the jurisdictional boundaries prescribed under the OCS can be varied to better conform to the span of a given fishery (or fisheries).

Mirror provisions within the fisheries legislation of the jurisdictions give their respective Ministers the power to enter into OCS fisheries arrangements and then give legal effect to those arrangements. The validity of OCS fisheries arrangements has been upheld by the High Court (*Port MacDonnell Professional Fishermens’ Association v South Australia* (1989) 168 CLR 340).

Not all fisheries spanning the waters of the Commonwealth and a state/Northern Territory (as defined in the OCS) are subject to an OCS fisheries arrangement. Where there is no such arrangement, jurisdiction over the fishery defaults to the state/Northern Territory within their waters and the Commonwealth within its waters (the ‘default jurisdiction arrangements’).

The 1991 OCS fisheries arrangements between the Commonwealth and New South Wales, and 2006 amendments to the *Fisheries Management Act 1991* (Cwlth) marked further distinct moves away from the single jurisdiction model. New South Wales’ 18 OCS fisheries arrangements involve shared jurisdiction with the Commonwealth over a number of stocks. The 2006 amendments provided for a fishery to be managed according to the different laws of different jurisdictions in different areas provided those areas do not overlap — that is, the amendments explicitly provided for the shared management of a single fishery.

At least 29 of the current 59 OCS fisheries arrangements place the management of fisheries or fish species with two or more jurisdictions.

Construction and focus of OCS fisheries arrangements

OCS fisheries arrangements set out the physical area, fishing method(s) and the species or group of species to which the arrangement applies. They also specify whether it is the state/Northern Territory, Commonwealth or a joint authority that is responsible for all or specific aspects of the fishery. The arrangements deal with the question of jurisdiction only. They do not, for example, set out the basis for sharing access between different types of fishers or set out the management arrangements for fisheries.

OCS fisheries arrangements typically apply to commercial fishing and fishing methods. The emphasis on commercial fishing reflects the historical focus of regulators on commercial fishers and predominance of commercial fishers in Commonwealth waters.

Memoranda of understanding

Victoria, South Australia and Tasmania each have an overarching Memorandum of Understanding (MoU) with the Commonwealth (and AFMA) to guide the operation of their OCS fisheries arrangements. As the extent of shared jurisdiction with the Commonwealth is not as great for Queensland, Western Australia and the Northern Territory, these jurisdictions do not have overarching MoUs — rather memoranda cover specific major areas of potential overlap between state, Northern Territory and Commonwealth regulation — namely, the management of tuna (and tuna-like species) and the Northern Prawn Fishery.

Despite their considerable shared jurisdiction and 18 OCS fisheries arrangements, New South Wales does not have any MoUs in place with the Commonwealth.

Both the overarching and specific memoranda seek to promote cooperation between jurisdictions. Examples of provisions promoting better practice include:

- the timely sharing of data and research on both target species and bycatch
- the coordination of catch and bycatch policies for those instances where a species is targeted by more than one jurisdiction or targeted in one jurisdiction but incidentally caught in another
- commitments to establish a global total allowable catch (TAC) for a shared species and allocation of the TAC across jurisdictions
- commitments to establish arrangements to ensure each jurisdiction remains within its allocated catch limit
- regular meetings to discuss the management of shared, adjoining and overlapping fisheries
- consistent measures for managing bycatch.

Joint authorities

The OCS provides for the establishment of ‘joint authorities’ to manage fisheries that span jurisdictional boundaries. A joint authority comprises the Ministers responsible for fisheries from the Commonwealth and the state(s)/Northern Territory (as applicable). Collectively, the Ministers oversee the strategic direction of the fishery. Day-to-day management is undertaken by the nominated jurisdiction according to its fisheries laws.

At the time the OCS was agreed it was expected that joint authorities would play a meaningful role in the management of fisheries. But, as at August 2016, only three fisheries joint authorities were operating pursuant to OCS fisheries arrangements: the Queensland Fisheries Joint Authority, Northern Territory Fisheries Joint Authority and the Western Australian Fisheries Joint Authority.

Joint authorities have not been a favoured management arrangement for fisheries spanning borders because they ‘tend to be administratively cumbersome and ... perpetuate the problem of divided responsibility’ (DPIE 1989, p. 54). In a recent review of Queensland’s fishery management arrangements, MRAG Asia Pacific noted that ‘[i]n an era of small and more cost efficient government it is hard to see where the [Queensland Fisheries Joint Authority] adds value to a fishery that is primarily managed by Queensland’ (2014, p. 105). That the OCS provides for the Commonwealth’s view to prevail in the event of any disagreement within the joint authority is likely to have reduced the appeal of this model to other jurisdictions.

AFMA has indicated that it will seek to disband the three joint authorities and replace each with a single jurisdiction management structure as one of its ‘red tape reduction initiatives’ (AFMA 2016h).

6.2 Problems in cross-jurisdictional fisheries

Informed by submissions and previous reviews, the Commission has identified 24 stocks that are being adversely affected in some way by shared management (table 6.1). The most significant concerns relate to stocks in southeast Australia. The combined gross value of production of affected stocks is approximately \$485 million.

The concerns raised by stakeholders focus almost exclusively on the costs and complexity arising from shared management. These include the costs of:

- duplicated management systems (multiple stock assessments, harvest management plans, research processes, monitoring and compliance systems, and stakeholder engagement processes)
- complying with the different systems (maintaining separate log books for each jurisdiction, meeting different licence requirements and participating in multiple consultation processes)

- meeting requirements developed to deal with the problems caused by shared jurisdiction (for example, the ‘single jurisdiction trip requirements’ — box 6.3).

Table 6.1 Stocks identified as of concern under shared management

<i>Stocks</i>	<i>Managed by</i>	<i>Gross value of production^a</i>
		\$ million (2013-14)
Southern rock lobster	Vic, SA, WA and Tas	178
Southern bluefin tuna	Cwllth, NSW, Vic, SA, WA and Tas	125 ^b
Coral trout	Cwllth, Qld, WA and NT	30
Mud crab	NSW, Qld, WA and NT	27
Sardines	Cwllth and SA	19
Gummy shark	Cwllth, NSW, SA and WA	19
Yellowfin tuna	Cwllth, NSW, Vic, Qld, SA and WA	15
Tiger flathead	Cwllth and NSW	14
Spanish mackerel	Cwllth, Qld, WA and NT	8
Grey mackerel	Qld, WA and NT	7
East coast snapper	NSW, Vic and Qld	5
Eastern school whiting	Cwllth and NSW	5
Pink ling	Cwllth and NSW	5
Scallop	Cwllth, Vic and Tas	4
Blue eye trevalla	Cwllth and NSW	4
Blacktip shark	Qld, WA and NT	3
Red emperor	Qld, WA and NT	3
Black jewfish	Qld, WA and NT	3
Albacore	Cwllth, NSW, Vic, Qld, SA, WA and Tas	<2
Bight redfish	Cwllth and SA	<2
Striped marlin	Cwllth, NSW, Vic, Qld, SA, WA and Tas	<2
Orange roughy	Cwllth and NSW	<2
Silver trevally	Cwllth and NSW	<2
Striped trumpeter	Cwllth and Tas	<2

^a Commission estimates of the gross value of production are based on catch data for 2012-13, 2013 calendar year and 2013-14 — whichever was the most current. ^b Based on the ‘farm gate’ value (that is, after captured fish have been grown out in aquaculture pens). Value at the time of capture is approximately \$40 million.

Sources: Commission estimates; ABARES (2015b); AFMA (2016a); DAF Qld (2015a, 2015b); DEDJTR (Vic) (2014); DPIF NT (2015b); Econsearch (2015b); FRDC (2014c); Industry & Investment (NSW) (2010a, 2010b).

Box 6.3 **Stocks most affected by shared management**

Southern bluefin tuna (SBT)

The Convention for the Conservation of Southern Bluefin Tuna allocates Australia an allowable catch quota for SBT. SBT is a high value and at-risk species that would benefit from a clear apportionment of the allowable catch to the commercial and recreational sectors. Recreational fishers are seeking secure rights to the stock, for example:

There are insufficient legislative measures in place to protect recreational fishing grounds and the surrounding regional communities that they support, especially for our premier game fish species such as [SBT] ... (Victorian Recreational Fishers, sub. 25, p. 1).

Commonwealth/New South Wales trawl fisheries (includes tiger flathead, eastern school whiting, pink ling, silver trevally and blue eye trevala)

Catch is controlled in the Commonwealth fishery through a quota system while catch in the New South Wales fishery is controlled using limits on boats and gear. AFMA establishes a recommended biological catch (RBC) for species targeted in both fisheries (such as the eastern school whiting). AFMA estimates how much New South Wales fishers are likely to take and subtracts that estimate from the RBC before issuing quota against the remaining RBC to Commonwealth fishers. However, the absence of catch limits for New South Wales fishers means there is a heightened risk of over-fishing should their catch exceed that predicted by AFMA. Conversely, if New South Wales fishers do not meet their notional catch allocation, Commonwealth fishers bear the costs of that under-fishing through lower than optimal quota. New South Wales fishers benefit from AFMA's stock assessments but do not contribute to the costs (which are mostly borne by Commonwealth fishers).

Fishers are subject to restrictions on fishing to prevent the gaming of the Commonwealth's quota system. The restrictions include:

- a requirement that fishing is only undertaken in one fishery on each fishing trip ('single jurisdiction trip' requirements). This means that, while a fisher might travel through the Commonwealth and New South Wales fisheries on a fishing trip, they can only take fish from one or the other fishery (but not both), even if they hold licences to fish in both fisheries
- limits on the take of certain species (known as 'trip limits'). The limits are 50–1000 kilograms per trip (depending on the species).

East coast biological snapper stock

New South Wales, Victoria and Queensland complete their own stock assessments on east coast snapper even though it is a single biological stock. Multiple stock assessments result in higher management costs as well as less complete information for management decisions (compared to an overarching assessment). The lack of information on the overall stock has resulted in the status of the stock being classified as 'undefined', although the stock had been classified as 'overfished' by Queensland in 2009 (FRDC 2014c).

A joint project has commenced to develop a computer model for the stock and draw up protocols for inter-jurisdictional decision making processes. This project is expected to be completed during 2017.

Inconsistent approaches to management are also leading to:

- the creation of higher risks in relation to the sustainability of fish stocks and ecological systems due to different methods of controlling catch
- inequitable treatment of fishers operating within and across fisheries due to the application of different rules and cost recovery arrangements
- high levels of waste through discarding where shared jurisdiction over an expanse of water³⁶ results in higher levels of incidental catch of non-target species.

The nature and magnitude of detriment arising from shared management varies from fishery to fishery. For some stocks (such as southern bluefin tuna (SBT)) there are clear risks to sustainability and/or value (box 6.3). For other stocks (such as southern rock lobster and coral trout), the costs and/or the risks are much lower (box 6.4). (Appendix B provides detailed case studies on SBT, eastern school whiting, snapper, gummy shark, southern rock lobster and southeast Australian scallops.)

Even where management arrangements are well aligned and designed to reduce duplication, management and compliance costs are higher than would be the case if the stock was managed by a single (efficient) jurisdiction due to the transaction costs incurred in preserving alignment.

Reducing compliance costs could improve the viability of commercial fishing businesses. Where regulatory costs are higher than necessary, consumers will pay higher prices, which may in turn reduce demand, fishing activity, investment and employment.

³⁶ An expanse of water can contain multiple fisheries. For example, off the South Australian coast there are at least seven fisheries in the same waters — Rock Lobster Fishery (South Australia), Marine Scalefish Fishery (South Australia), Sardine Fishery (South Australia), Small Pelagic Fishery (Commonwealth), Southern and Eastern Scalefish and Shark Fishery (Commonwealth), Southern Squid Jig Fishery (Commonwealth) and Western Tuna and Billfish Fishery (Commonwealth).

Box 6.4 Other stocks affected by shared management

Yellowfin tuna, albacore and striped marlin

The absence of an explicit allocation of catch between commercial fishers (managed by the Commonwealth) and recreational fishers (managed by the states) is resulting in tension between the sectors as they compete for catch. The level of competition (and tension) between fishers is expected to grow as the recreational effort in Commonwealth waters increases.

Sardines

Commonwealth fishers with rights to take sardines from the Small Pelagic Fishery (SPF) must travel past any sardines off the South Australian coast and discard them if accidentally caught when targeting another species. Only one Commonwealth vessel captured and retained sardines in the SPF in 2013-14. There are potential productivity gains for Commonwealth fishers from reform but it is unclear whether there would be a significant improvement in overall efficiency given South Australian fishers are already taking the majority of sardines.

Coral trout

The costs arising from shared management are likely less than in other cross-jurisdictional fisheries as over 95 per cent of the total catch is taken from Queensland fisheries (FRDC 2014c). Further, some duplication of management processes is unavoidable as the management of the Torres Strait Finfish Fishery (managed by the Commonwealth and from which coral trout is taken) is bound by the 1985 Torres Strait Treaty with Papua New Guinea.

Gummy shark

There is a single biological stock of gummy shark that extends from New South Wales to Western Australia. Management of the stock is shared by the Commonwealth, New South Wales and Western Australia with only a very small catch taken from New South Wales waters. Stakeholders have not raised concerns about the costs arising from the dual Commonwealth/Western Australia management arrangements.

South Australian fishers who also hold Commonwealth fishing rights for gummy shark are having to discard gummy sharks when caught in a 'South Australian fishery'. But, given the array of fisheries off the South Australian coast, the extent to which discarding would be alleviated by reform is unclear. Any reform of arrangements for South Australian waters would need to be mindful of adjoining jurisdictions and avoid the creation of a new shared fishery.

Southern rock lobster

Southern rock lobster is a single stock that is managed by four states. 98 per cent of the total catch taken by Victorian, South Australian and Tasmanian fishers (FRDC 2014c). Costs and risks have been substantially reduced by cooperation between the states on research and management, the use of a common model to perform stock assessments and regular liaison between marine scientists/researchers. It is unclear whether further reform would produce net benefits given the gains already made, the costs of reform and the stock's sedentary nature.

Mud crab and Southeast Australian scallops

These stocks are subject to duplicated management processes. However, their sedentary nature means there are fewer impacts from shared management than for other species. In the case of scallops, the relatively low value of the three fisheries and extent of cooperation between jurisdictions means that there is likely to be only limited (if any) net gains from reform.

Structural problems facing cross-jurisdictional fisheries

The rigidly defined geographic boundaries specified in many OCS fisheries arrangements are not suited to providing dynamic regulatory responses to changing fish populations and distributions arising from climate change, nor moves toward ecosystem based fishery management. The Food and Agriculture Organisation (FAO) has noted that climate change is already affecting fish and their ecosystems:

... with some species moving to deeper waters, and ... some species moving hundreds of kilometres poleward. As a result there is [an] introduction of new species and losses of familiar species in conventional fishing grounds. These changes ... could introduce considerable confusion in stock assessments, confounding the ability to distinguish between the impact of fishing and that of the environment. For species or populations that cannot move in response to climate change, changes in the population parameters used for stock assessment and management could affect the reliability of assessment made using historical parameter values (2009, p. 49).

Arrangements according the states and Northern Territory sole responsibility for the regulation of recreational fishers are also under some pressure. Their limitations are already evident in the management of stocks such as tunas (boxes 6.3 and 6.4) and marlins. On the latter the Australian Government has banned the capture of blue and black marlin for commercial purposes in agreement with the commercial sector, charter operators and game fishers. While recreational fishers are likely to continue to fish mainly in coastal waters, it is conceivable that a small but increasing number (including charter and game fishers) will access Commonwealth waters as boating and gear technology improves.

Where have single jurisdiction arrangements been instituted?

Fisheries under management by a single jurisdiction show few (if any) of the problems noted above and are considered by stakeholders to work well (for example, subs. 21, 48, 60 and Woodhouse 2002, p. 74). These fisheries include the Northern Prawn Fishery (Cwlth) and those in Queensland and Western Australia subject to OCS fisheries arrangements (such as the Western Rock Lobster Fishery (WA), East Coast Otter Trawl Fishery (Qld), Spanner Crab Fishery (Qld) and West Coast Deep Sea Crustacean (WA)). The combined gross value of production in these fisheries exceeds \$450 million.

The OCS fisheries arrangement for the Northern Prawn Fishery was agreed between the Commonwealth, Queensland, Western Australia and the Northern Territory in 1988 (and amended in 1995). The arrangement followed an expansion in the fishing grounds and a significant number of freezer trawlers entering the fishery, as well as increasing concerns regarding overexploitation and overcapitalisation within the fishery. It was to provide for more effective and flexible management of the fishery, particularly the sensitive nursery areas (Cartwright 2005).

The OCS fisheries arrangements between the Commonwealth and Western Australia, and between the Commonwealth and Queensland provide for the states to have jurisdiction

over the majority of waters off their coasts (box 6.5) and so have avoided duplication. Queensland and Western Australia also appear to have been advantaged by their relative isolation from other states.

The distinguishing features of the fisheries above are that:

- a single jurisdiction is responsible for each fish stock/fishery
- management responsibilities have largely been aligned to the geographic range of the fish stock/fishery under management — a prerequisite for good fisheries management (FAO 1995)
- governance arrangements have been set according to that geographic range — the state is responsible for fisheries completely contained within the waters adjacent to the state while the Commonwealth is responsible where the fishery spans waters adjacent to multiple jurisdictions.

Box 6.5 OCS arrangements: Western Australia and Queensland

The five OCS fisheries arrangements involving Western Australia provide for the management of commercial fishing under Western Australian law, with the exception of commercial fishing in the Northern Prawn Fishery, fishing for tuna and trawling in waters more than 200 metres deep (which are Commonwealth responsibilities).

Similarly, the OCS fisheries arrangements between the Commonwealth and Queensland provide for management of the majority of fishing activity in waters adjacent to the Queensland coast under Queensland law. The Commonwealth separately manages the Northern Prawn Fishery, the Torres Strait Fisheries (the subject of a bilateral treaty with Papua New Guinea), the Coral Sea Fishery and deep water trawling in southern Queensland, as well as fishing for tuna and tuna-like species fisheries.

6.3 Past reform attempts

As noted by Borthwick (2012, p. 81), ‘[o]ver the years, there has been considerable discussion of how these [shared management] issues might be better resolved but they have not come to much’.

Past experience has been that significant change has generally only been achieved when the cost of not acting, such as the risk to the sustainability of a species, became too great.³⁷ For example, a decision by Victoria, South Australia and Tasmania in 2000 to cede jurisdiction over the gummy shark to the Commonwealth followed a considerable depletion in the species’ biomass. Similarly, increasing concern over the sustainability of

³⁷ The costs of overfishing and actions to recover fish stocks can be significant. For example, the fishing of orange roughy was prohibited for over a decade while stocks recovered. As another example, in the United States, the National Marine Fisheries Service and the U.S Fish and Wildlife Service (2005, cited in (Little et al. 2015)) estimated the cost of rebuilding Atlantic salmon to be at least US\$36 million.

catch in the Northern Prawn Fishery led to the ceding of jurisdiction to the Commonwealth.

Generally, the potential to avoid costs, including the costs of opportunities foregone from better utilisation of resources, have not been sufficient to prompt change in the management of many of the stocks identified as being of concern. In some cases where reform has been attempted, the timeframes have extended beyond what most would consider reasonable — nearly 10 years in the case of negotiations over the Commonwealth and New South Wales trawl fisheries (which remain to be fixed) and over 30 years for the ‘on again, off again’ reform initiatives in the southeast Australian scallop fisheries.

The cost of undertaking reforms appears to have been a significant impediment, as well as a lack of priority being given to this area of reform. The process of moving a shared fishery to management by a single jurisdiction can be complex, costly and time consuming. For example, before management of a stock can be transferred to one jurisdiction, the rights of fishers in the existing fisheries need to be converted to rights in the new fishery (and compensation provided if the existing rights are somehow diminished in the process).

Seeking to improve a shared management arrangement by better aligning approaches can also be a complex undertaking — for example:

- jurisdictions need to agree on a range of matters (such as stock assessment methods) before stock assessment processes and management controls can be aligned
- before a single stock assessment can be introduced there needs to be agreement on how the resultant TAC will be determined and allocated across the jurisdictions. This requires agreement on the objectives of the TAC. Negotiations can become protracted where governments have different priorities
- if services (such as research) are to be shared, consensus needs to be reached on matters such as how costs will be shared and the scientific methods to be used.

The planning and design process itself can also be costly — for example, the Commission understands \$0.5 million has been allocated by the New South Wales Government to plan and design the reform of the Commonwealth/New South Wales trawl fisheries. While this is relatively complex multispecies fishery, it is an indication of the initial outlay required.

Many past reform attempts appear to have faltered because they relied on ‘business as usual’ resources or resources being allocated to other priorities:

Tasmania has 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 ... (Sen (2011, p. 40) in relation to the reform of the southeast Australian scallop fishery)

The Review Team [reviewing commercial fisheries in New South Wales] understands that the issues around OCS discussions between the Commonwealth and NSW are quite complex, and that it is unlikely that all these issues can be resolved in a short timeframe. This is because of resource constraints within the Fisheries Division of NSW DPI and the Commonwealth ... (Stevens, Cartwright and Neville 2012, p. 39)

It appears that the costs of reform and other priorities are also reasons why, where change has occurred, it has often not required change to underlying lines of jurisdictional responsibility — for example, efforts by jurisdictions to jointly undertake some tasks or share services (section 6.1).

6.4 Reform directions

Continuation of the current approach is not tenable if governments wish to maximise the value of fisheries and ensure their sustainability. The costs of not changing will increase, particularly for fish stocks affected by climate change and subject to increasing effort by recreational fishers in Commonwealth waters.

Prioritising reform

Limited resources and the costs of reform mean that reforming all cross-jurisdictional fisheries with scope for improvement is not realistic. Ultimately, the benefits of reform have to outweigh the costs over a reasonable timeframe. This suggests:

- governments should focus on fish stocks that are of higher value/risk and subject to inconsistent stock management arrangements
- governments should consider whether transfer of management responsibility to a single government or better alignment of management arrangements would produce the greatest net benefits considering the costs involved.

Selecting the jurisdiction of management

In 1993, the jurisdictions agreed to a set of principles to guide the formation of OCS fisheries arrangements (box 6.6). These included that governments should avoid, as far as possible, subdividing management responsibility for a stock under different jurisdictions — that is, management by a single jurisdiction is best. The Commission considers that this principle remains relevant. On who should be responsible for what, experience suggests:

- the Commonwealth should have jurisdiction over migratory species that are subject to international agreements and span multiple jurisdictions given it is the Commonwealth that is both signatory to the relevant international conventions and best placed to manage species across jurisdictions. This should not preclude the Commonwealth assigning some management tasks to the states/Northern Territory if they are best placed to undertake them (for example, monitoring and enforcement of catch at the shore), but these tasks should be undertaken in accordance with the Commonwealth's management policy.
- a state or the Northern Territory is usually best placed to manage stocks (other than those subject to international agreements) that span the waters of only their

state/territory and the Commonwealth as they are better placed to manage the totality of issues in waters off their coast lines.

Box 6.6 Guiding principles: OCS Fisheries Arrangements (1993)

In 1993 the jurisdictions agreed that new OCS fisheries arrangements should:

- ensure, through proper conservation and management measures, that living resources of the Australian Fishing Zone (AFZ) are not endangered by over-exploitation
- achieve the optimum utilisation of the living resources of the AFZ
- avoid, as far as possible, subdividing a single stock under different jurisdictions
- achieve (as a preference) single agency management of fisheries as opposed to joint authorities which add another layer of consultation and operate less rapidly
- include memoranda of understanding to ensure reciprocal licensing data transfer and the application of uniform arrangements where appropriate
- seek to preserve the flexibility of the fleet to move within a fishery according to changes in the seasonal or geographic distribution of resources
- avoid discriminating against fishermen solely on the basis of state of residence
- avoid restrictions which represent an impediment to trade between the states
- set boundaries which seek to maximise the potential to develop efficient catching, processing and marketing sectors (subject to resources conservation considerations)
- take account of administrative law including principles of natural justice with respect to the introduction of measures to regulate fisheries
- seek to achieve a broad based species approach to OCS arrangements with respect to bycatch
- minimise the number of boundaries and the cost of administration and enforcement.

Source: ANAO (1996).

For stocks (other than those subject to international agreements) that span the borders of two or more states/territories, and the Commonwealth, the considerations are more complex. Decisions need to be made on a case-by-case basis considering, among other matters:

- the extent of fishing within the coastal waters of the states/Northern Territory and within Commonwealth waters
- the relative expertise of the jurisdictions in regard to the fish/fishery
- the extent to which the decision on management would result in shared jurisdiction over an expanse of water
- the geographic distribution of fishers in the fishery
- the extent of recreational fishing in the fishery
- the fishing methods used in the fishery and the management responsibility for other species taken by those methods.

When moving to a single jurisdiction is not suitable

Transferring management of a stock to a single jurisdiction may not be cost-effective or a priority for: stocks fished primarily by recreational fishers across multiple states; sedentary stocks; and those stocks of low value (current and potential) subject to poor data (table 6.2).

Table 6.2 Where a single jurisdiction may not be suitable

<i>Situation</i>	<i>Reason</i>
Recreational stocks taken by fishers in multiple states	The impact of shared fishery arrangements on recreational fishers is reportedly 'relatively minor'. ^a However, the efficiency and effectiveness of management is still adversely affected where states complete their own stock assessments for a shared fish stock. This can be mitigated by sharing research and commissioning a single stock assessment.
Sedentary stocks (such as rock lobster, scallops and abalone)	By their nature, these stocks often need targeted spatial management. When supported by a cooperative management approach between jurisdictions (as with the southern rock lobster), separate management arrangements across (and within) jurisdictions can operate without a material adverse impact on outcomes.
Low value (current and potential) and data poor stocks	The low value of these stocks limits the potential net gains from reform. More cost-effective reform may entail sharing information and data between jurisdictions.

^a Amateur Fishermen's Association of the NT Inc (sub. 20), VR Fish (sub. 25), Merimbula Big Game & Lakes Angling Club Inc (sub. 27) and Tasmanian Association for Recreational Fishing Inc. (sub. 42).

Where transferring management to a single jurisdiction is unlikely to be cost-effective, the path of reform should be based on:

- sharing information and research: this is a relatively low cost way to support more informed (and consistent) decision making in cross-jurisdictional fisheries
- aligning stock assessment processes and management controls: once jurisdictions have a shared understanding of the fishery this can be translated into a common stock assessment methodology (or directly into an agreed basis for a single stock assessment — below). Management controls should also be aligned where possible. Some controls, such as size limits and fishing seasons, may still need to vary but there should be sound management reasons for doing so. Other initiatives could include: streamlining data collected from fishers; aligning the timing of key management decisions; streamlining consultation processes; and aligning harvest strategies
- rationalising multiple stock assessments into a single assessment: once jurisdictions have implemented aligned stock assessment processes and/or come to an agreement on the assessment methodology, they can undertake a single stock assessment rather than multiple individual assessments. It follows that a process of allocating catch limits across the jurisdictions is required. The implementation of a single harvest strategy for the fishery and transferrable entitlements (chapter 3) would support this process.

DRAFT RECOMMENDATION 6.1

In reforming cross-jurisdictional fisheries, Australian, state and Northern Territory Governments should:

- focus on fish stocks that are of higher value/risk and subject to inconsistent management arrangements
- consider whether transfer of management responsibility to a single government or better aligning management arrangements would produce the greatest net benefits.

The cost of actions on the reform path set out above will increase as jurisdictions move from sharing to rationalisation. The Commission envisages that reform actions will be guided by the size and likelihood of net benefits. Section 6.5 considers specific reform priorities and preconditions given the above considerations.

Is there a case for more fundamental reform?

The Commission has considered the case for more fundamental reform — namely the establishment of a single fisheries jurisdiction for Australia and a regionally based division of responsibilities (boxes 6.7 and 6.8, respectively).

Under a single fisheries jurisdiction scenario, all fisheries would operate under a consistent management approach (which, for practical reasons, would have to be the Commonwealth's). While the benefits of a single jurisdiction are likely to be substantial, there would be significant costs involved and some limitations with this approach. In particular, this model would likely reduce efficiency in managing inshore fisheries (and recreational fishing in particular where the Commonwealth has little advantage in day-to-day management).

It is similarly doubtful that regionally based management arrangements for fisheries would confer significant advantages over current arrangements as this would likely result in six management regions instead of the present eight and not reduce the need for cross-jurisdictional negotiation on fisheries. The Commission therefore considers that there is not a strong case for fundamentally redrawing jurisdictional responsibilities in this way.

Box 6.7 **Benefits and costs of moving to a single fisheries regulator**

A single fisheries jurisdiction (with a single regulator) could be established via an OCS fisheries arrangement in which the states and Northern Territory cede jurisdiction over their coastal waters to the Commonwealth. This would create a single Commonwealth fishery jurisdiction, which could be managed by a single national fisheries regulator.

There is limited data on the costs and benefits of current OCS fisheries arrangements and the management of cross-jurisdictional fisheries more generally. However, the benefits of moving to a single regulator can reasonably be assumed to include:

- decreased risks to fish stocks from managing shared stocks according to a single stock assessment
- reduced management and compliance costs arising from duplication
- greater certainty in the management of fisheries, including in relation to how governments deal with emerging fisheries management issues such as climate change
- improvements in productivity arising from the removal of regulatory controls aimed at preventing the ‘gaming’ of shared fishery management arrangements (for example, trip limits and single jurisdiction trip requirements).

Over 45 per cent of Australia’s wild caught fish by value are sedentary species (Savage and Hobsbawn 2015). These species can often be managed as separate stocks across (and within) jurisdictions without a material adverse impact on outcomes. This feature limits the overall benefit to be gained by moving to a single fisheries jurisdiction.

The costs of moving to a single regulator would include:

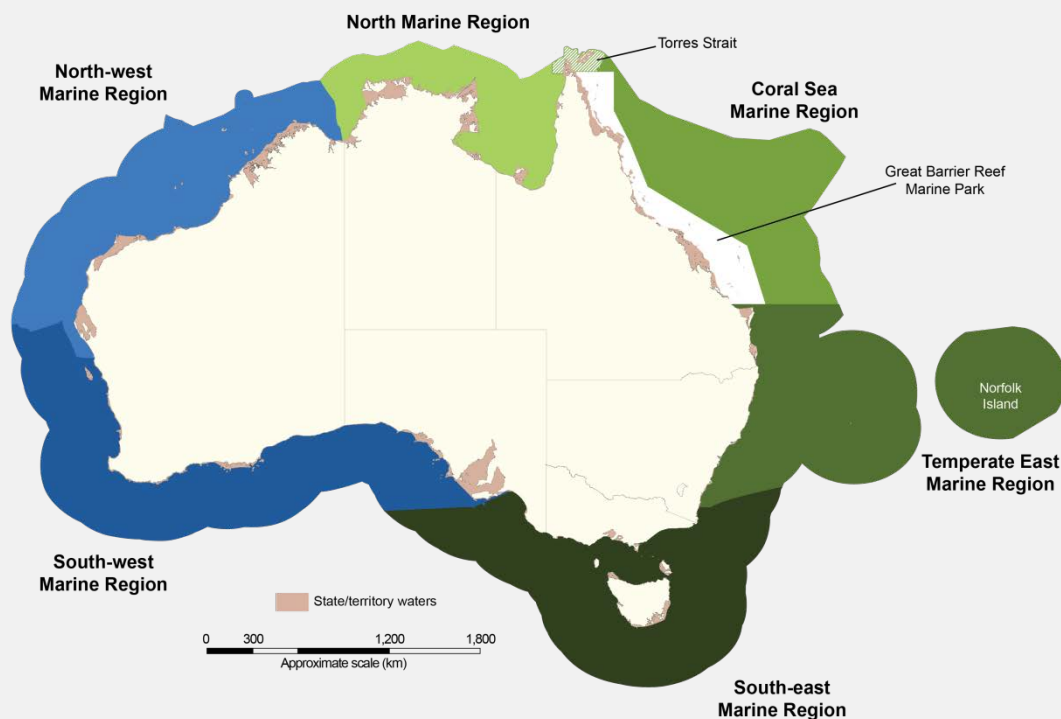
- likely significant establishment costs, including those related to restructuring current cross-jurisdictional fisheries, consultation with stakeholders and incorporating the management of all affected fisheries into a national approach
- potential loss of innovation associated with loss of competitive federalism
- loss of efficiency in managing inshore fisheries.

The latter is likely to be significant. The Commonwealth has no advantage in managing inshore fisheries (and recreational fishing in particular) and would require a significant increase in resources to do so. While the latter could theoretically be met in part by a transfer of funds to the Commonwealth, this would not address its disadvantage relative to the states in dealing with local issues, including relevant planning laws and determining access in consultation with stakeholder groups. It is probable that a national regulator would need to delegate tasks to the states and/or have local branches in the states.

Box 6.8 What merit in moving to regional management?

A regional management structure applied in Australia would ideally be aligned to the major marine regions (below) to better facilitate the management of ecosystems. This would result in six 'management jurisdictions' rather than the current eight — a marginal improvement that is offset by the need to maintain an overarching governance structure for each of the six regions.

Australia's marine regions



Source: (Commonwealth of Australia 2015).

A regionally based approach to management would not remove the problems of fish spanning borders. For example, the Commission has identified:

- six Commonwealth fisheries containing a number of species that would shift from management under a single jurisdiction to management across a number of regions
- some species, such as Gould's squid, that are currently managed under two jurisdictions but would span three marine regions
- a number of species, such as Balmain bugs, dusky sharks, Western Australian salmon and black jewfish, that would span the same number of jurisdictions/regions under either arrangement.

Regionally based management would not reduce the need for cross-jurisdictional negotiation on, and management of, cross-jurisdictional fisheries. Further, regionally defined borders present no obvious advantage over historic borders when it comes to addressing phenomena such as climate change and the changing distributions of fish stocks. The issues that have beset Australia's joint authorities could also become factors in any regional management council arrangement. As such, the Commission does not consider that there is any significant advantage to moving to regionally based management arrangements.

6.5 Reform priorities

Specific stocks

Of the 24 stocks raised with the Commission as being of concern, the management of SBT, the Commonwealth/New South Wales trawl fisheries (tiger flathead, eastern school whiting, pink ling, silver trevally and blue eye trevala), and east coast snapper stock, are the highest priorities for reform.

The management arrangements for the Commonwealth's Eastern Tuna and Billfish Fishery (which includes yellowfin tuna, albacore and striped marlin) should be the next priority for reform as the fishery is subject to increasing recreational take and competition between fishers. The development of an allocation process for SBT may provide useful lessons for the reform of these stocks.

Governments should proceed with their plans to replace each of the three joint authorities with single jurisdiction management structures (section 6.1) — these authorities are responsible for managing stocks of Spanish mackerel, grey mackerel and red emperor.

Reform arrangements for gummy shark and sardines off the South Australian coast would be subject to a cost/benefit appraisal. All other stocks are considered lesser priorities in the short to medium term because the net gains from reform are likely to be relatively small or are very uncertain.

Southern bluefin tuna

SBT should be a high priority for reform given its high value and vulnerable status, with it now being considered to be overfished (ABARES 2015b).

As the Australian Government is accountable to the Convention for the Conservation of Southern Bluefin Tuna (CCSBT) for Australia's management of SBT, it should be responsible for setting the allowable catch limits for all fishers (including recreational fishers).³⁸ A national survey of the recreational catch of SBT, planned for 2017-18 (DAWR 2016b), should inform sectoral catch limits.

For practical reasons, the Commonwealth may continue to draw on the states' expertise and proximity to recreational fishers for the day-to-day management of the recreational effort applied to SBT. However, under such an arrangement the states would need to be accountable for compliance with the catch allocation assigned to their recreational fishers.

³⁸ Australia (and other countries subject to the CCSBT) need to have a system to account for all SBT mortality arising from fishing activities by 2018 (CCSBT 2014). Draft recommendation 6.2 is not aimed at meeting this requirement, though it may assist the Australian Government to advance work necessary to do so.

This could be achieved through a mechanism similar to OCS fisheries arrangements for the gummy shark, where there is a notional allocation to the states and they are responsible for managing to that limit.

The Commonwealth could also choose to assume significantly more management responsibility than at present. This may be more likely if, for example, controls such as tags were employed to manage recreational catch, which would reduce reliance by regulators on proximity to fishers. There are advantages and disadvantages to the Commonwealth becoming more involved in the management of the recreational fishing. Ultimately, consultation between the Commonwealth, states, commercial fishers and recreational fishers is required to ensure a prudent and practical division of day-to-day management responsibilities.

DRAFT RECOMMENDATION 6.2

The Australian Government should set allowable catch limits of southern bluefin tuna for all fishing sectors (including the recreational sector). Sectoral allowances should be in place in advance of the southern bluefin tuna fishing season commencing on 1 December 2018.

In consultation with fishers, the Australian Government and state governments should negotiate the nature of, and responsibility for, the day-to-day management of recreational fishers targeting southern bluefin tuna.

The current OCS fisheries arrangements and MoU will require amendment (and a new agreement with New South Wales will be required) once management arrangements have been determined. Amending a single OCS fisheries arrangement has not been a simple or timely process in the past and the amendment of seven arrangements may pose significant hurdles. As an alternative approach, the Australian Government could:

- give notice that the OCS fisheries arrangements for SBT are to be cancelled
- use its powers under s. 6 of the *Coastal Waters (State Powers) Act 1980* (Cwlth) to legislate to limit the fishing of SBT and impose controls on both commercial and recreational fishing as necessary.³⁹

Commonwealth and New South Wales trawl fisheries

AFMA (sub. 50) and SETFIA (sub. 56, p. 8) confirm there is ‘in principle’ agreement from stakeholders to ‘rationalise the management’ of the two trawl fisheries. The New South Wales Southern Fish Trawl Fishery should be absorbed into the Commonwealth Trawl Sector of the Southern and Eastern Scalefish and Shark Fishery as:

³⁹ s. 6 of the *Coastal Waters (State Powers) Act 1980* (Cwlth) protects the Commonwealth’s rights and duties to ensure compliance with international agreements of which Australia’s commitments to the CCSBT would be one.

-
- the Commonwealth has the necessary management infrastructure in place including a proven stock assessment method and a best practice individual transferable quota regime
 - the fish taken by trawling in southern New South Wales waters extend into Victorian and Tasmanian waters where they are also managed by the Commonwealth within the Commonwealth Trawl Sector.

Transferring jurisdiction for trawling to the Commonwealth would see shared jurisdiction over New South Wales' inshore waters. The Commission understands that there are relatively few inshore species that would be both bycatch for trawlers (Commonwealth jurisdiction recommended) and target species for other fishing methods such as longlining (New South Wales jurisdiction). At the least, the issues arising for bycatch in inshore waters are expected to be less than arising under the current arrangements.

DRAFT RECOMMENDATION 6.3

The New South Wales Southern Fish Trawl Fishery should be absorbed into the Commonwealth Trawl Sector of the Southern and Eastern Scalefish and Shark Fishery by the end of 2018.

East coast snapper

As the catch of east coast snapper is dominated by recreational fishers, there is a case for leaving the ongoing management with the states (New South Wales, Victoria and Queensland). However, management costs could be reduced by undertaking a single stock assessment rather than each jurisdiction completing their own assessment. Against a single assessment, the jurisdictions will be better placed to: make a determination on the status of the stock and what remedial action, if any, needs to be taken; and determine the extent to which the disparate catch controls of the states can be more closely aligned.

DRAFT RECOMMENDATION 6.4

The New South Wales, Victorian and Queensland Governments should make the joint stock assessment process for the east coast biological snapper stock a reform priority and provide the resources necessary to ensure the timely completion of the assessment.

Progressing reforms

To gain support for reforms, the expected costs and benefits of reforms need to be robustly assessed and clearly communicated. Further, it is important that political will be backed by a commitment of sufficient resources to support reform design and implementation, and engagement with stakeholders. In this regard, the New South Wales Government's commitment of dedicated resources to plan and design the reform of the Commonwealth/New South Wales trawl fisheries is a welcome development.

While the Australian Fisheries Managers Forum (comprising the agency heads of each jurisdiction) has promoted some reforms in fishery management, progress on the more challenging areas has been slow, reflecting limited buy-in from governments. The Commission considers that governments should make the reform of cross-jurisdictional fisheries a collective priority. To this end, Ministers should develop and make public a joint reform strategy for identified priority stocks and ensure that management arrangements over cross-jurisdictional fisheries are kept under regular review. Progress should be assessed and reported annually over the term of the strategy.

The reform strategy should span the medium term (three to five years) and include:

- the species/fisheries that are priorities for reform, the proposed reforms and intended outcomes
- intended investigations of other management areas to reduce costs and improve outcomes (for example, to institute reciprocal or consistent catch controls, or data collection arrangements)
- milestone actions and dates for each reform initiative
- details of the criteria and timing for determining future reform priorities.

The determination of a strategy will require coordinated action by governments and consultation with stakeholders. To enable time for its proper design and adequate buy-in, the strategy should be released within 12 months of the release of the Commission's final report.

DRAFT RECOMMENDATION 6.5

Australian, state and Northern Territory Governments should make the reform of cross-jurisdictional fisheries a collective priority and issue a joint reform strategy within 12 months of the release of the Commission's final report. Progress against the strategy should be reported annually over its term.

Resistance to reform has arisen from commercial fishers where it would see them moving from a jurisdiction without cost recovery to a jurisdiction with full cost recovery (such as the Commonwealth). As discussed in chapter 10, there are sound reasons for moving to

cost recovery arrangements. Cost recovery arrangements should be reformed as necessary to ensure equitable treatment of fishers across cross-jurisdictional fisheries.

Better supporting shared management in the future

To reduce the costs of potential change in future, and to better meet policy goals, governments should adopt best practice approaches to core fisheries management tasks (such as stock assessments and harvest controls) and cooperate to the extent possible on management and reform. The task of reviewing and developing reforms to reduce the costs of cross-jurisdictional fisheries should be the subject of a joint Ministerial direction to agencies.

It is important that fisheries administrators have a structured means of sharing information, including on the emerging challenges they face and lessons learned. The Australian Fisheries Managers Forum appears to work well in this regard.

The *Principles Guiding Revision of the OCS Fisheries Arrangements* (box 6.6) agreed by the jurisdictions in 1993 remain valid and important. The Commission notes that the problems caused by shared jurisdiction over expanses of water are not addressed by the *Principles* although they have been a cause of concern for many stakeholders — most notably in South Australia (for example, in relation to sardines and gummy shark). Accordingly, the *Principles* should be amended to include limiting the extent of shared jurisdiction over expanses of water wherever possible.

Reflecting best practice from existing MoUs (as outlined in section 6.1), future MoUs should include requirements for sharing data and managing bycatch. The requirements for bycatch should detail how limits are to be set by management agencies rather than prescribing bycatch limits. This would allow bycatch limits to be adjusted in light of changing circumstances without having to renegotiate the MoU.

Like other areas of regulation, fisheries management arrangements should be periodically reviewed to ensure that they remain fit for purpose against policy objectives and that their terms provide for the efficient achievement of those objectives. This review should occur at least with any revision of the harvest strategies for the stocks in cross-jurisdictional fisheries. Such reviews should focus on ensuring that arrangements remain valid in light of any change in the distribution of fish stocks, changing fishing behaviour (including from recreational fishers), changing fishing methods, any advances in fisheries management, and/or changes to the harvest strategy. These reviews should also seek to correct the known drafting errors in OCS fisheries arrangements (appendix B).

DRAFT RECOMMENDATION 6.6

The management arrangements for cross-jurisdictional fisheries and supporting memoranda of understanding should be reviewed regularly by governments to ensure they remain fit for purpose. At a minimum, they should be reviewed as part of any revision of the harvest strategy for the relevant species.

The task of reviewing and developing reforms to reduce the costs of cross-jurisdictional fisheries should be the subject of a joint Ministerial direction to agencies.

The *Principles Guiding Revision of the OCS Fisheries Arrangements* should be amended to include an intention to limit the extent of shared jurisdiction over expanses of water wherever possible.

7 Managing the environmental impact of fisheries

Key points

- The regulatory framework that governs the environmental impact of fisheries appears to be broadly effective.
- Public understanding, and the setting and refinement, of environmental management controls would be improved by:
 - managing the impacts of fisheries on protected species through use of explicit mortality limits.
 - governments releasing periodic summaries on interactions with protected species.
 - clarifying the purpose of the List of Marine Species established under the *Environment Protection and Biodiversity Conservation Act 1999*, and the basis on which species are added to or removed from the list.
- To further improve transparency on fishery outcomes, the Department of the Environment should publish the annual reports submitted by fisheries in relation to their compliance with accreditation requirements.
- Third party certification of fishery management practices is a divisive issue in the industry. Some view it as an important step in securing a 'social licence' to operate, while others view it as unnecessary and expensive.
 - As third party certification standards are set by private organisations (often on a fee-for-service basis), third party certification should not replace regulatory requirements or set regulatory benchmarks. However, there may be scope to consider information collected as part of third party certification in EPBC Act assessments to reduce costs.

It is undisputed that fishing needs to be regulated to manage its impacts on the marine environment. Accepting that regulation is needed, the Commission explored three key questions, are current environmental regulatory requirements:

- effective — do they achieve what they set out to do;
- efficient — do they operate with as little cost as possible; and
- being set and reviewed transparently — and so informing public understanding and debate on environmental objectives and outcomes?

Answering these questions is challenging because of the diverse nature of fisheries. Hundreds of different species are caught across dozens of different fisheries and unique environments. The management approaches employed in each fishery vary, and these approaches periodically change (as they should) to accommodate new information or

manage new risks. The Commission has therefore considered available information on environmental outcomes, and sought to assess the processes through which regulatory requirements are set and objectives met, rather than the specific management techniques used in individual fisheries.

7.1 Overview of the regulatory framework

The environmental regulation of fisheries is undertaken by both the Australian Government and the governments of the states and territories. All jurisdictions promote the sustainable management of their fisheries and have enshrined the concept of sustainability — often in the form of ecologically sustainable development — into the objectives of their fishery management acts (chapter 2).

Some jurisdictions have also adopted more specific objectives, including the protection of endangered species (NSW) and minimising the impact of fishing on non-target species (Commonwealth).

Regulatory requirements

In most jurisdictions, the primary laws managing the environmental impacts of fishing are contained in fisheries management acts. However, aspects of other environmental regulation may also be relevant — for example, acts relating to protected species or biosecurity may also impact on fisheries.

The primary fishery management acts for each jurisdiction empower fisheries authorities to develop and enforce fishery management plans. It is typically through these plans that the environmental objectives established in legislation are translated to ‘on the ground’ regulatory requirements.

Management arrangements for fisheries that are either managed by the Australian Government, operate in Commonwealth waters or export produce, are subject to the *Environment Protection and Biodiversity Act 1999* (section 7.3). The Act provides for arms-length vetting of fishery management plans by the Commonwealth environment department. About 80 per cent of all Australian fisheries are subject to the EPBC Act and so are subject to the same environmental standard.

State and territory-based fisheries that are subject to the EPBC Act are also subject to state and territory fisheries and environmental laws. Broadly speaking, these are less stringent than what is required under the EPBC Act. To the extent that Commonwealth and state and territory laws conflict, Commonwealth laws prevail.

Fisheries subject to the EPBC Act are evaluated against the Australian Government’s *Guidelines for Ecologically Sustainable Management of Fisheries*. The *Guidelines* judge ecological sustainability on the basis of:

-
- the adequacy of fish stocks; and
 - whether fisheries are managed so as to minimise the impact of fishing on ecological systems (box 7.1).

Box 7.1 Principles of the Guidelines for the Ecologically Sustainable Management of Fisheries

In 2007, the Australian Government released the Guidelines for the Ecologically Sustainable Management of Fisheries. To satisfy Commonwealth Government requirements, fisheries must be managed in a way that satisfies the two principles outlined in the guidelines.

Principle 1

A fishery must be conducted in a manner that does not lead to over-fishing, or for those stocks that are over-fished, the fishery must be conducted such that there is a high degree of probability the stock(s) will recover.

Principle 2

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

Principle 2 has several subcomponents that focus on different parts of the marine environment. These require that the fishery is conducted in a manner that:

- does not threaten bycatch species
- avoids mortality of, or injuries to, endangered, threatened or protected species and avoids or minimises impacts on threatened ecological communities
- minimises the impact of fishing operations on the ecosystem generally.

In addition to these principles, the guidelines also outline some characteristics that management arrangements should possess with respect to transparency, consultation, capabilities and reporting.

Source: Australian Government (2007).

Fisheries not subject to EPBC Act assessment are regulated by the state and territory governments. The requirements placed on these fisheries vary — both across and within jurisdictions — although for the vast majority, the sustainability of the target stock is monitored through stock assessments and/or harvest strategies. Many fisheries also undertake environmental risk assessments that identify and measure the wider ecological risks of fishing activity (with these risks managed through fishery management plans). These assessments are done by fishery management agencies in each jurisdiction and do not face assessment by the relevant environment department.

Fisheries authorities are granted considerable discretion with respect to the content of fishery management plans so as to allow them to address challenges unique to each fishery. Consequently, different approaches are applied across fisheries to manage risks to the environment. The most common methods of managing risks are the imposition of gear requirements (such as requirements to utilise bycatch exclusion devices) and closures of fishing areas.

Fisheries management plans may be supplemented by other regulatory documents, including directives from fishery management authorities, bycatch and discard plans and species management plans. In addition to fishery-wide requirements, which apply to all vessels in a fishery, individual vessels may be subject to vessel management plans if they pose additional or particular risks.

7.2 How are regulatory arrangements working?

Fish stocks

Available information suggests that fisheries are, on the whole, being managed well with respect to the sustainability of targeted stocks. Reports suggest that there is a small proportion of Australian fished stocks that are subject to overfishing. For example, according to ABARES (2015b), roughly two per cent of the nearly 100 fish stocks it monitors in Commonwealth waters are subject to overfishing – down from 12 per cent in 2004. The proportion of overfished stock is higher (about 13 per cent) (box 7.2).

Of the 170 out of 238 fish stocks in Australia for which a status has been determined, 75 per cent (129 stocks) were sustainable, four per cent (seven stocks) were recovering and 11 per cent (19 stocks) were depleting (FRDC. 2015 and box 7.2).

Box 7.2 Overfishing vs overfished

A stock is classified as **subject to overfishing** if the rate at which the stock is removed is considered to be unsustainable (ABARES 2015b).

A stock is considered to be **overfished** if the biomass has been depleted through catch, so that average recruitment (reproduction) levels are significantly reduced and current management is not adequate to recover the stock (or measures put in place have not yet resulted in measurable improvements) (FRDC 2015).

A fishery can be overfished without being subject to overfishing if overfishing in the past has reduced its biomass to an undesirably low level. While stocks that are overfished are still cause for concern, addressing overfishing is particularly important because unsustainable levels of harvest are still occurring.

Stocks can be considered as **recovering** if the biomass is overfished but the biomass of this stock is improving or **depleting** if the biomass is not yet overfished, but fishing pressure is too high and therefore, if continued, the stock will become overfished.

Six per cent of stocks (11 stocks) were considered to be overfished. This is an increase from 3.5 per cent in 2012, the first year of national reporting.⁴⁰ For example, four of the

⁴⁰ Nationally consistent reporting on the status of key Australian fish stocks commenced in 2012. The 2012 report examined 150 stocks across 49 wild caught species. The 2014 (latest) report examined 238 stocks across 68 species.

stocks identified as overfished were abalone species in Victoria (both greenlip and blacklip abalone across two zones), while in other jurisdictions, overfished species included species of school shark, jewfish, gemfish, mulloway, snapper and tuna.

By comparison, 16 per cent of fish stocks in the USA are considered to be overfished (NOAA 2015), while in several key European seas, the proportion of stock considered overfished is much higher (up to 41 per cent of stocks in Atlantic waters, the North Sea and the Baltic Sea and 91 per cent in the Mediterranean Sea) (European Commission 2014).

If catch, rather than number of stocks is examined, Australia's fisheries compare even more favourably, with the FRDC finding that around 90 per cent of the catch by tonnage examined was sustainable (figure 7.1).⁴¹

The proportion of fish stocks that have an unknown or undefined status has also significantly decreased over the past decade — for example, from over 70 per cent in Commonwealth waters in 2004 to presently 15 per cent. Of the 238 species examined by the Fisheries Research and Development Corporation (FRDC), about 5 per cent of catch (or about 28 per cent of species caught) were found to be undefined.

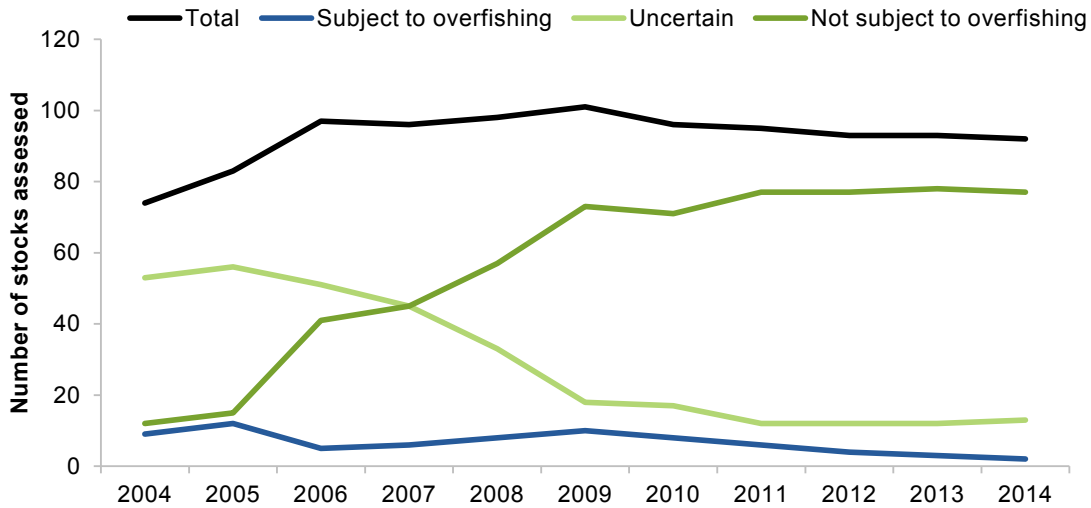
The above indicates that regulatory effort has generally been well-directed — providing for the restoration or better management of fish stocks at risk, and better understanding of the status of other stocks, and so the continued utilisation of fishery resources.

The Commission notes that small increases in the proportion of stocks that are reported overfished, at risk or of uncertain status may be due to either or both better information on stocks and actual deteriorations in their status. This should be considered a positive indication that the system is 'working' insofar as this prompts intervention or a more risk-averse approach to the use of fishery resources until risks or uncertainties are reduced. A downward or stable trend (at low levels) of overfished, at-risk and undefined key fish stocks would signal effective stock management. The relatively recent institution of a consistent national basis for reporting on key stocks is an important and welcome move towards more targeted management in this regard.

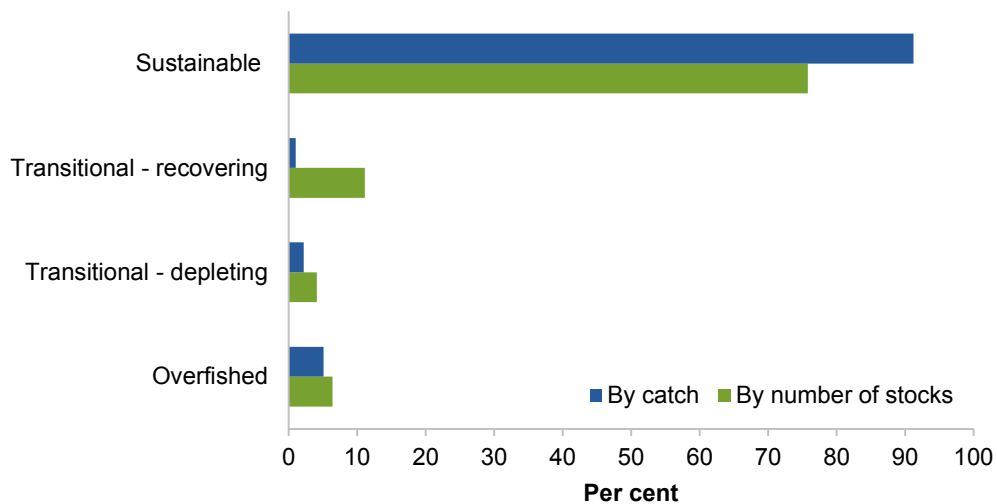
⁴¹ This does not include 'undefined' stock, where information is insufficient to make a judgment about sustainability.

Figure 7.1 Overfishing in Australia is very low

ABARES assessment of Commonwealth fisheries, by fishing mortality status



FRDC assessment of key fish stocks, all jurisdictions (2014)^a



^a Does not include stock that is considered 'undefined'

Sources: ABARES (2015b), FRDC (2014c).

Ecological systems

Unlike stocks, where sustainability can be described quantitatively through stock assessments, the wider impacts of fishing on the marine environment are harder to observe

and measure. However, Australia rates reasonably highly compared to other countries in instances where effectiveness in managing the marine environment has been measured.⁴²

Jurisdictions appear to invest significant effort in identifying risks to the wider marine environment from fishing, and almost all fisheries have management approaches in place that aim to mitigate these risks to some extent.

Adequacy of ex-post assessments

Ex-post assessments appear to be timely and well-targeted. A standard condition placed on fisheries by the Department of the Environment is that their managers must annually report on the environmental performance of the fishery. These annual reports are the primary tool used by the Department of the Environment to ensure fisheries comply with the conditions of their accreditation and, by extension, that management objectives with respect to the environment are met.

Annual reports are typically prepared by fisheries management authorities and must include, among other things: changes to management arrangements; relevant research results; catch data; and the number and nature of interactions with protected species. Additionally, they must contain information on the fishery's progress in implementing any recommendations or conditions resulting from the Department's accreditation of the fishery (DEWR 2007, Appendix B).

In the event that compliance is inadequate, export approval may be revoked, although this has rarely taken place. One example occurred in 2008, when the export accreditation of the Joint Authority Northern Shark Fishery was revoked (Hawke 2009).

The Commission notes that the annual reports on fisheries subject to the EPBC are not published by the Department of the Environment (although in some instances they are published by individual fishery management agencies). There would be benefits in the Department of the Environment publishing these reports in a central repository online. These include provision of information and assurance to the public on the management of fisheries, and enabling commercial fishers to more readily point to their compliance with regulatory requirements, thereby strengthening their 'social licence' to operate. That is, greater transparency on outcomes could assist to ensure that regulatory requirements are proportional and well-targeted over time.

⁴² Punt et al. (2016) provide a brief summary of studies that make such comparisons, as well as pointing to the strength of Australia's fishing management system more generally.

DRAFT RECOMMENDATION 7.1

The Australian Government should publish online the annual reports that fisheries produce as part of their accreditation requirements under the *Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)*.

State and territory-managed fisheries

The environmental assessment and monitoring undertaken in state and territory-managed fisheries is generally less extensive than fisheries subject to the EPBC Act. This appears to reflect a view that they are of lower value and/or risk, being often small scale or niche fisheries. This may also explain why, in most cases, there is no arms-length assessment of fisheries management plans and outcomes by environment departments. The Commission would value feedback from stakeholders as to whether environmental management regimes are adequate for these fisheries — if not, why not — and how they should be improved, if required.

INFORMATION REQUEST 7.1

Are fisheries not assessed under the Environment Protection and Biodiversity Conservation Act 1999 (Cwlth) subject to adequate environmental management? If not, how should the environmental management of such fisheries be improved?

Regulatory requirements vs public expectations

Some participants commented that adequate heed was not being given to scientific information in setting standards. There were two sides to this, with some suggesting scientific evidence supports more stringent rules, and others less (predominantly the former).

It is evident that there is a gap between the standards expected by some in the community and those set (or perceived as set) by regulations. This gap has been bridged to an extent by the emergence of third party certification schemes, which seek to give greater assurance to the public on the sustainability and environmental impact of products. In part, these schemes have developed as a consequence of poor practice and overfishing in the past, and a greater public awareness and concern about environmental issues. However, such schemes may also suggest to the public that non-certified fisheries may not be sustainable, even though they meet all regulatory requirements. That is, they can undermine perceptions regarding the quality of regulatory requirements, even when these are robust and well-targeted.

The Commission considers that third party schemes primarily provide fishers greater 'social licence' to operate and potentially marketing/branding advantages, rather than securing prudent environmental outcomes.

The Geelong Star is a prominent example of where regulatory requirements have been considered to be insufficiently stringent by some sections of the community. The Geelong Star has faced calls for it to be banned, despite the fishery in which it is operating (the Small Pelagic Fishery) receiving EPBC Act approval, and scientific information indicating that its operation is not leading to the detrimental impacts claimed (box 7.3).

Environmental standards should be no less or no more than that required to prudently manage risk. To the extent that there is a significant gap between what is scientifically judged to be sustainable and what the public perceives to be sustainable, governments and industry can seek to close this, including through the publication of regular, objective reports (as discussed above), and clarification of any ambiguous standards (discussed in section 7.4).

Box 7.3 **The Geelong Star**

The Geelong Star is a 95 metre long freezer trawler that operates in the (quota managed) Small Pelagic Fishery (SPF) managed by AFMA. Since the Geelong Star began operating in Australian waters in 2015, it has been subject to concerted public opposition, including a popular Facebook campaign calling for the trawler to be stopped.

Public concern relating to the Geelong Star has centred on the size of the vessel, which is the largest operating in Australia, and the local depletion of stocks. There is little evidence, however, to support these concerns.

The CSIRO has noted that the rules under which vessels operate (which have been developed to achieve and maintain sustainability) are more important to the sustainability of a target stock than the size and type of vessel (CSIRO 2015, p. 8). The size of the nets used by the Geelong Star are 'typical of any mid-water trawlers operating sustainably in Australian waters' (Colbeck nd).

Moreover, there is no evidence that interactions with bycatch, including protected species, are greater for one large vessel, such as the Geelong Star, than would occur with a fleet of smaller vessels that would be authorised to catch the same quantity of target species (CSIRO 2015, p. 11).

Similarly, there is little evidence that the stocks of fish in locations in which the Geelong Star operates would be subject to any more threat than would be the case if a number of smaller vessels operated in its place. The allowable catch limits in the SPF are set with reference to the stocks of target fish and the ecological environment (as per the fishery's harvest strategy), rather than the nature of the vessel.

Another concern is that the species fished by the Geelong Star, including sardines and mackerel, form part of the diets of larger and highly sought game fish, such as tuna and marlin and could lead to the latter's depletion. But the Institute for Marine and Antarctic Studies (IMAS) has noted that fishing for such small pelagic species will not have an impact on higher-level predators that recreational fishers target:

Ecosystem modelling of the pelagic ecosystem off southern and south-eastern Australia showed that harvesting in the SPF will have minimal (negligible) impact on the species that support these related commercial and recreational fisheries (IMAS 2015, p. 6).

Similarly, the CSIRO has noted that many predatory species in the SPF are opportunistic feeders, and:

On very short time scales localised depletion is likely inevitable, but on longer time scales pertinent to overall ecosystem status there is no conclusive evidence of historical localised depletion leading to adverse environmental impacts in the SPF (CSIRO 2015, p. 12).

Both IMAS and CSIRO have noted that management controls have been established to address any localised depletion impacts.

From a regulatory perspective, ensuring compliance with environmental regulations is likely to be easier for fewer, larger vessels than a multitude of small ones. One of the requirements outlined in the Revised Draft vessel management plan for the Geelong Star (released in June 2016) is that an AFMA observer be carried 'at all times' (AFMA 2016f, p. 4).

7.3 Is there scope to streamline environmental assessments of fisheries?

Assessments of the environmental impact of fisheries are undertaken on a fisheries-wide basis. This means that individual fishers or vessels do not apply for approval of their proposed fishing practices and rather fisheries management authorities act on behalf of all fishers for the fishery as a whole. Management arrangements are developed and enforced by the fisheries management authorities, typically in consultation with the industry.

Australian Government assessments of fisheries are undertaken under the auspices of the EPBC Act. Depending on the characteristics of the fishery, assessment may be undertaken across any or all of three separate parts of the Act:

- Part 10 of the Act applies to **all Commonwealth fisheries** and assesses the impact of these fisheries on the nine Matters of National Environmental Significance listed in the Act.⁴³
- Part 13 applies to **all fisheries operating in Commonwealth waters** and assesses the impact of these fisheries on species listed under the Act. These species includes: threatened species, migratory species, listed marine species and threatened ecological communities.
- Part 13A applies to **all fisheries that export native produce** and assesses whether the fishery is managed in an ecologically sustainable way.⁴⁴

Despite each part of the Act serving different functions, the criteria against which these assessments take place is the same — the *Guidelines for the Ecologically Sustainable Management of Fisheries* (discussed in the previous section).

The Australian Government may also accredit state and territory environmental assessment regimes for the purposes of approving fisheries under the EPBC Act, although accreditations have not been issued to date.

Fisheries that are located in state and territory waters, but export produce, are subject to state and territory fishery regulation as well as being assessed under the EPBC Act. Fisheries that are managed by the states and territories but do not export are wholly managed under state and territory laws.

⁴³ The Matters of National Environmental Significance are: world heritage properties; national heritage places; wetlands of international importance; listed threatened species and ecological communities; migratory species; Commonwealth marine areas; the Great Barrier Reef Marine Park; nuclear actions; and a water resource in relation to coal seam gas development and large coal mining development.

⁴⁴ The Guidelines define ‘ecologically sustainable’ as the use of natural resources within their capacity to sustain natural processes while maintaining the life support systems of nature and ensuring that the benefit of the use to the present generation does not diminish the potential to meet the needs and aspirations of future generations (DEWR 2007, p. 10).

The requirements under these laws vary. As noted, states and territories do not formally assess fisheries against state environmental regulation (although plans are still developed under fishery legislation). Fishers nevertheless are required to comply with state-based regulations relating to protected species. In addition to regulated requirements, some fisheries also opt to seek assessment through (private) third-party accreditation schemes — the most common in Australia being through the Marine Stewardship Council, although dozens of different schemes exist.

The efficiency of current regulations

Submissions to this inquiry raised concerns regarding duplication involved in meeting environmental regulations, specifically in terms of requirements:

- in the EPBC Act and those made under fisheries management plans;
- across several parts the EPBC Act itself; and
- in the EPBC Act and those of under third party certification schemes.

These issues are explored in detail by Southern Rock Lobster Limited (sub. 22), the Commonwealth Fishing Association (sub. 49), AFMA (sub. 50) and the South East Trawl Fishing Industry Association (sub. 53).

Subjecting fisheries to two different regulators across two separate jurisdictions raises questions about duplication. Similarly, the fact that assessments under the EPBC Act span three separate parts, yet are underpinned by the same set of guidelines, can create confusion. However, it appears that, in most instances, current regulatory arrangements do not impose unduly onerous or inefficient requirements on fishers. Indeed, in instances where fisheries are overseen by multiple regulators, these regulators serve different functions, which are complementary, rather than duplicative. This is explored below.

The role of fishery managers versus the role of environmental assessors

Some stakeholders expressed concern that fishers could be fully compliant with the regulatory requirements set out by a fishery management authority (be this AFMA or a state government authority), yet fail to satisfy the requirements under the EPBC Act. They suggested that this created a form of ‘double jeopardy’, whereby the activities of fishers were regulated twice — once by fishery managers and once by the Department of the Environment — to ensure they comply with sustainability objectives.

It has been put to the Commission that one way to address this concern would be to accredit AFMA and/or state fishery authorities with approval functions under the EPBC Act (including by AFMA itself sub. 50). In effect, this would make fishery management authorities responsible for ensuring fisheries meet the requirements of the EPBC Act, negating the need for an assessment by the Department of the Environment. This proposal was also conditionally recommended in the Borthwick Review (2012), on the basis it could

better integrate environmental and fisheries regulation (although the review indicated that it did not know how this would be translated into legislation or changed practices (p. 69)).

The proposal to allow fisheries management authorities to approve plans erroneously assumes that fishery management authorities and the Department of the Environment have the same role in relation to environmental assessments.

Fisheries management authorities write management plans in consultation with the industry — in effect, acting as its agent. The Department of the Environment's role is to assess the efficacy of these plans and their implementation in terms of achieving environmental outcomes. Allowing fishery management authorities to assume the Department of the Environment's role would mean that they would develop, approve and enforce plans for the purpose of meeting the EPBC Act objectives. This would inevitably raise conflicts of interest for fishery management authorities, which are obliged to also promote the exploitation of fisheries resources.

Some stakeholders have argued that managers in other industries have been accredited with approval functions under the EPBC Act, an example being the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA).

NOPSEMA assesses petroleum activities in Commonwealth waters under the auspices of the EPBC Act. A critical difference between NOPSEMA and fishery management authorities, however, is that NOPSEMA does not write the plans against which EPBC Act approval is sought. It only has approval and enforcement roles and, therefore, avoids conflicts of interest.⁴⁵

As such, the Commission considers that fishery management authorities should not be accredited with approval functions with the EPBC Act.

There were no significant concerns expressed by stakeholders in relation to the notion that there should be arms-length appraisal of fishery management plans by the Department of the Environment. The Commission considers this a prudent safeguard for the high risk fisheries that are generally targeted by the EPBC Act, but welcomes the Department's recent decision to extend the maximum duration of EPBC Act approval for low-risk fisheries from five years to ten years, which has reduced regulatory burden and uncertainty, and rewarded good stewardship.

⁴⁵ A further difference, as identified by the Department of the Environment (sub. 54), is that NOPESMA only does assessments under Part 10 of the EPBC Act (strategic assessments), and does not have functions related to Part 13 (protected species) or Part 13A (export of native wildlife). In this submission, the Department notes that accrediting fishery management authorities with these functions could involve considerable modification of the EBPC Act and/or fisheries specific legislation to avoid adding to the duplication.

Duplication within the EPBC Act

A small number of stakeholders commented that having fisheries assessed under three separate parts of the EPBC Act was duplicative. (The Commonwealth Fisheries Association, sub. 49, South East Trawl Fishing Industry Association, sub. 53). The Department of the Environment (sub. 54) submitted that a single assessment process is undertaken under the auspices of the *Guidelines for the Ecologically Sustainable Management of Fisheries*.

As only one assessment is undertaken, the Commission does not consider amalgamating parts 10, 13 and 13A of the EPBC Act to be a priority for reform.

Should third party certification schemes be accredited under the EPBC Act?

Third party certification is a relatively new innovation in the fishing industry. It involves fisheries volunteering (and paying) to be assessed by a non-regulatory body — typically a non-government organisation — with a view to this body endorsing the management practices of the fishery. Typically, third party certification schemes have an overriding objective — environmental conservation — and thus require fishery management arrangements to be far more conservative with respect to environmental requirements than that required by government regulation.

Some supermarket chains require third party certification as a condition of selling produce. This seems to be in response to consumer preferences and concerns regarding sustainability. Supermarkets are also likely to have adopted third party certification as part of a broader drive to be seen by the community as socially and environmentally mindful.

The role and importance of third party certification is a divisive issue among the industry. Much of the debate has centred on the perceived costs and benefits of certification.

Some submissions viewed third party certification as an important step to securing a ‘social license’ to operate or demonstrating the sustainable operation of the fishery (for example, Wildcatch Fisheries SA Inc, sub 10 and Southern Rock Lobster Limited, sub 22). Others in the industry viewed third party certification as unnecessary (and more about branding than sustainability) and very expensive. As an indicator of cost, the Western Australian Government invested over \$14 million towards certification for the 47 commercial fisheries operating in its state (sub. 21). Some participants also commented that fisheries that were not certified were viewed by the market as less sustainable, despite the vast majority of fisheries meeting the same requirements of the EPBC Act. Third party certification was seen as potentially eroding confidence in regulatory standards by implying existing standards are not sufficient.

The question for policymakers is whether third party certification schemes should be recognised under and/or integrated into current regulatory arrangements.

Several participants argued that fisheries that are certified should be exempt from some requirements under the EPBC Act. While this view is understandable from the perspective of those who feel obliged to comply with two approval regimes, the Commission considers that governments should not support such a move.

Approvals issued under the EPBC Act and certification by third parties serve a fundamentally different purpose and provide different benefits. The EPBC prescribes the minimum environmental standards that fisheries must meet, as set by the Government, on behalf of the Australian community. The benefits of having fisheries meet this standard are primarily public — it helps to ensure that the fishery resource may be accessed for the benefit of the community as a whole, but in a manner that minimises the risks to the sustainability of the stock, or the environment more generally.

In contrast, third party certification schemes seek one primary aim — environmental protection — and so do not take into account other policy objectives that might be served through the managed exploitation of fishery resources. The benefits conferred by third party certification are largely private and arise from actual or perceived marketing advantages associated with being viewed as above the minimum standard. Third party certification may, for example, open up markets and/or generate a price premium.

Third party certification is also provided on a fee-for-service basis. While third party certification bodies seek to improve environmental outcomes, they also seek to maintain their businesses. There are potential conflicts of interest associated with third party certification schemes setting and assessing standards and maintaining a viable business model over time.

As a practical concern, there is a multitude of third party certification schemes, each with different standards and processes. It is not practical, nor desirable, for governments to vet or approve third party certification schemes, their quality and diligence or ongoing consistency with domestic regulatory objectives and requirements.

As such, third party certification should not replace regulatory requirements or set regulatory benchmarks. There may be scope to reduce the burden on third party certified fisheries in relation to information gathering and provision. In instances where the information requirements under third party certification are similar to requirements under the EPBC assessment, the Department of the Environment could consider using the information provided to the third party certification body for assessments under the EPBC Act or vice versa, given the fact that their assessment often takes into account the quality of local regulatory frameworks.

7.4 Managing protected species

Regulation is necessary to manage the impact of fishing on protected species. However, if this regulation is excessively burdensome, lacks transparency or creates uncertainty, it may impose undue costs on fishers. This section explores the scope to improve protected species arrangements.

The EPBC Act protects marine species through four main mechanisms.

- Listed marine species provisions (established under s.248 of the Act).
 - This list provides protection to seals, sea lions, dugongs, turtles, seasnakes, seahorses, sea dragons, pipefish and seabirds.
- Listed migratory species provisions (established under s.209 of the Act).
 - This list contains species that Australia has committed to protect through international treaties. It includes dugongs, some shark species and multiple species of turtle and seabird.
- Listed threatened species provisions (established under s.178 of the Act).
 - This list provides protection to a range of species deemed by the Minister to be threatened. Some species, such as the subantarctic fur seal, the short nosed seasnake and the loggerhead turtle, appear on both this list and the list of marine protected species.
- Protections given to cetaceans (whales and dolphins) under part 13, division 3 of the Act.

In addition, states maintain their own protected species lists, which typically overlap with the list contained in the EPBC.

The reality is that where fishing occurs, whether it be for commercial or recreational purposes, there may be a risk of interactions with protected species, some of which may result in deaths. If this fact is accepted in certain fisheries, relevant questions for policy makers are how to minimise the disturbance in those fisheries and whether there are firm thresholds to indicate when the impact on a protected species is unacceptable, so as to ensure timely and appropriate intervention.

Scope to better define limits

In the *Guidelines for the Ecologically Sustainable Management of Fisheries*, one of the objectives against which sustainability is assessed is that:

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

This requires that:

There are measures in place to avoid capture and/or mortality of endangered, threatened or protected species. (DEWR 2007, p. 8)

Broad principles for managing bycatch were agreed to by all governments via the National Policy on Fisheries Bycatch developed in 1999 (Ministerial Council on Forestry Fisheries and Aquaculture 1999).

Several participants in this inquiry commented that there was considerable ambiguity concerning what is considered to be an acceptable impact on protected species and that, in an operational sense, the level of impact pursued is zero, which places considerable costs on fishers. For example, the Department of Fisheries (WA) stated:

One particular area of concern with respect to the implementation of the EPBC Act is the matter of interactions with Threatened, Endangered and Protected Species (TEPs). Dealing with TEP interaction is of utmost importance in fisheries management and aids industry's 'social license' to operate. DotE has been unwilling to express a view on, or specify 'acceptable levels' of interaction with TEP species. This has caused tension in fisheries where solutions to TEP interactions have proved particularly difficult (particularly where the interactions are seen as having no biological or ecological impacts), with DotE wanting interaction rates to continue to decrease (if not become zero) and industry feeling it has done all that it reasonably can. (sub. 25, pp. 10–11)

Some overseas jurisdictions more explicitly define what represents an acceptable impact on TEP species through mortality limits. For instance, since 1992, operators in the Western Pacific tuna fisheries (a multinational fishery with operators in North and South America), have been subject to a limit on dolphin mortalities (International Dolphin Conservation Program 2014). Another example is New Zealand's management of sea lion bycatch in its Southern Squid Trawl Fishery (box 7.4).

Explicit mortality limits on bycatch of TEP species appear to be rarely utilised in Australia. One of the few examples of a clear limit being in place in an Australian fishery is contained in the Australian Sea Lion Management Strategy for the Southern and Eastern Scalefish and Shark Fishery (AFMA 2015a), which assigns mortality limits across seven different areas. If these limits are exceeded, the area is closed to fishing.

Box 7.4 Managing sea lion bycatch in the NZ Southern Squid Trawl Fishery

The New Zealand Government's regulation of the Southern Squid Trawl Fishery provides an example of using limits as a tool to regulate bycatch. The Government has set a fishing-related morality limit of 68 sea lions per annum in this fishery.

This limit, along with the probability that a sea lion will be killed in any one tow, is a factor that the Minister considers when determining the total number of tows allowed to be undertaken in the fishery.

The Minister has also established explicit trigger points which, if breached, will initiate a review of the plan. A review is triggered if:

- fewer than 98 per cent of tows undertaken in the fishery use a sea-lion exclusion device that meets the specifications in the plan
- fewer than 95 per cent of tows undertaken in the fishery meet the reporting requirements specified in the plan
- more than 15 sea lion mortalities are observed by Ministry Observers in any one season
- more than 4700 tows are undertaken in any one season
- there is a pup count of fewer than 1501 pups on the Auckland Islands
- there is any new information that indicates the risk to sea lions posed by fishing in the fishery is appreciably greater than the current information suggests.

Source: MPI NZ (2012).

There would appear to be several advantages in explicit mortality limits being adopted more widely:

- it would make standards for bycatch of TEP species transparent. Providing information on limits and how they are derived will, in turn, inform debate about what future limits should be
- the establishment of quantitative limits is a practical way for regulators to adjust limits in response to changes in the underlying threats to the species in question. As Hutton et al. note, such limits:

... may be adjusted over time to reflect the state of the bycatch species stock or slowly reduced if the aim is to encourage vessels to become more efficient in this respect. (Hutton et al. 2010, p. 18)

Limits can be set so as to reflect the nature of users in a fishery. One method would be to set an aggregate limit for the fishery, which may prompt information sharing and innovation by fishers in order to avoid hitting limits. Alternatively, limits could be allocated to individual vessels, in effect, minimising the burden on vessels that seldom interact with TEP species, but opening up 'repeat offenders' to sanction.

Important, of course, are other controls that seek to prevent mortalities in the first place, including gear requirements (such as mandatory exclusion devices), closures of areas

considered to have a high risk of interaction and regulation of fishing times. The Commission also notes that explicit limits are not suited to all fisheries — for example, limits are unlikely to add value in fisheries that have very low levels of interactions with TEPs.

These points notwithstanding, there is value in expanding the use of explicit mortality limits with respect to TEP species.

DRAFT RECOMMENDATION 7.2

The Australian, state and Northern Territory Governments should expand the use of explicit mortality limits for fisheries that have a high risk of interaction with threatened, endangered and protected species.

Limits should be used in conjunction with controls on fishing methods and equipment that have proven effective in minimising the impact of fishing activity on protected species.

Setting a mortality limit shares some similarities with setting a total allowable catch. As with setting a TAC, the process should be informed by objective scientific information. There should be a clear statement of intention with respect to the conservation goal — that is, whether the goal is to sustain the population at current levels, or increase it (and if so, by how much).

Setting a limit for a particular species requires an assessment of the size of the current population and its rate of reproduction, natural (non-fishing) mortality and the rate of mortality attributable to fishing. This information can be combined to set a mortality limit that meets the conservation goal.

Scope to improve transparency and clarity

All jurisdictions require fishers to report interactions with TEP listed species to fishery management agencies, but only two jurisdictions — the Commonwealth and South Australia — make information on these interactions available online.

This information should be publicly available, ideally in conjunction with TEP limits, which will make clear what the limits are and whether they are being met. In turn, this will inform the future adjustment of limits and strengthen accountability for meeting these limits.

AFMA's publically available information on TEP interactions represents the current leading practice in Australia. On a quarterly basis for each fishery, AFMA outlines: the number and type of species interacted with; the gear type used; the status of the specimen after the interaction; and how the interaction took place. AFMA's reporting could be

further strengthened by adding the number of fishing days undertaken for each fishery over the reporting period, to allow stakeholders to gauge how common interactions are relative to the amount of effort undertaken (as opposed to just the level of interaction in absolute numbers).

AFMA's publication of TEP interactions represents a template that other jurisdictions should adopt.

DRAFT RECOMMENDATION 7.3

Governments that do not already do so should make summaries of information on interactions with protected species publically available (online).

Summaries should be provided on a fishery by fishery basis and at a minimum include:

- the species with which there was an interaction
- the gear type used
- whether the specimen survived, was injured or died as a result of the interaction
- the total number of fishing days undertaken in the fishery across the duration of the reporting period.

Jurisdictions could also consider including information on any change in the underlying conservation status of the species. This includes changes to the species status on the List of Threatened Species in the EBPC Act, changes to the species status on the IUCN Red List⁴⁶ or any new population assessments.

Listing and delisting species

Once a species is listed under state, territory or Commonwealth protected species legislation, it is afforded special protection. This protection is usually afforded because it is perceived to be necessary for the conservation of the species. However, it also imposes costs on parties who are likely to interact with these species (for example, fishers face the costs of modifying equipment to avoid interactions). Consequently, listing creates both costs and benefits.

This inquiry heard concerns about both the listing and delisting of species, primarily in relation to the EPBC Act, although the issues raised also have relevance for state governments.

⁴⁶ The IUCN Red List is the most prominent approach used to assess the conservation status of species on a global level.

Listed marine species

The list of marine species was established with the implementation of the EPBC Act in 1999, identifying 11 families, genera and classes of species to be protected. Since then the composition of the list has not changed. This is despite the Minister having the power to amend the list (after consideration from the scientific committee).

The purpose of the list of marine species is not clear, nor is the rationale for determining which species were initially placed on the list. When adding to the list — something that has not been done since the list's inception — the Act stipulates that the Minister must not do so unless 'the Minister is satisfied that it is necessary to include the species in the list in order to ensure the long-term conservation of the species' (s250 (1)(a)).

This suggests that the primary purpose of the marine species list is conservation and its purpose is broadly similar to the threatened species list. Despite this, only around 10 per cent of listed marine species appear on the EPBC Act threatened species list. Further, the list has not changed since its inception to reflect the underlying sustainability of the listed species. This suggests that conservation is not the list's sole purpose.

This inquiry has heard that one rationale for protecting species is that they are 'charismatic' — that is, the species possesses some characteristics that the community finds appealing and therefore are sympathetic to the species being protected regardless of costs.

If the community derives significant value from protecting species because they are charismatic (rather than, or in addition to, the species being threatened), this should transparently be recognised as a factor that may be taken into account in listing. Further, in contrast to the listing process for threatened species, the criteria for listing on the marine species list, and the process by which a species is listed or delisted, is not public.

The fishing industry, and indeed the community as a whole, would benefit from clarity on the purpose of the marine species list and the process by which species are listed or delisted. This clarification does not necessarily need to be pursued through modification of the EPBC Act, but could be achieved through the publically releasing guidelines on how provisions relating to the marine species list are interpreted and applied, similar to what is done for threatened species through the *Threatened Species Status Assessment Manual*.

DRAFT RECOMMENDATION 7.4

The Australian Government should clarify the purpose of the List of Marine Species established in Part 13, Division 4 of the *Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)* and provide further information on the criteria against which species are added to or removed from this list.

Protected species in state jurisdictions

State and territories provide blanket protection to all native vertebrate species in their jurisdiction, including seals, dolphins and turtles through their wildlife regulation. The main rationale for such protection relates to the sustainability of native species — protected species cannot be hunted, killed, harmed, sold or kept as pets.

This protection can be exempted if the animal is deemed to be noxious or a pest. In some jurisdictions for example, some species of cockatoo are not protected in certain areas due to the damage they do to grain crops. Similarly, crows and ravens are not protected in some areas because of the damage they do to young livestock. In other cases, governments may act to minimise the impact of a protected species on its environment, for example, by re-locating a species or culling them.

Native species have the potential to affect the productivity of fishing businesses, as they do with terrestrial agriculture. An example of where native wildlife is substantially affecting commercial fishing is South Australia's Lakes and Coorong Fishery (box 7.5).

Box 7.5 New Zealand fur seals in the Lakes and Coorong Fishery

The Lakes and Coorong Fishery is a multi-species fishery in South Australia. Species caught include bream, perch and mulloway, as well as crustaceans and molluscs. Finfish are typically caught using nets or set lines. Commercial operators in the fishery have identified that interactions with New Zealand fur seals are having an adverse impact on their ability to fish (some have even identified that their viability is threatened) (Anderson 2015; Strathearn 2016). This concern relates not only to competition between the seals and fishers for fish, but also the frequency which seals damage expensive fishing equipment.

New Zealand fur seal are found in Southern Australia and the South Island of New Zealand. While previously hunted to low population levels, the IUCN Red List of Threatened Species lists the species as 'Least Concern' (meaning they do not qualify as threatened or near-threatened). Its assessment, undertaken in 2014, notes:

Presently the majority of New Zealand Fur Seal populations are increasing, and there is no evidence for sustained declines anywhere within their range. The breeding range of the species is still expanding in both New Zealand and Australia. Although the species is subject to some commercial fisheries bycatch in both New Zealand and Australia, those takes do not appear to be inhibiting broad scale population recovery (Chilvers and Goldsworthy 2015, p. 1).

As with all marine mammals, New Zealand fur seals are protected in both South Australian and Commonwealth waters.

The South Australian Government has undertaken several actions to minimise the impact that fur seals are having on commercial fishers. These include temporarily waiving net fees for operators in the fishery and increasing the number of days net fishing can take place in certain areas (Bignell and Hunter 2015).

The South Australian Government has also implemented a trial of underwater fire crackers in order to attempt to scare away the seals, although fishers appear to be sceptical of the efficacy of such measures (Gage 2016). Some have called for a portion of the seals to be culled (ABC 2015).

As previously endangered species (such as seals) recover, tension in the management of these species due to increasing interactions with fishers can be expected to become more common. Where this happens, regulators will need to be clear about how they will balance an increasing number of protected animals against a viable fishing industry.

At present, there appears to be little transparency in how states make such a judgment and under what circumstances governments would intervene to address problem species. The Commission would appreciate feedback from stakeholders on whether this process needs to be clearer and, if so, in what ways it can be improved.

INFORMATION REQUEST 7.2

Can the processes by which state governments and the Northern Territory manage the impact of pest native species on fishers be improved?

Threatened species

With respect to threatened species, some stakeholders expressed concern that the assessment criteria for listing was geared towards terrestrial species. It was suggested that terrestrial ecosystems and marine ecosystems were sufficiently different that the application of a terrestrial based criteria results in some marine species being identified as being threatened when they are not.

The question of what criteria a species should meet before it is considered threatened is primarily a scientific one. That said, the Commission notes the process of listing and delisting threatened species in the EPBC Act is both transparent and accessible. Any party can nominate a species for listing or delisting, the criteria against which this nomination is assessed is publically available and nominations are assessed by an independent scientific committee with opportunity for public participation in the assessment process. When considering commercially harvested fish, the scientific committee explicitly acknowledges it will consider (but not be bound by) the Commonwealth Government Harvest Strategy Policy.

Similarly the processes for listing and delisting species on state and territory maintained protected species lists appear generally robust with transparent and accessible processes by which an individual can nominate a species for listing or delisting.⁴⁷ There are also moves to harmonise the assessment approaches used to assess threats to species across jurisdictions, thereby removing inconsistency across both different states, and the states and the Commonwealth (DoE 2015).

⁴⁷ While both South Australia and the Northern Territory maintain protected species lists, the processes by which a species is listed or delisted is less formal than other jurisdictions, nor does there appear to be the capacity for individuals to nominate a species for listing or delisting.

The Commission notes that the lists of threatened species used by all jurisdictions appear fluid, with species being listed or delisted on a regular basis. This contrasts to marine species listed under the EPBC Act, which is much more static.

8 Aquaculture

Key points

- Aquaculture production in Australia is primarily based on salmon, tuna, oysters (pearl and edible) and prawns, and has grown in overall importance as wild-caught fish production has declined.
- Aquaculture is regulated to mitigate the industry's impact on the environment, provide access to publicly owned land and water and manage the potential conflicts with other users of these resources.
- Growth in Australian aquaculture production over the past decade has been underpinned by growth in Tasmanian farmed salmon production. There has been little growth in production of the other major species produced in Australia, except for barramundi.
 - For these species, the limited growth reflects factors other than regulation.
 - Many 'newer' species have not proceeded to commercially viable production due to technical and biological challenges in ensuring fish health and growth in a controlled production environment.
 - Regulatory arrangements have, however, impeded growth of land-based prawn production in North Queensland.
- Challenges to the future growth of the aquaculture industry include producing species that are commercially viable given competition with producers in other countries, and finding suitable sites given increasing competition for access to coastal land and waters, and environmental concerns.
- For states with well-developed aquaculture industries, the designation of zones for potential aquaculture development provided an efficient way of identifying suitable sites, greater regulatory certainty and streamlined approval processes for investors.
 - However, the extent to which this can beneficially be used in the future depends on the 'match' of commercially viable species with the physical traits of the land or waters to be zoned and access to essential services.
 - Whether their use, or greater use, is warranted should be determined in consultation with industry.
- Concerns about the environmental and amenity impacts of aquaculture developments in some states highlight the tensions for governments in both regulating and promoting industry growth.
 - These could be reduced by having separate agencies responsible for regulatory and industry development functions.
 - Industry also has a role in addressing community concerns by building and maintaining 'social license' to operate in the community.

Aquaculture is the cultivation or farming of aquatic organisms, including finfish (such as salmon and tuna), molluscs (such as oysters), crustaceans (such as prawns) and plants (microalgae for beta-carotene) in a managed marine or freshwater environment. This usually involves some intervention in the growth cycle to enhance production, including breeding, regular feeding, stocking and protection from predators. Aquaculture is undertaken both in terrestrial and marine environments and uses a range of production systems depending on the nature of the species and environment — for example, cages or land-based tanks for the farming of marine finfish, stick and tray production for oysters and mussels and land-based pond culture for prawns.

8.1 What is at issue?

Aquaculture has grown in its importance in overall fisheries production, in Australia and globally, as wild-caught fisheries production has declined due to environmental concerns. In Australia, governments see aquaculture as a potential source of economic growth, particularly in the context of projected increases in global demand for protein. (HRSCARFF 2012).

A major concern, therefore, has been to ensure that regulations do not unduly constrain the sector's growth and productivity.

Aquaculture is primarily regulated to control where and how businesses can operate. Like other businesses in Australia that compete for access to land and water that may affect public amenity, they must be compliant with planning and development laws. As aquaculture often requires the use of publicly-owned land and waterways, one of the common aims of regulation is to manage potential conflicts with other uses of these resources — such as marine transport, fishing, recreation and nature conservation.

Aquaculture is also regulated to mitigate the industry's impacts on the environment. The environmental impacts of aquaculture production depend on factors such as the type of species being cultivated, the method of production, the capacity of the surrounding waters to assimilate nutrient discharge, and the number and location of farms. Impacts can include degradation of the marine environment, introduction of disease, impacts on wild fish stocks and ecological systems and effects on the amenity values of surrounding communities (box 8.1).

Box 8.1 Potential environmental impacts of aquaculture

The aquaculture industry is diverse and each type of production has different potential environmental impacts.

For example, sea cage production can affect the quality of surrounding waters and the marine floor if the discharge of nutrients (such as uneaten fish food and fish waste) and the chemicals and antibiotics used to control pests and disease exceeds the absorptive capacity of the surrounding water. Water quality can also be affected by the use of chemical agents to remove the build-up of organic material (biofouling) on cages and other submerged infrastructure.

Cages can attract other fish and predators (such as seals) and so affect other marine life in the area. Fish can also escape, introducing disease or a genetic weakening of wild stocks. The existence of cage structures can reduce the area available for other uses, and farm operations may mar visual amenity and create noise for nearby residents.

In contrast, the farming of oysters and mussels through the use of rack and tray production and rope longlines have relatively low impacts on water quality. These species are not fed, but rely on the food they filter from the surrounding water. This filter feeding may contribute positively to water quality in waters with excessive nutrients, although in some waterways can result in a reduction in nutrients that support the surrounding ecosystem. As with cages, the infrastructure associated with rack and tray and rope longline production can shade the marine floor and alter water currents and the movement of sediment. These operations can also reduce the area available for use by others and affect visual amenity.

Pond production presents the risk of nutrient discharge into adjacent waterways. For example, the production of prawns in land-based ponds in coastal areas, which draws on seawater from estuaries or directly from the sea, has been criticised for the discharge of nutrients back into those waters. The production of trout in freshwater raceways — enclosures linked to inland waterways — can also result in waste products and other nutrients entering the riverine environment.

Where aquaculture is reliant on the use of wild caught juvenile fish for brood stocks, there can be an effect on wild populations. Some have questioned the longer term sustainability of feeding fish with other fish (usually in the form of fishmeal and fish oil) sourced from wild harvested stock such, as pilchards and anchovies.

Sources: DoE (2001); PC (2004).

The Commission's previous study

The Commission's 2004 study, *Assessing Environmental Regulatory Arrangements for Aquaculture* (PC 2004), assessed the existing regulatory arrangements and identified the key features of an efficient and effective regulatory framework (box 8.2).

For this inquiry, in line with the terms of reference, the Commission has considered the extent to which regulations examined in the 2004 review have changed, and how regulations have affected the sector's development.

Box 8.2 Key features of an effective regulatory framework for aquaculture

The key features on an effective regulatory framework identified by the Commission's 2004 study include:

- clear legislative objectives to promote certainty and consistency in setting the parameters of the legislation and in guiding ministers, government agencies and others in interpreting and applying the legislation
- separate agencies for industry development and regulation to remove potential conflicts of interest and improve public confidence in environmental protection, resource planning, allocation, approvals and enforcement
- the use of a spatial planning regime for marine aquaculture to designate aquaculture development zones in suitable environmental locations
- a land use planning system that recognises and provides for land-based aquaculture and provides guidance to local government planning arrangements
- the effective provision of tenure to public waters and land to provide adequate security to meet the needs of different lease categories and uses
- the use of environmental risk assessment processes to guide decision-making based on the species, production system, site location, management practices and the condition of the local environment (such as the quality and assimilative capacity of the receiving waters)
- a limited approvals process to minimise the number of different individual approvals required for an aquaculture development, ideally by having one approval for aquaculture operations and one for environmental management.

Source: PC (2004).

8.2 How aquaculture is regulated

Given their jurisdiction over most planning and local environmental matters, states and territories are primarily responsible for the management and regulation of aquaculture.

The primary modes of control (and facilitation) are the granting of leases on public land and waters so as to provide secure tenure to a site, and the issuing and administration of various development and operating approvals. These approvals may stipulate conditions such as requirements to observe specified distances between farms, stocking rates, restrictions on the type of infrastructure that can be employed and requirements to maintain the quality of water to a specified level (for example, there may be requirements to ensure there is no visible or measureable impact on the water or seabed beyond the farm lease boundaries). Regulations also usually seek to control interactions with other wildlife, such as seals and seabirds.

State governments are usually responsible for assessing marine-based aquaculture development applications, while local governments are responsible for assessing land-based aquaculture development applications. Some state governments have more

proactively used planning and zoning to select and define suitable areas for marine based aquaculture (see below).

Most jurisdictions do not regulate aquaculture through dedicated legislation. In these jurisdictions, the sector is regulated under fisheries legislation in conjunction with a range of other legislation. For example, Queensland regulates aquaculture through its fisheries Act along with environment protection legislation, land planning legislation and water quality management legislation. Western Australia regulates through its fisheries Act along with specific pearling legislation, and has recently established two aquaculture development zones. New South Wales and Victoria rely on a mixture of fisheries legislation, environmental and planning legislation, water management and coastal planning legislation.

South Australia is the only jurisdiction with legislation dedicated to supervising the development and operation of aquaculture businesses — the *Aquaculture Act 2001*. Tasmania also has specific legislation, the *Marine Farming Planning Act 1995*, relating to the planning aspects of aquaculture.

The Australian Government has had limited involvement in the regulation of aquaculture to date, as most aquaculture operations have occurred on state and territory-controlled land and water. The exceptions are where aquaculture operations have been required to be assessed under the auspices of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), which applies to matters of national environmental significance, including export fisheries, threatened species, migratory species and the Great Barrier Reef Marine Park.

The Australian Government also coordinates policy over national issues, such as disease control, quarantine (which affects the importation of broodstock), product quality, labelling and trade.

The overall impacts of regulation differ depending on the method of production employed to farm a particular species. The range of conditions and reporting requirements placed on operators generally reflect the potential environmental impacts associated with the different methods of production and species. For example, more stringent conditions and reporting requirements are typically placed on intensive aquaculture operations where feed is provided, such as finfish farming, due to the potential impact on surrounding water quality. In contrast, operations such as oyster production, where food is not provided and the potential impact on the water quality is less, are subject to fewer conditions and reporting requirements.

8.3 Aquaculture trends in Australia

Aquaculture has grown in importance as a source of seafood as wild caught production has declined. In 2014, global consumption of aquaculture products exceeded that from wild

caught fisheries for the first time (FAO 2014). The potential for growth in the aquaculture sector is viewed as considerable given projected increases in demand for seafood and for non-food applications, for example, the farming of aquatic plants for beta-carotene.

Aquaculture's share of fisheries production by value in Australia increased from under 30 per cent in 2001-02 to around 40 per cent in 2013-14.

Australia compared to the rest of the world

Australia is a minnow in world aquaculture production, accounting for less than 0.1 per cent of world aquaculture output (DoA 2015). The majority of aquaculture production occurs in Asia, with China, India, Vietnam and Indonesia accounting for nearly 80 per cent of world output.

Australia's aquaculture sector has experienced impressive growth, with total output by volume increasing by nearly 70 per cent between 2001-02 and 2013-14. This is commensurate with the growth of the two largest global producers, China and India, whose output increased by 64 per cent and 82 per cent between 2003 and 2012, respectively (albeit from much higher bases). The next two largest producers, Vietnam and Indonesia, experienced even stronger growth, with output by volume increasing by over 200 per cent over the same period (OECD 2015).

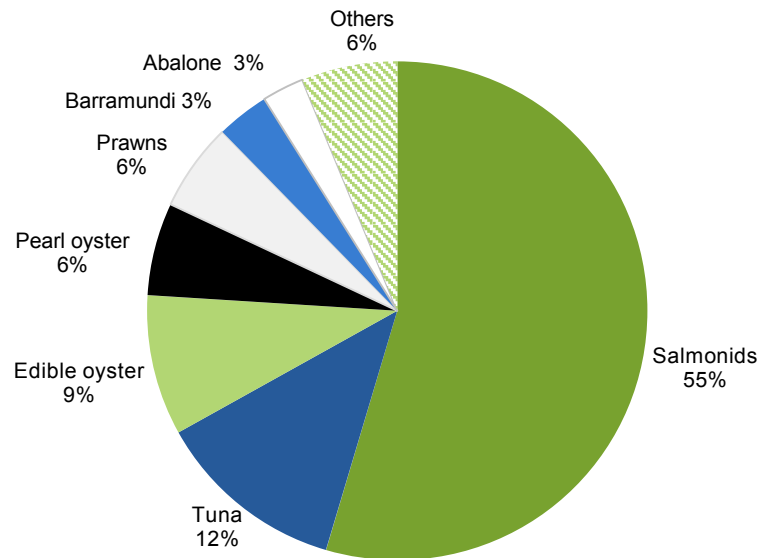
Australia, like other OECD countries, has focused production on high-value marine species such as salmon, tuna and oysters. Production in Asia is focused on low value freshwater species such as carp and catfish (OECD 2015). Australia accounted for less than 4 per cent of the value of aquaculture production across the OECD in 2013, but growth in the value of Australian aquaculture production between 2002 and 2013 was second only to Norway (OECD 2015).

There is general consensus that Australia is unlikely to grow its share of world aquaculture output by volume relative to aquaculture producers in Asia in the medium term given its relatively stricter environmental regulations and higher production costs, such as labour.

What is farmed in Australia and where

Aquaculture production in Australia is primarily based on the production of salmon, tuna, oysters (pearl and edible) and prawns (see figure 8.1). Other species include barramundi, abalone, mussels, trout, marron, redclaw (freshwater crayfish), yabbies and microalgae (beta-carotene).

Figure 8.1 **Australian aquaculture production by value**
(2013-14) Total value of production \$994 million



Data source: Savage and Hobsbawn (2015).

Climate and geography are major determinants of where and what species are farmed. Other factors include access to suitable waterways and infrastructure.

The cooler southern ocean waters of Australia are suited to salmon, abalone and mussels, whereas prawns and barramundi are produced in the warmer northern waters. This means that the species produced around southern Australia are typically competing with aquaculture production from the more developed countries in the northern hemisphere, whereas species produced in the tropical waters of northern Australia are competing against the lower-cost producers in Asian countries.

There are also a number of site-specific factors. The Sydney rock oyster is native to the eastern Australian coast and farmed in New South Wales and southern Queensland. In Tasmania and South Australia oyster production is based on an introduced species, the Pacific oyster.

Although most jurisdictions across Australia produce a number of species, production tends to be dominated by a single species. In Tasmania, aquaculture production is dominated by the production of farmed salmon in sea cages. In South Australia, the aquaculture industry is based on wild caught tuna grown out in sea cages and, to a lesser extent, oysters. In Queensland, aquaculture is based on land-based prawn production; in Western Australia it is pearls, in New South Wales, oysters, and in Victoria, abalone.

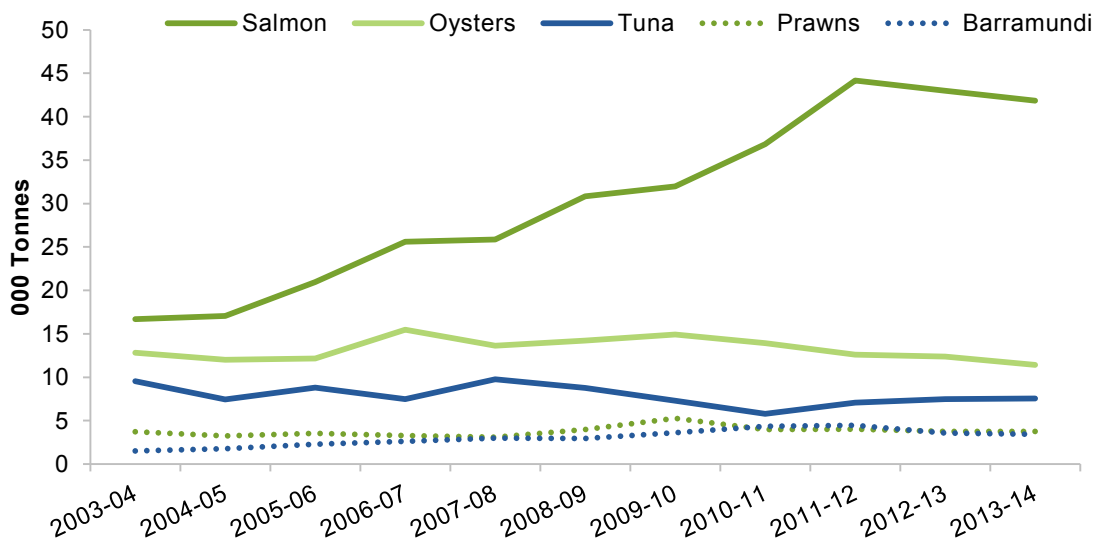
The sector in the Northern Territory remains relatively small and focuses on barramundi farmed in land-based ponds. The less heavily populated coastlines of the Northern Territory and Western Australia are considered to hold further development opportunities for aquaculture, although these locations face significant infrastructure challenges.

Although aquaculture is undertaken in all jurisdictions, Tasmania (56 per cent) and South Australia (18 per cent) account for around three-quarters of the value of Australia’s aquaculture production. Industry has indicated that these two jurisdictions have the most developed and facilitative regulatory frameworks for aquaculture development (National Aquaculture Council, sub. 2; Tasmanian Salmonid Growers Association, sub. 8; Australian Prawn Farmers Association, sub. 23; Australian Southern Bluefin Tuna Industry Association, sub. 59).

Trends in Australian aquaculture production

The growth in Australian aquaculture production over the past decade has been underpinned by growth in Tasmanian farmed salmon. Barramundi production also increased significantly, although from a low base. For the other major species, there has been little growth, or small declines, in production (figure 8.2).

Figure 8.2 **Growth in aquaculture production, selected species**
2003-04 to 2013-14



Data source: Savage and Hobsbawn (2015).

In real value terms, aquaculture production has declined over the past decade for six of the 11 main species farmed in Australia (table 8.1). Notable exceptions were salmon, barramundi and abalone.

Table 8.1 Methods of aquaculture production by species

<i>Species</i>	<i>Production method</i>	<i>Jurisdiction</i>	<i>Value of production 2013-14</i>	<i>Change in value of production 2003-04 to 2013-14^a</i>
			(\$ 000)	%
Salmon	Sea cages	Tas	542 956	194
Southern blue fin tuna	Sea cages (for the growing out of wild caught fish)	SA	122 400	-61
Edible oysters	Rack, raft and longline	NSW, SA, Tas	90 293	-11
Pearl oysters	Longline	WA	60 719	-62
Prawns	Land based ponds	Qld	63 522	-16
Barramundi	Sea cages, land based ponds	NT, Qld, WA	33 857	92
Abalone	Land based tanks, ocean rafts and cages	Vic, SA, Tas	26 802	144
Blue mussel	Longline	SA, Tas, Vic	9 614	3
Silver perch	Pond	NSW, Qld, WA	4 106	13
Marron	Ponds and farm dams	WA	1 836	-11
Redclaw	Ponds and farm dams	Qld	682	-58

^a Values are CPI adjusted.

Sources: PC (2004); Savage and Hobsbawn (2015).

Tasmanian farmed salmon has experienced rapid growth. In the ten years to 2013-14, production of farmed salmon in Tasmania increased by 151 per cent in volume terms and 194 per cent in value terms (Savage and Hobsbawn 2015).

At present, Tasmanian salmon is mainly produced for domestic markets. In its initial stages of small scale production in the early 1990s, around 60 to 80 per cent was exported (IC 1996). The rapid increase in production has improved the availability of and access to salmon in the domestic market and is reflected in strong growth in Australia's per capita salmon consumption. Exports accounted for around 2 per cent of the value of Tasmanian salmon production in 2013-14 (DoSG Tas 2015). However, with further expansion in production and some reported changes to arrangements for supplying major Australian supermarkets, there is likely to be a greater focus on export markets.

The rapid growth of farmed salmon in Tasmania has also encouraged other states to further develop and promote aquaculture, and producers of other aquaculture species to seek to emulate the success of the Tasmanian industry.

The production of farmed barramundi has increased over the past decade, but its growth rate is likely to have been affected by competition from other white fish, particularly lower-cost imported product. The relatively small scale of production (around 100 licensed farmers produce around 3500 tonnes per year) also makes it difficult to compete with imports. However, there are plans to develop large scale barramundi production — up to

1000 tonnes per year — in sea cages in the Kimberley aquaculture development zone off the Western Australian coast.

Other major aquaculture species farmed in Australia have experienced little growth in production for a range of reasons. For example:

- the production of Southern Blue Fin Tuna farmed in South Australia is limited by the quota.
- oyster production is limited by the availability of sites with high water quality. Increased run-off from coastal development and the susceptibility of oysters to disease are key issues. In New South Wales, oyster production peaked in the mid-1970s and has been declining since due to degradation in water quality in coastal rivers, estuaries and lakes, outbreaks of disease and changes in consumer tastes (DPI NSW 2014). In South Australia, production adjacent to more sparsely populated coastlines has increased (12 per cent) over the past decade, but like all oyster production remains susceptible to disease outbreaks (Savage and Hobsbawn 2015).

8.4 Impacts of regulation on the aquaculture sector

There have been few significant changes to the regulatory arrangements across Australia in the past decade. The major exception is the recent introduction of aquaculture zones by the Western Australian Government to foster development of aquaculture in the Kimberley and the mid-west regions (DoF WA 2015a).

The regulatory framework in Tasmania was introduced in the mid-1990s. The regulatory regime in South Australia has been in place since 2001, although changes to improve timing and address some areas of duplication in South Australia were finalised in 2013 and 2014 (Australian Southern Bluefin Tuna Industry Association, sub. 59).

Many features of good regulatory frameworks highlighted in the Commission's 2004 study were in place or have since been adopted in Tasmania and South Australia, and have proven important in the expansion of industry in those states.

In the other states and territories of Australia (apart from Western Australia) there has been little regulatory change since the Commission's 2004 study and little growth. However, the main impediments to aquaculture ventures have primarily been non-regulatory in nature, suggesting that the lack of regulatory change is due to the lack of demand for change. The exception to this is land-based prawn production in North Queensland.

Factors affecting growth

Effective regulatory frameworks are only one of several pre-conditions for successful aquaculture developments.

Principally, aquaculture developments require access to suitable locations. That is, locations with the right climatic and environmental conditions and a surrounding environment with sufficient assimilative capacity. The suitability of a location will also depend on potential impacts on other users of the waterway and nearby coastal populations and accessibility to necessary infrastructure. Of course, commercial viability requires that investors select species that they can produce competitively.

Major species, except for salmon and barramundi, have experienced little growth over the past decade (figure 8.2) and regulatory factors do not appear to have played a major role in this trend.

Other ‘newer’ species in Australia have often not proceeded to a commercially viable stage of production due to technical and biological challenges in ensuring fish health and growth in a controlled production environment. These challenges are even greater for those species that have not previously been farmed extensively and where there is little or no established knowledge or expertise as to how they should be farmed.

Aquaculture ventures require significant up-front investment in research and infrastructure and face considerable risks and uncertainties. These are highlighted by the experience of Western Kingfish Ltd and its investment in the sea cage farming of yellowtail kingfish off the Western Australian coast in 2007. Having listed on the Australian Stock Exchange and invested some \$8 million dollars in the venture, the company went into liquidation in less than 18 months following a disease outbreak (Ferrier Hodgson 2016; Jose 2016). (Since then, further commercial trials of farming yellowtail kingfish have been undertaken off Geraldton in Western Australia by Indian Ocean Fresh working with the Mid West Development Commission (Jose 2016)).

Such failures have resulted in other new projects facing difficulty in accessing financing, particularly where the failed projects have been over-promoted, resulting in unmet investor expectations and a loss of investor confidence in the sector (Australian Venture Consultants Pty Ltd 2015).

A distinguishing feature of the regulatory systems in South Australia and Tasmania, where the industry has expanded, has been the use of spatial planning to designate zones for aquaculture. The establishment of zones has helped to establish the legitimacy of aquaculture (that is, address the actual and perceived risks associated with fish farming), improved regulatory certainty, and reduced the red tape associated with environmental impact assessments and public consultations for new aquaculture developments.

In contrast, the most significant concerns raised by stakeholders in states without designated zones were the need to understand and comply with multiple Acts, obtain multiple approvals from different levels of government and agencies, and consequential regulatory complexity and delay.

The regulatory arrangements in Tasmania and South Australia are considered good relative to other developed countries (box 8.3). Western Australia has recently introduced

aquaculture zoning and the Queensland Government has recently announced that it will identify aquaculture development areas (discussed further below).

Box 8.3 **The regulation of aquaculture in other developed countries**

A common feature of aquaculture in developed countries is that the sector is subject to strict environmental standards to meet community expectations. In most of these countries, aquaculture is regulated by a range of different Acts, involving different levels of government and various regulatory authorities.

One approach to reduce the time and cost associated with gaining approval for new aquaculture developments has been to designate zones for aquaculture developments. This approach, similar to some Australian states, has been used in Scotland. Criticisms of other developed countries, such as Canada, New Zealand and the United States, centre on concerns similar to those levelled at Australian states without a regulatory framework based on development zones.

Norway regulates aquaculture, primarily the farming of Atlantic salmon, under the *Aquaculture Act (2005)*. It aims to develop the industry, protect the environment, simplify the approval process and ensure consideration of other uses of the coastal zone. Applications for new developments are made to the regional fisheries office, which following approval sends the application on to other regional authorities for further approval (coastal administration, food safety and County Governor). Environmental monitoring requirements are undertaken by both local and regional authorities based on the level of impact of the marine farm. The Norwegian regulation has a focus on standardising equipment requirements, such as cage construction.

Scotland requires aquaculture to be located in designated areas or farm management areas. Within these areas there are specific requirements related to infrastructure and controls for disease management. New developments require approvals from various authorities, such as planning consent from local government, discharge and medication consent from the Scottish Environmental Authority and navigation consent. Environmental monitoring is undertaken by the environmental authority.

New Zealand previously required finfish farms to be located in Aquaculture Management Areas designated by local councils. Following the lengthy, complex and costly processes required to establish these areas and the lack of new water space made available, these arrangements were amended in 2011. Currently all new aquaculture developments are required to submit an environmental impact assessment and obtain a resource consent from the relevant local council. Obtaining the resource consent can be an expensive and lengthy process due to the considerable public consultation undertaken. The resource consent stipulates the location and scale of the operation, production limits and environmental monitoring and compliance standards. The Minister for Primary Industries also needs to confirm the development will have no 'undue adverse effects' on recreational, commercial or customary fishing. If there are adverse effects, compensation is required for the affected parties.

Aquaculture in **Canada** is primarily regulated at the province level although aquaculture operations are subject to relevant aspects of Federal fisheries, navigation and endangered species legislation. New aquaculture developments are required to obtain an operating consent from the provincial government and for larger scale operations an environmental impact assessment (EIA) may be required. Development zones and areas are not used. Most provinces, for example New Brunswick and Nova Scotia, use environmental monitoring programs that stipulate the conditions that have to be met and the monitoring requirements.

Source: Sim-Smith and Forsythe (2013).

Other governments will need to decide, ideally in consultation with industry, whether there are likely to be sufficiently viable prospects to develop the necessary regulatory and planning framework. This should avoid what the CSIRO describes as the ‘catch 22’ situation where the lack of a regulatory framework deters potential investors and the lack of projects means that the regulatory framework is yet to be developed (sub. 61).

There may be additional benefits in amalgamating legislative requirements. Again, South Australia and Tasmania are viewed as leading in this area. Aquaculture producers considered that South Australia’s ‘one stop shop’ regulatory regime gave it a competitive advantage. As noted, Tasmania does not rely on a single aquaculture Act, but has legislation dedicated to the development and planning of marine aquaculture.

DRAFT FINDING 8.1

The development of aquaculture requires access to suitable sites. Spatial planning assists in the efficient identification of these locations. Spatial planning may also provide greater certainty, regulatory predictability and a more streamlined approval process for investors.

Where regulation has impeded the growth of aquaculture — land based prawn farming in Queensland

As much of the Queensland coastline is adjacent to the Great Barrier Reef, potential aquaculture operators are required to maintain water quality in accordance with standards that reflect its World Heritage status. Uncertainty as to how to meet these requirements has impeded the development of terrestrial-based prawn farms in North Queensland, which require an ability to discharge into waters adjacent to the Reef. This has resulted in considerable delays in the development assessments and created further uncertainty for other investors.

Australian Prawn Farmers (sub. 23) drew attention to the 15 year approval process for the Guthalungra prawn farm. This long process was due to strict environmental restrictions on the level of nutrients in discharge water — the so called ‘zero net discharge’ or ‘zero net nutrient release’ requirement placed on new prawn farms by the Great Barrier Reef Marine Park Authority (GBRMPA). This requirement was viewed by industry as effectively prohibiting further development of land-based prawn farms (box 8.4).

The Queensland Competition Authority (2014) and Joint Parliamentary Select Committee on Northern Australia (2016) proposed the use of zoning to overcome the impasse between aquaculture development in North Queensland and ensuring the long-term health of the Great Barrier Reef. The Queensland Competition Authority recommended that each area designated as suitable for aquaculture development be given a code setting out the regulatory conditions for that area — such as species, permitted discharge, the required

environmental offsets and approved locations for water intake and discharge structures (QCA 2014).

Following these reviews, the Queensland Government has indicated it will designate aquaculture development areas (DAF Qld 2016c). The onus now rests on the Queensland Government to do so.

Box 8.4 The Guthalungra prawn farm and the ‘zero net discharge’ requirement

Pacific Reef initially proposed a 200 plus hectare prawn farm at Guthalungra between Ayr and Bowen in North Queensland in 2001. The project finally received a permit from the Great Barrier Reef Marine Park Authority (GBRMPA) to discharge into the Great Barrier Reef marine park in 2015. Final approval from the local shire council is expected in the second half of 2016.

The Queensland Government approved the project in 2008 and in 2010 the Commonwealth Department of Environment approved the project subject to conditions, including that there was no net increase in background level of nutrients in the water at Abbot Bay into which the farm would discharge. This became known as the ‘zero net discharge requirement’ and was seen effectively as a ban on further development of the prawn farming industry in North Queensland.

The CSIRO commented that no prawn farm in the world could achieve a zero net discharge and the Australian Institute of Marine Science believed that such a requirement would not be economically feasible. In 2011, the approvals were amended to allow for discharges above the background levels in the water at Abbot Bay provided these discharges were fully offset. However, the proponent, Pacific Reef, found that initially there was little guidance on how to achieve these offsets. These will now be achieved through payments to the Reef Trust, recently established by the Queensland and Australian Governments, which will deliver funding to projects to protect the Great Barrier Reef. This is likely to involve restoring riparian zones and wetlands and funding cane growers to improve their land management practices. Provisional estimates of the annual cost of these offsets is around \$95 000 through improvements to 1689 hectares of sugar cane growing land.

In its evidence to the Joint Parliamentary Select Committee in 2015, the GBRMPA rejected that there had ever been a regulatory standard for a zero net discharge for all new aquaculture projects. This standard was a condition that had only applied to the Guthalungra project — the farm would be discharging directly into the ocean at Abbot Bay via a pipeline where the nutrient levels already exceeded water quality guidelines. Other prawn farms discharge into creeks and mangrove estuaries where the waters have a greater assimilative capacity.

The GBRMPA told the Joint Parliamentary Select Committee that the conditions placed on the Guthalungra development were specific to that location. It commented that future approvals would not be so protracted due to improvements in technology, regulator learning and legislative changes that would improve the process. In addition, proponents would no longer be able to apply for separately for EPBC and GBRMPA permits which had further lengthened the process.

Source: Joint Select Committee on Northern Australia (2016).

Queensland is different

Queensland is different from other jurisdictions as most of the proposed aquaculture developments (and the major species produced there) have been land-based rather than marine-based. This has presented a number of challenges for the industry in North Queensland.

There are likely to be more competing uses for the land, which makes the establishment of land-based aquaculture development areas more problematic than for marine-based areas.

The special requirements of the Great Barrier Reef introduce added complexities. Land-based aquaculture operations in North Queensland are subject to strict environmental regulations relating to discharges to maintain water quality. Aquaculture requirements are more stringent than for most other coastal developments, and relative to other sectors in Queensland that may affect water quality in the Reef, such as the agriculture sector. This is because the specific source of pollution can be easily identified (being a single point — the aquaculture business). In contrast, the agricultural sector has diffuse sources of pollution relating to sediments, nutrients and chemicals from cropping and grazing lands that are not easily measured.

In addition to strict discharge requirements, the Guthalungra project has been required to purchase offsets for discharges to maintain water quality in the Great Barrier Reef. While the use of offsets can be an effective means to manage environmental impacts, requiring aquaculture operations to purchase offsets requires them, in part, to rectify the land management practices of other landholders so as to maintain water quality in the Great Barrier Reef.

The Commission considers that the use of offsets should not result in aquaculture operators rectifying the adverse impacts of the land management practices of other land holders.

The impact of regulations on aquaculture operations

The focus of government and industry has largely been on improving the regulatory framework applying to the development and approval of new projects and the expansion of existing aquaculture operations. However, there are also regulatory requirements that apply to day-to-day operations, including monitoring and reporting of water quality and interactions with other marine species. These reporting conditions are generally attached to the relevant aquaculture licence.

There are other regulations that potentially impact on aquaculture producers. For example, a problem for other primary industries and anecdotally in the aquaculture sector is delays in or inability to access medicines and vaccines from overseas that are not registered for use in Australia due to the cost and delays associated with gaining the necessary approval. In its draft report on regulation of Australian agriculture, the Commission recommended that the Australian Pesticides and Veterinary Medicines Authority should make greater use

of international evidence from trusted comparable international regulators in its assessment of these products and that reforms underway in this area be expedited (PC 2016).

As in other sectors, it is often the cumulative effect of regulation rather than individual requirements that affect aquaculture operations (PC 2007). The Tasmanian Salmonid Growers Association noted that meeting the wide range of ongoing environmental regulations and reporting requirements resulted in compliance costs of around 4 cents per kilogram of production. Although the industry accepted this as a cost of ‘doing business’ these costs weigh on competitiveness (Tasmanian Salmonid Growers Association, sub. 8).

The aquaculture industry has looked to innovations and technology to improve productivity, provide solutions to environmental problems, and meet environmental standards. For example:

- water quality has been improved through the use of feeding systems that reduce waste and the non-chemical management of bio-fouling (CSIRO, sub. 61)
- improved structures and barriers have been adopted to protect bird and seal populations
- the use of algal treatment of water discharge has been used to lower nutrient levels in discharge to the levels required by regulators in proposed terrestrial prawn farms in North Queensland
- the more effective use of reticulated aquaculture systems has reduced effluent discharges and these systems provide the opportunity for aquaculture operations to become a stand-alone system removed from surrounding waterways
- the use of improved sensor technology and software systems have been used to improve real time monitoring of stock and environmental impacts and enable producers and regulators to respond to changes (CSIRO, sub. 61)
- technology has been key to selective breeding to improve growth, overall animal health and disease resistance, as well as the better selection of and handling of brood stock.

There is no evidence to suggest that regulations have impeded the development and use of technology in the aquaculture sector.

DRAFT FINDING 8.2

The regulatory arrangements for aquaculture have not significantly changed since the Commission’s 2004 study. This has not been a significant impediment to the growth of the aquaculture industry in Australia as the major aquaculture-producing states already had many best-practice regulatory features and other states have faced challenges that are predominantly non-regulatory in nature.

8.5 Are the regulatory settings right for the future?

Many consider that aquaculture is a future growth industry. For example, The Joint Select Committee on Northern Australia's view was that local aquaculture presented an opportunity to replace imported seafood, particularly in Northern Australia due to the long coastlines, availability of suitable land, pristine waters, potential to farm tropical species and proximity to Asia (Joint Select Committee on Northern Australia 2016). The CSIRO noted that there were many opportunities for the expansion of aquaculture in Northern Australia, particularly pond-based aquaculture that could also provide a market for locally irrigated crops as feed stock (sub. 61). The Tasmanian Government has also indicated its intention to expand the existing salmon farming industry.

Although the lack of regulatory change has not been the predominant influence on industry growth over the past decade, a pertinent question is whether government aspirations to further develop aquaculture can be realised with existing settings. Of course, the required regulatory settings to promote growth will differ for the infant aquaculture operations in northern Australia compared to the well-established industry in Tasmania and South Australia.

Increasing coastal development, growing environmental concerns and, in more remote locations, access to the necessary infrastructure will present challenges to industry growth. Not all of these challenges can be addressed through changes to regulation. Industry will also need to be proactive to maintain its 'social licence' — or community approval — to operate and grow.

A crowded coastline

Coastal development and associated population growth will place further pressure on both the industry and government. More populated coastlines increase competition for access to coastal land and water and may result in opposition to future aquaculture developments. At the same time, the proximity of aquaculture operations to coastal populations has heightened community concerns about the environmental impact of aquaculture. Land-based pond production of marine species is likely to be particularly problematic given its need for large areas of land in proximity to high quality seawater.

Regarding the prospects of developing marine fish farming, the New South Wales Department of Primary Industries (2016c) said:

... a major limitation on marine fish farming in New South Wales is the likely scarcity of suitable sites in sheltered embayments for the grow out of fish to market size. ... Sites in sheltered embayments with these characteristics are relatively sparse in NSW, due to existing demand from a variety of other interest groups (population pressure on coastal zone, recreational anglers and boaters). (p. 1)

If governments want further industry growth, land and marine planning regimes will need to consider the impacts of development on potential aquaculture sites. Coexistence between competing developments may require future developments to mitigate their impacts on the environment as well, such as through restrictions on run-off into the marine environment.

To alleviate the pressures from coastal development, there have been suggestions that future aquaculture operations, both marine and terrestrial, should be undertaken in more remote or offshore locations. These locations can offer good quality water and the opportunity to develop new species. They can also avoid competition and possible conflict with other users of marine resources (recreational fishing, commercial fishing and recreational boating) and the opposition of local residents in more closely settled coastlines.

However, challenges for remote locations include access to transport, infrastructure, adequate power and labour and, for offshore operations, the establishment of necessary infrastructure to deal with large seas, and providing feed and other inputs to facilities some distance from the shoreline.

The Commission understands that some proposals in remote locations are being explored, for example a large scale land-based prawn farm (Project Sea Dragon) in the Northern Territory close to the Western Australian border near Kununurra and proposals for cage-based production off the Kimberley coast of Western Australia. The Tasmanian salmon farming industry has also undertaken trials of offshore farming to test infrastructure in large swells (Tasmanian Salmonid Growers Association, sub. 8).

Infrastructure costs are likely to be significant in more remote areas. For example, the Commission understands that the Western Australian and Northern Territory Governments are spending \$70 million to seal the road from Kununurra to the proposed site of Project Sea Dragon in the Northern Territory (Dupe 2016). There is also a commitment from the Australian Government to contribute \$40 million for the upgrade of the road (Chester, Frydenberg and Canavan 2016).

The Australian, state and the Northern Territory Governments have agreed that the states and the Northern Territory will regulate any aquaculture in adjacent Commonwealth waters. This issue is being progressed through consultations between the Commonwealth Department of Agriculture and Water Resources and the relevant jurisdictions (Department of Fisheries (WA), sub. 21).

Better managing the community's concerns about aquaculture

There are concerns in some parts of the community that current regulatory frameworks are not adequately reporting on or managing the environmental impacts of the sector, or taking into account the impact on other users of the water resources, including those living in coastal communities close to aquaculture operations.

These concerns are prominent in Tasmania, where sections of the community consider that the growth of the salmon farming industry and its importance to the Tasmanian economy has been at the expense of the environment, other users of the waterways and nearby residents. Concerns have increased with the expansion of salmon farming operations in Macquarie Harbour and around the more heavily populated areas of south-east Tasmania. The Tasmanian Government has a policy commitment to partner with the salmon farming industry to grow the farmed salmon industry in Tasmania to a \$1 billion industry by 2030.

Other aquaculture developments along populated coastlines have also faced strong community opposition. For example, proposals to develop cage-based aquaculture in Moreton Bay in south-east Queensland faced considerable opposition from nearby communities concerned about the environmental impacts and their loss of amenity as well as from other commercial and recreational users of the waterway (QCA 2014).

Particular concerns in Tasmania centre on the perception of regulatory capture, as the functions of regulating and promoting the industry rest with a single minister and agency. Some stakeholders consider that the Tasmanian Government is regulating and acting in the interest of the salmon farming industry instead of the public interest. For example, EDO Tasmania (2015) said:

The close relationship between the three companies and the regulator, a history of under-regulation and enforcement ... and explicit support expressed by DPIPW [Department of Primary Industries, Parks, Water and the Environment] for aquaculture projects all affect public trust in the rigour of the regulatory framework. (p. 6)

Separating regulatory and industry development functions would address perceived conflicts of interest. There is also obvious merit in robust and transparent stakeholder engagement processes on proposed developments if governments wish to promote the growth of their aquaculture industries.

DRAFT FINDING 8.3

Concerns about the environmental and amenity impacts of aquaculture developments are prominent in some states, highlighting tensions for governments in both regulating and promoting industry growth. These concerns could be minimised by having separate agencies responsible for regulatory and industry development functions.

Industry should also play a role

Industry should also play a role in addressing community concerns. This will require industry to exert some effort to gain acceptance or approval for its activities from the local community and other stakeholders.

This requires building trust with the local community and demonstrating the community benefits that flow from the success of the industry. In other industries, effective community relationships have been built on openly engaging with the community about the nature of the operations, how the impacts on the surrounding community will be managed, providing information on impacts in a timely and transparent manner, collaborating and consulting with the local community on problems, and sharing the benefits by investing in the local community. By investing in these relationships on an ongoing basis, industry is better placed to deal with and manage any issues as they arise with some support or at least acceptance from the community rather than attempting to ‘build bridges’ to the community after the event.

Many aquaculture operators have made efforts to develop and maintain a social licence. For example, some aquaculture operators have been involved with collaborative community projects to investigate the health of local waterways (Tasmanian Salmonid Growers Association, sub. 8). Other initiatives have involved the maintenance of surrounding foreshores and the provision and maintenance of recreational infrastructure.

The Commission recognises that the sector is exploring the greater use of third party certification and accreditation schemes to improve the community’s (and consumers’) perceptions of the aquaculture industry and particularly its impact on the environment.

Going forward, both government and the industry have a role to play to further develop aquaculture in Australia. For industry, a proactive approach is required to engage with and improve relations and its image with the community. For governments, providing an effective regulatory framework (as outlined in box 8.2) is important not only to manage the environmental impacts and the competing claims on a shared resource, but also maintain community confidence in the regulatory arrangements. This can be assisted through effective consultation with industry and the community, and communication of longer-term plans for aquaculture. Governments will also have to make decisions as to the extent of their role in providing infrastructure to prospective aquaculture developments in more remote locations.

The Commission notes that the Australian Government has committed to work with the industry to develop a national aquaculture strategy. This will reportedly focus on governments providing an efficient and effective regulatory environment that supports the sustainable growth of the industry, encourages investment, maintains strong environmental performance and manages biosecurity risks (DAWR 2015). Development of the strategy provides an opportunity, in consultation with industry, to re-visit the key regulatory features identified in this review.

9 Downstream processes

Key points

- Downstream processes involve processing, wholesaling and retailing of seafood. All businesses involved in downstream processing are regulated through licensing or accreditation for food safety reasons, and to provide for traceability of product for fisheries management purposes and detection of illegally caught product.
- Most of the seafood produced in Australia (around 90 per cent by volume) is sold as fresh or frozen product, so seafood processing in Australia adds little value — mainly involving basic filleting, chilling, freezing and packaging. The value added is in the correct handling and timely delivery of product to local and overseas markets.
- The most significant issue raised by participants relating to downstream processes was a desire that mandatory country of origin labelling requirements be extended to seafood sold for immediate consumption in restaurants, clubs, hotels and takeaways.
 - Consumer health and safety interests would not be enhanced by such a policy change, and there are many practical impediments to implementation. If such arrangements are desired, industry should apply them voluntarily.
- There were also calls for the voluntary Australian Fish Name Standard to be made mandatory to provide consumers with more accurate information.
 - Adoption of the Standard requires agreement between the states and territories on the names of each particular species and extensive education and awareness-raising for industry and consumers. The Commission was not presented with evidence indicating detriment to the public from the current arrangements, and mandating use of the Standard does not appear warranted.
- Licensing and accreditation fees for seafood processors should be based on the actual (efficiently incurred) costs of government monitoring and enforcement activities (for example, through the use of a tiered scale of fees reflecting the size and scale of processing operations). This will reduce the scope for smaller businesses to cross-subsidise the regulation of larger businesses.

9.1 Downstream processes and their regulation

After capture or harvest, seafood is processed to a varying extent before being sold to wholesalers, distributors and then on to retail outlets or the food service sector. The various flows of seafood from capture or harvest to the consumer are outlined in figure 9.1.

This section describes the major phases of downstream processing and relevant regulatory requirements.

Processing

Around 90 per cent of the seafood produced in Australia by volume is sold as fresh or frozen product. Thus the majority of seafood processing undertaken in Australia adds very little value to the product – mainly involving basic filleting, chilling and freezing, and packaging. The value added is in correct handling and timely delivery to local and overseas markets (almost 70 per cent of Australia’s seafood exports are transported by air) (ABS 2012; DoA 2014; Spencer and Kneebone 2007).

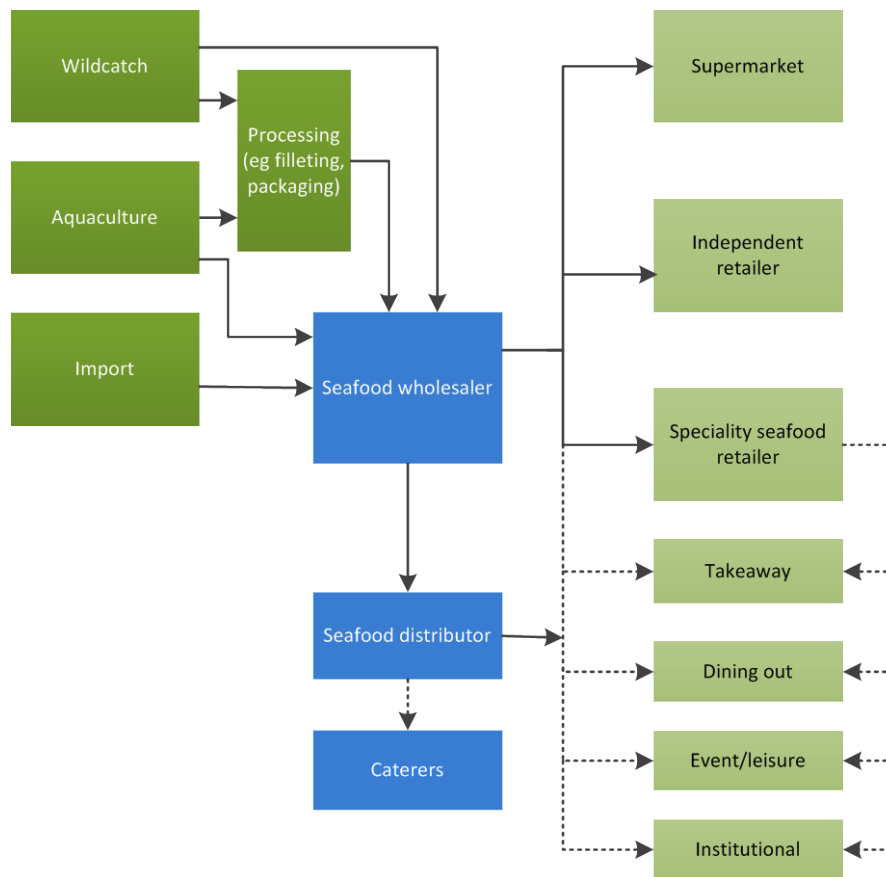
Further processing occurs in certain species. For example, some Atlantic salmon farmed in Tasmania is subject to processing to produce smoked salmon.

In 2015, there were 217 seafood processing businesses operating in Australia — down from 306 in 2008 (ABS 2016). The decrease in seafood processing businesses most likely reflects the decline in wild caught catch. The decline in the number of seafood processing businesses has been more pronounced in the non-metropolitan coastal areas of south-eastern Australia (data request from ABS 2016).

These establishments vary by size and scope of operations, but the focus is on filleting and basic preparation of the product for sale as fresh or frozen product. Some fishers have their own onshore processing facilities, and processing can be done on board fishing vessels (for example, the cooking of crustaceans). So-called ‘factory’ trawlers utilise large scale onboard processing and freezing facilities to prepare catch for export markets. The size and scale of these vessels and their recent arrival in Australia has raised concerns with various groups, which are discussed in chapter 7.

Apart for Tassal (the major salmon farming producer in Tasmania) and Simplot (the owner of major frozen brands such as Birdseye and canned fish product such as John West) the majority of seafood processors are small to medium sized enterprises (IBIS World 2015). Most seafood processing businesses (nearly 80 per cent) had fewer than 20 employees in 2015 (ABS 2016). There were just under 1800 people employed in seafood processing in total across Australia at the time of the last ABS Census in 2011 (Savage and Hobsbawn 2015).

Figure 9.1 **Seafood distribution channels**



Source: Spencer and Kneebone (2007).

Wholesaling

Seafood wholesalers supply both domestic and imported product to distributors and retailers directly or via specialised seafood distributors (figure 9.1). There were around 845 fish and seafood wholesaling businesses operating in Australia in 2015 employing just under 4000 people (ABS 2016; IBIS World 2015).

Australian wholesalers are heavily reliant on imports. Imports account for two-thirds of domestic consumption and mainly comprise low-value frozen and thawed fish from New Zealand, Vietnam, China and canned fin-fish (such as tuna) from Thailand. The low cost of white boneless farmed fish, such as basa fillets, from Asia and its neutral taste makes it attractive to Australian consumers and is the most common and widely eaten import. Australian seafood exports consist of higher-value product such as lobster, tuna and abalone. Although available in Australia, local consumers are often unwilling to pay as high a price as is available in export markets for these products (DoA 2015).

Wholesalers also play an important role as a supply conduit for seafood sourced from remote locations to reach major markets. Wholesalers and distributors also operate through central markets in major cities, such as the Sydney and Melbourne fish markets. The dominant role of some of these central markets largely stems from past government regulation of seafood marketing. In New South Wales, between 1945 and 1997 the Sydney Fish Market held a legislated monopoly over the marketing of fish and seafood into Sydney. Outside of Sydney, fish and seafood could only be sold to the various fisherman's cooperatives operating along the New South Wales coast. Since 1997, fishers have been able to sell their catch to any buyer in New South Wales holding a licence to receive fish and seafood. In Queensland, regulated marketing arrangements were also disbanded in the 1990s.

The move away from regulated marketing has resulted in a decline in the membership of some of the New South Wales cooperatives. For some smaller cooperatives, this has reduced the ability of the cooperative to maintain critical infrastructure, such as unloading facilities and slipways. This has resulted in commercial fishers having to travel further to access facilities or relocating their base of operation, placing further pressures on the viability of the cooperatives (GHD 2014). Although deregulation has placed pressure on some cooperatives, it has expanded the marketing channels for seafood and provided commercial fishers with choice as to where and to whom they can sell their catch.

Retailing

Seafood retailing is undertaken through various outlets, including large supermarket chains, independent retailers and specialist seafood outlets. Around 9800 supermarket and grocery stores and 4800 fresh meat, fish and poultry retailers were in operation in 2014 (ABS 2015).

There is little concentration in the retail market for fresh seafood. Around 17 per cent of domestic sales of fresh seafood occur in supermarkets and around 40 per cent through independent seafood outlets, with the remainder sold through takeaway and dining venues. There is considerably higher concentration in the retailing of more highly processed seafood due to the dominant market position of large supermarket chains in the sale of consumer packaged products. Canned seafood and frozen product are more likely to be sold through supermarkets, with around 87 per cent of canned seafood product and 25 per cent of frozen product sold through these stores in the mid 2000s (Spencer and Kneebone 2007).

Regulation in downstream processes

The licensing and accreditation regime

All states and territories require businesses handling seafood (processors, wholesalers, seafood storage and transport) to be licensed or accredited. Most also require commercial

fishers to be licensed or accredited. Licensing regimes for the handling of seafood are implemented under: fisheries legislation (South Australia, Western Australia and the Northern Territory); relevant food safety acts (New South Wales, Queensland and Tasmania); or specific seafood safety legislation (Victoria) (table 9.1).

Businesses that hold a licence are required to comply with the relevant food safety legislation in each jurisdiction (for example, the *Seafood Safety Act 2003* in Victoria or the *Food Act 2003* in New South Wales) that implements the National Food Standards Codes (Standard 3.2.2, *Food Safety Practices and General Requirements*; Standard 3.2.3, *Food Premises and Equipment* and Standard 4.2.1 *Primary Production and Processing Standard for Seafood*).

Some jurisdictions also require licensing and registration of those purchasing fish or particular types of fish. This is to assist in fisheries management and provide traceability of product to ensure that commercially supplied fish are legally caught by licensed commercial fishers. New South Wales requires those purchasing all types of fish from fishers for processing or resale to be registered as a fish receiver. Victoria only requires those purchasing abalone to be registered and Western Australia requires those receiving rock lobster from the West Coast Rock Lobster Managed Fishery to be licensed. In Tasmania, a separate licence is required for those handling, but not processing, rock lobster and giant crab.

Processors, wholesalers and retailers of fish caught in certain Commonwealth fisheries are also required to hold a fish receiver permit. For example, fish receivers of Southern Bluefin Tuna are required to register with Australian Fisheries Management Authority (AFMA) and comply with the fish receiver permit conditions. This requires the permit holder to tag, weigh and measure each fish and have the correct accompanying documentation before it can be sold domestically or exported to comply with the catch documentation scheme specified by the International Commission for the Conservation of Southern Bluefin Tuna (AFMA 2016d).

Processors dealing with product for export are required to be registered with the Department of Agriculture and those exporting seafood are required to hold an export permit. These export requirements apply to fish caught in any Australian jurisdiction. This regulation enables supervision of the export supply chain to ensure all exported seafood complies with Australian Food Standards and any additional importing country requirements (DAWR 2016a).

There is considerable variation as to how the fees for processor licences and accreditation are set across jurisdictions. Some jurisdictions apply a flat fee for all processors irrespective of the size or nature of processing undertaken. Others differentiate the licence fee by the type of species being processed or by the size and scale of the premises (table 9.1).

Table 9.1 Licensing and accreditation of the seafood industry by state

<i>Jurisdiction</i>	<i>Relevant legislation^{a,b}</i>	<i>Who is required to hold a licence</i>	<i>How are licence and accreditation fees applied for seafood processors</i>
NSW ^c	<i>Food Act 2003</i>	Those processing, packaging, storing transporting or wholesaling seafood. Specific requirements apply to seafood transport vehicles.	By number of fish handlers on premises.
Vic ^d	<i>Seafood Safety Act 2003</i>	Different licences apply to seafood harvesting businesses, wholesalers, processors and retailers. There is also a licence for retailers operating from a boat.	By volume of species processed on the premises.
Qld	<i>Food Production (safety) Act 2000</i>	Wild animal harvesters, aquaculture businesses, seafood processors, seafood storage.	Single fee for all seafood processors.
WA ^e	<i>Fisheries Resources Management Act 1994</i>	Those processing fish for a commercial purpose. A licence is not required to process fish on a boat or for fish that have been harvested in accordance with an aquaculture licence (except for rock lobsters, prawns and scallops).	By species. Higher fees apply for processors of rock lobster and prawns.
SA	<i>Fisheries Management Act 2007</i>	Those processing, storing, transporting and dealing in seafood. Full processor registration allows the licensee to buy products from aquaculture authority holders, registered processors and wholesalers. Restricted registration is available to those holding a fishing or aquaculture licence and only allows for the sale of product or purchase from own licence.	By species. Higher fees apply for processors of rock lobster, prawn and abalone.
Tas ^f	<i>Primary Produce Safety Act 2011, Food Act 2003</i>	Those growing, cultivating, picking, harvesting, catching, transporting or holding seafood. Seafood processing.	By number of full-time employees on premises
NT	<i>Fisheries Act</i>	Those purchasing fish or aquatic life for processing or sale.	Single fee for all seafood traders and processors.

^a Requirements may also be contained in regulations issues pursuant to the acts listed. ^b All jurisdictions require licensees to comply with the Food Standards Code. ^c Those purchasing fish from fishers are also required to be registered as a fish receiver with Fisheries New South Wales in accordance with the New South Wales *Fisheries Management Act 1994*. There is also a restricted fish receiver registration for commercial fishers who do not receive fish for resale from other commercial fishers. ^d Those purchasing abalone are required to be registered with the Victorian fisheries agency. ^e A licence is required for those receiving rock lobster from the West Coast Rock Lobster Managed Fishery. ^f A licence is required for those handling rock lobster and giant crab.

Sources: DPIPWE (2014b); NSW Government (2015); PIRSA (2015a); PrimeSafe Victoria (2015); Safe Food Queensland (2015).

Most jurisdictions do not require fish retailers to be licensed. Victoria requires seafood retailers to be licensed (including those operating from a boat or a vehicle), but these licences incorporate the relevant food safety requirements. The Northern Territory, under the *Fisheries Act 1988*, licenses fish retailers to ensure compliance with the Territory's

labelling requirements for imported seafood. Food safety accreditation is provided separately under health legislation. In the other jurisdictions, seafood retailers are only required to comply with the relevant food safety requirements.

Food labelling

Under the Australia New Zealand Food Standards Code (Standard 1.2.11), seafood for retail sale is required to include a country of origin label indicating where the seafood was harvested, processed or manufactured. Restaurants, takeaways, canteens, schools, caterers, hospitals, correctional facilities or other institutions where food is offered for immediate consumption are exempted.

For unpackaged seafood there must be a label in connection with the display of the seafood indicating the country or countries of origin or indicating the proportion of Australian ingredients if the seafood is a mix of local and/or imported product. For packaged seafood, a label is required on the packaging that identifies the origin of the product or the country where it was manufactured or packed and whether the product is made from local and/or imported ingredients. These requirements have applied to seafood sold in Australia since 2006.

New country of origin labelling arrangements were introduced in July 2016 that will become mandatory in 2018 under Australian Consumer Law. Under these arrangements food produced, grown or made in Australia will be required to display an 'Australian made' label (a kangaroo in a triangle symbol with a statement that the food was grown, produced or made in Australia). The minimum proportion by weight of Australian ingredients in the food will be indicated by a percentage and displayed in a bar chart as part of the label. Imported food will require the country of origin to be specified in a clearly defined box (ACCC 2016).

There is a separate labelling scheme for seafood sold in the food services sector in the Northern Territory. Following representation from industry, the Northern Territory Government introduced legislation in 2008 requiring fish retailers (including eating establishments such as restaurants and takeaway outlets) to label seafood as 'imported' if it was not harvested in Australia as a condition of their licence. No labelling is required for seafood harvested in Australia.

The New South Wales Government has proposed a source of origin labelling scheme to promote locally caught seafood sold for immediate consumption, and indicated it would work with fishers, the catering industry and retailers on scheme design and operation (New South Wales Food Authority 2016).

A further feature of the labelling of seafood is the display of independent third-party certification credentials by retailers to demonstrate that the seafood being sold is from a sustainable source. There is a range of certification schemes in place, the most widely used

being the Marine Stewardship Council scheme (DoA 2015). These schemes are discussed further in chapter 7.

9.2 Issues in the downstream sector

The Commission has not been presented with any evidence to indicate that current regulatory arrangements have resulted in significant negative impacts on the operations of the downstream sector. The most significant matter raised by some parts of the industry was a request that country of origin labelling requirements be extended to seafood sold in restaurants, clubs, hotels and takeaway outlets.

Extending country of origin labelling to seafood for immediate consumption

Some in the industry (The National Aquaculture Associations, sub. 2; The Tasmanian Salmonid Growers Association, sub. 8; Sydney Fish Market, sub. 13; GA&MJ Stevenson, sub. 26) have called for the removal of the exemption from country of origin labelling for seafood for immediate consumption in the Food Standards Code on the basis that this would provide better information to consumers and a consistent approach to labelling across the supply chain (SRRATRC 2014). The Australian Barramundi Farmers Association referred to this as ‘truth in labelling’ and said:

... [the] aim is to identify origin of seafood so that consumers, including diners, can make informed purchasing decisions. (sub. 34, p. 1)

Proponents have also argued that country of origin labelling would remove the scope for misleading statements, and/or substitution of lower cost imported product for domestic product. For example, where a menu item is described as ‘barramundi’, consumers may assume it is local product when it is cheaper imported barramundi. It was claimed that there was no incentive for the food service sector to voluntarily identify imported product, and that differences in quality and misperceptions about origin could damage the reputation of local product and producers. Concerns about ‘substitution’ of local barramundi in the food services sector have been commonly cited by local industry as an example of a gap in the regulation (SRRATRC 2014).

The introduction of the labelling of imported seafood sold for immediate consumption in the Northern Territory was highlighted by industry as an indication that country of origin labelling of seafood in the food services sector was feasible across Australia.

These issues have been raised in previous reviews and inquiries, including the Blewett Review of Food Labelling and Policy, a Senate inquiry and the Joint Select Committee on Northern Australia inquiry into aquaculture in Northern Australia (box 9.1).

Box 9.1 Previous reviews and inquiries on extending country of origin labelling to seafood for immediate consumption

The *Labelling Logic: Review of Food Labelling Law and Policy* conducted by Dr Neil Blewett in 2010 did not find sufficient arguments to justify lifting the exemption on country of origin labelling for seafood for immediate consumption (Blewett et al. 2011).

A Senate Rural and Regional Affairs and Transport References Committee report, *Current requirements for labelling of seafood and seafood products*, recommended that the exemption from the country of origin labelling for seafood under the Food Standards Code be lifted. It considered that this would provide a simple and cost-effective means of achieving a level playing field for Australian and overseas producers. An independent Senator introduced a Bill to put this into effect, which was rejected by the Senate (SRRATRC 2014).

The Joint Select Committee on Northern Australia report, *Scaling up. Inquiry into opportunities for aquaculture in Northern Australia*, also recommended that the exemption for country of origin labelling under the Food Standards Code for seafood be removed. The Committee came to this conclusion based on the Northern Territory experience, the potential stimulus that could be provided to the local industry and the need to assist consumers in making informed choices (Joint Select Committee on Northern Australia 2016).

Is there a need for it?

Food labelling provides information to consumers and helps address the information imbalance between producers and consumers. Certain labelling (such as ingredients and expiry dates) is required to ensure food safety where there are direct and immediate risks to the health and safety of consumers. Other labelling, such as the relationship to animal welfare, environmental sustainability or identifying the method of production (such as ‘free range’) is often used by producers to differentiate their product and assist consumers to make purchases according to their personal preferences. Country of origin labelling for seafood for immediate consumption falls into this category.

The rationale argued for mandatory country of origin labelling for seafood sold for immediate consumption would be to address potentially misleading country of origin information and/or for food safety reasons — to the extent consumers use the country of origin as an indicator of food safety. However, these concerns are dealt with under existing legislation.

Consumers are already protected from incorrect labelling of seafood under consumer protection legislation. For example, consumer protection legislation is in place to protect consumers from false or misleading information as to the origin of the seafood. Similarly, the issue of food safety is addressed through the food safety codes that apply to imported as well as domestic product.

The main benefit of country of origin labelling for food sold for immediate consumption would be to allow consumers to more readily choose products that are sourced from a particular location or in ways that are more consistent with their preferences. The starting

presumption from proponents of mandatory labelling is that there is a preference for locally caught seafood. However, if this were the case, food outlets should have an incentive to provide information on product origin (so long as the cost of labelling does not exceed the potential for higher profits with higher priced local product).

There are also practical impediments to implementing country of origin labelling for ready-to-eat seafood. Food service businesses need to be able to change menus in response to quality, seasonality and availability of different seafood products and would need to identify the proportion of local and imported content in seafood dishes offered every time menus change. Also, the symbols and bar charts for country of origin labelling for packaged and fresh food that will become mandatory in 2018 could be difficult to replicate on menus and menu boards.

Because of the practical difficulties, including the costs associated with menu changes and the possible impacts of mandatory labelling on product sourcing, the Australian and New Zealand Food Standards Code specifically exempts all food — not just seafood — for immediate consumption, sold in restaurants, takeaways, hotels, clubs, hospitals and canteens from country of origin labelling (DIIS 2015).

The Queensland Government noted that there was no gap in the existing regulation, and that the most effective way of addressing consumer information preferences would be the development of an industry-led code of conduct (DAFF Qld 2014). New Zealand provides for voluntary country of origin labelling (FSANZ 2016).

The Northern Territory's labelling regime for seafood sold through the food service sector only requires imports to be identified. The Fisheries Research and Development Research Corporation (FRDC) commissioned a survey to gauge the impact of the scheme, but the results were mixed. Given the small number of businesses surveyed and the size and structure of the food services sector in Darwin compared to the rest of Australia and the 'import' only labelling regime, it is difficult to accurately use the experience of the Northern Territory as an indicator of the national impacts of removing the exemption.

The Commission considers that there is no case for extending mandatory country of origin labelling to seafood sold for immediate consumption. If such information is valued by consumers it is in the interests of industry to provide it. Any country of origin labelling for seafood sold for immediate consumption should be based on a voluntary industry-initiated arrangement, as in New Zealand.

DRAFT RECOMMENDATION 9.1

Governments should not extend mandatory country of origin labelling to seafood sold for immediate consumption.

Labelling for additional information

The Marine Conservation Society (sub. 33) and the World Wildlife Fund for Nature (WWF) (sub. 62) also proposed mandatory labelling of seafood to identify the species, the origin of catch and method of catch or aquaculture used to provide additional information to consumers.

Similar to mandatory country of origin labelling, consumers are already protected by health and consumer protection legislation, and the labelling of seafood to identify species, origin and method of catch would primarily help to meet the preferences of consumers requiring information as to the provenance of their seafood and its method of production.

The market is already responding to the demands of consumers through the use of third party certification schemes that provide consumers with information as to the provenance of the seafood and the sustainability and condition of the fishery from which it originates (see chapter 7). These certification schemes are in place for both wild caught and aquaculture based products and are widely used by retailers as a point of product differentiation to market seafood. There are also online resources that provide information to consumers as to the sustainability of common types of seafood sold in Australia. These schemes and resources are responsive to the preferences and values of consumers and other stakeholders and already provide flexible means for responding to them.

Australian Fish Name Standards

The Australian Fish Name Standards (AS 5300 -2015) is a voluntary standard introduced in 2007 that specifies the prescribed fish name for fish sold to consumers or for wholesale, export and import. The Standard names apply to over 4000 Australian and imported species.

The Standard aims to address confusion over fish names caused by the numerous species Australia has on offer, a species being known by more than one name, or the same name being used for more than one species. The overarching purpose of the Standard is to improve traceability of product and provide confidence to consumers. Some participants called for the Standard be made mandatory. For example, the Sydney Fish Market claimed that a mandatory Australian Fish Names Standard would ensure consumers had accurate information as to the fish they are purchasing and assist in any product recall (sub. 13).

The 2014 Senate inquiry *Current requirements for labelling of seafood and seafood products* noted that not all species had a unique standard name and some species of fish were known by different names in different jurisdictions. For example, ‘flathead’ could be used to describe a number of different Australian species as well as some imported species that were not considered to be flathead. The FRDC told the inquiry that while the Standard had recorded thousands of fish names, many names were group names covering multiple species to which naming conventions were not yet in place (SRRATRC 2014).

There are considerable difficulties to be overcome to institute a mandatory fish names standard. The major obstacle is that naming conventions differ for the same species across jurisdictions and that some species have widely accepted names in different jurisdictions. Consequently, standardisation would require agreement between the states and territories on the names for each particular species and changing these names would require an extensive education and awareness campaign targeted at industry and consumers (SRRATRC 2014).

The existing arrangements do not appear to be having significant negative impacts on consumers or business. Currently businesses can sell fish and seafood using historically entrenched common use names (provided they are not misleading or deliberately mislabelled) or the names under the Standard.

The Commission considers that the current voluntary arrangements are a practical and proportionate response to problems arising from the use of different fish names across Australia. At this stage, the use of voluntary Australian Fish Names Standard and further development of the Standard by the Fish Names Committee of the FRDC to reflect the needs of industry and consumer preferences should continue.

DRAFT RECOMMENDATION 9.2

The Australian Fish Names standard should continue to be used on a voluntary basis. Further development of the Standard by Fisheries Research and Development Corporation should continue to reflect the needs of industry and the preferences of consumers.

Other issues

Regulation and opportunities for growth

There is no evidence of significant regulatory impediments to the expansion of downstream processing. Although the decline in the wild caught catch has been reflected in the decline in the number of seafood processing establishments, there are also opportunities for the sector.

The FRDC identified a number of opportunities for improving the profitability of the downstream sector. These include reducing and or using the waste from fish processing plants as inputs to other products, improving the value-add of processed products and better understanding consumer needs. For example, being able to produce seafood products with a longer shelf life would provide additional opportunities in the packaged food sector.

Most businesses in the downstream sector operate in only one part of the supply chain. Tassal, as an aquaculture producer, is one of the few vertically integrated businesses. There

has been limited vertical integration due to the limited processing of product (as most product in Australia is sold as fresh or frozen). Nevertheless, the FRDC considered that there were opportunities to improve profitability through improved supply chain connections (FRDC 2015b). Also, advances in technology such as the availability of smaller sized and more affordable vacuum packaging equipment may provide the opportunity for those involved in harvesting to add further value to their product.

The level of licensing and accreditation fees for seafood processors

The level of licensing and accreditation fees required for the basic handling and packaging of seafood was raised by Queensland-based fishers. The Fisherman's Portal (sub. 17) questioned why fishers only handling and packaging whole frozen fish and live crabs paid the same accreditation fees as operators involved in substantial processing of fish and removal of waste product. It said:

The accreditation is \$1700.00 per year. Processing includes (among other things) packing of live mud crabs, palletizing frozen boxes of fish and packing whole fish into boxes to prepare the product for the truck. We feel that \$1700.00 per year to have the accreditation to carry out these activities which are incidental to our operations is not necessary. (sub. 17, p. 12)

The Queensland *Food Production (Safety) Act 2000* requires seafood processors (including those handling, packing, freezing and storing seafood for retail sale) to be accredited and operate in accordance with the standards for the production and processing of seafood under the Australia New Zealand Food Standards Code. These arrangements provide for seafood from post-harvest through to retail sale to be monitored and traceable under a state-based food safety regime.

The level of fee to accredit these activities is set by the relevant Minister on the advice of the board of Safe Food Queensland. The same fee applies for processors of dairy, eggs, meat and seafood. There is no differentiation of fee based on the scale or type of processing carried out.

Most other jurisdictions vary the licence or accreditation fee for seafood processing either by the size and scale of the facility or by species.

- *By species only.* South Australia applies different fees depending on the types of species being processed irrespective of the size or scale of the processing operation. A base fee applies to those dealing in or processing fish, with higher fees for those processing or dealing with rock lobster, prawn or abalone. Similar arrangements apply in Western Australia, where the level of fee for renewal of the licence depends on the species being processed, with a base fee for all species other than rock lobster and prawn and higher fees for establishments dealing with those species.
- *By size and scale of the facility.* New South Wales, Victoria and Tasmania apply the licence fee for seafood processors on a tiered scale, based on the size of the facility. In New South Wales the licence fee is based on the number of food handlers employed on a premises and in Tasmania on the number of full-time equivalent employees (for both

jurisdictions it is tiered on less than 5, 5 to 50 and more than 50 fish handlers or full-time employees). In Victoria, the licence fee is based on the volume of throughput for different species in each facility with larger volume establishments paying higher fees.

- *Single fee.* Queensland and the Northern Territory apply a single fee for all processing operations.

Fees for seafood processors should reflect the level of resources used by governments for monitoring and enforcement of the relevant regulatory regime. The approach of using a tiered scale of fees based on regulatory effort is a superior way of reflecting and efficiently dealing with differences between processors. This would also reduce the scope for smaller businesses to cross-subsidise the regulation of larger businesses. Fees on seafood processors should ultimately reflect the efficiently-incurred costs of regulating facilities.

DRAFT RECOMMENDATION 9.3

Australian, state and Northern Territory Governments should ensure that licence and accreditation fees for seafood processors reflect the efficiently-incurred costs of regulating these facilities.

The limitations of downstream regulation as an adjunct to enforcement

There was also a view that the monitoring of downstream processes was ineffective in preventing illegal sales — that is, where sales made by either recreational or commercial fishers to family, friends and work colleagues (Queensland Seafood Industry Association, sub. 29).

There are limitations to these monitoring processes for the enforcement of laws on illegal fishing as they can only monitor commercial premises and operations that are part of the regulated supply chain. Illegal sales made outside of those supply chains cannot be easily enforced under the monitoring regime. Enforcement issues are further discussed in chapter 10.

10 Other areas for improvement

Key points

- Available indicators suggest that Australia's fisheries are, on the whole, managed well relative to other advanced economies in terms of sustainability. This is attributable to reforms in fisheries management over the past 10–15 years.
- While fisheries administrators are broadly on the right path, there is still considerable scope to improve how fishing sectors are regulated (as discussed in earlier chapters) and core management tasks are undertaken.
- On making fishery management systems more efficient and effective:
 - the involvement of ministers/executive government in operational decisions slows the decision-making process and can contribute to poor outcomes. Many operational decisions can be efficiently made at the agency level and should be delegated accordingly.
 - governments can better tap into the knowledge and capabilities of stakeholders by looking beyond traditional consultation methods, and having policies that set out where (and how) stakeholders can contribute to the determination and/or implementation of alternative management models.
 - there is little reporting against the social objectives of fisheries. Implementation of harvest strategy policies (as recommended in chapter 2) will enable progress to be assessed against all fishery policy objectives.
- There is scope to improve efficiency by instituting best-practice cost recovery arrangements in all states and the Northern Territory. Efficiency can also be enhanced by making processes such as research, consultation and data management contestable.
- All governments follow risk-based approaches to enforcement. There appears to be generally high compliance with regulations.
 - Concerns remain in some quarters about illegal fishing. The extent to which this occurs for most species, however, is uncertain. Fisheries agencies should provide easily accessible channels through which the public can advise of illegal fishing activity.

The central regulatory concerns in fisheries management are whether regulations achieve environmental and fishery policy objectives, and do so in a way that encourages productivity and innovation, and minimises management and compliance costs.

While each fishery is unique and managed differently, the management of all fisheries requires three core tasks: research and/or collecting data to inform management; the development and implementation of fishery management controls; and enforcement of those controls.

The main concerns raised by stakeholders in this regard relate to the development, implementation and enforcement of controls on fisheries. These include:

- questions about the division of responsibility between the executive and departments on fishery controls
- a desire that stakeholders be more and/or better involved in the design and implementation of controls
- ensuring that regulations are well-targeted over time by regularly reviewing outcomes
- improving the enforcement of fishing rules.

This chapter discusses how outcomes can be improved in these areas as well as other sources of efficiency improvement, including cost recovery systems. The chapter should be considered alongside areas identified in earlier chapters that would improve the effectiveness and efficiency of regulation over fisheries (in particular, chapters 2 to 7).

The scientific research and advice supporting the management of Australia's fisheries is generally considered to be of a high quality (for example, Australian SBT Industry Association, sub. 59). Similarly, the research undertaken to improve industry outcomes is also well regarded.⁴⁸ However, concern has been raised by some stakeholders in relation to whether scientific research and advice is being given sufficient weight in some jurisdictions' decisions on access to fisheries and the operations of 'super trawlers'. These matters are considered in chapters 2 and 7, respectively.

10.1 How does Australia compare?

Available indicators suggest that Australia's fisheries are, on the whole, managed well relative to other developed countries. At present, approximately 11 per cent of fish stocks (for which a status has been determined) have been fished to unsustainably low levels (FRDC. 2015).⁴⁹ In comparison, approximately 29 per cent of the world's fish stocks have been fished to unsustainably low levels (FAO 2014).⁵⁰ More generally, as noted in chapter 7, Australia rates highly in international comparisons of effectiveness in managing marine environments.

⁴⁸ Tasmanian Salmonid Growers Association (sub. 8), Southern Rock Lobster Limited (sub. 22), South Australian Rock Lobster Advisory Council Inc. (sub. 28), Commonwealth Fisheries Association (sub. 49) and Australian SBT Industry Association (sub. 59).

⁴⁹ The definition of overfishing varies across countries. The Commission has used the data from the FRDC (2014c) to construct an estimate of stocks 'reduced to unsustainably low levels' to align with data presented by the FAO (2014, p. 7).

⁵⁰ The Commission has reported contemporary measures only as it is difficult to make meaningful comparisons over time because the coverage of stocks has changed significantly.

The Commission estimates that the cost to Australia's fisheries management agencies of managing Australia's wild catch fisheries and aquaculture production is approaching \$290 million per annum (or 12 per cent of the annual value of all seafood production).⁵¹

Reliable, up-to-date data on the cost of managing fisheries in other countries is not readily available. The comparable cost of managing New Zealand's seafood production is 6–7 per cent of the gross value of production (GVP),⁵² although it should be noted that New Zealand has a smaller marine fishing territory and population, and only a single fisheries administrator. Costello and Mangin (2015) estimated the costs of management in Canada, the United Kingdom and the United States during the mid-1990s and early-2000s to be 7-30 per cent of GVP.

10.2 Development and implementation of fishing controls

Responsibility for making decisions

Management decisions can be broadly categorised as either strategic decisions or operational decisions (box 10.1). Strategic decisions entail judgements made on behalf of the community on how resources should be used. It is prudent that strategic decisions be made by elected representatives, who can be held accountable for their judgements on the value the community places on fisheries resources.

Operational decisions are those required to put policy intentions into effect. International reviews of fisheries governance arrangements show that where there is a high level of political involvement in operational decisions there tends to be poor outcomes (AFMA 2012c, p. 13).

The independent reviews of fisheries for New South Wales (Stevens, Cartwright and Neville 2012) and Queensland (MRAG Asia Pacific 2014) found there was a high level of political involvement in operational decision-making in those states. This led to adverse outcomes, including unduly long decision-making processes. Both reviews recommended that the fisheries management agency in each state be responsible for operational decisions. Concerns have also been raised about other jurisdictions in recent years — for example, the Australian Southern Bluefin Tuna Industry Association (2012) expressed concern over political involvement in a total allowable catch decision for a Commonwealth fishery.

⁵¹ Estimates based on: ABARES (2015); AFMA (2014a); DoF WA (2014); MRAG Asia Pacific (2014); Department of Agriculture and Fisheries (Qld) pers. comm. 6 June 2016; Department of Economic Development, Jobs, Transport and Resources (Vic) pers. comm. 26 April 2016; Department of Primary Industries (NSW), pers. comm. 19 May 2016; Department of Primary Industry and Fisheries (NT), pers. comm. 3 June 2016; Primary Industries and Regions SA, pers. comm. 19 July 2016 and 27 July 2016.

⁵² Estimates based on: MPI NZ (2015); and Ministry of Fisheries (New Zealand) (2011a, 2015).

The Commission notes that the New South Wales Government (2012) and Queensland Government (DAF Qld 2016b) have accepted their respective reviews' recommendations to separate decision-making powers.

Box 10.1 **Strategic and operational decisions**

Strategic decisions

A strategic decision is one that shapes the overarching policy for the management of fishing or the management of an individual fishery. Strategic decisions inform the management plans and harvest strategies underpinning the management of fisheries. Strategic decisions are made on behalf of the community (the owners of the fishery).

A decision that fishing will be allowed in a certain area is a strategic decision. The details that define a fishery — the species, principles for allocation of access (discussed in chapter 2) and, sometimes, the forms of control — are also strategic decisions.

Operational decisions

Operational decisions underpin the daily management of a fishery and are often, but not always, technical in nature. Examples include the total allowable catch/effort in a fishery and the closure of areas within a fishery due to environmental concerns. Operational decisions are both constrained and guided by earlier strategic decisions, such as the policy objectives for the fishery.

Under harvest strategy frameworks, many operational decisions in fisheries are technical matters that can be made more efficiently at the agency fishery manager level. However, operational decisions often require judgements on the part of departments or other delegated authorities (for example, on the best methodological approach to be applied in stock assessments). Good outcomes require:

- clear rules to guide decisions
- decision-making expertise within the agency or other delegated authority
- sufficient resources available to the decision maker to assemble the information (including stakeholder input) required to make well informed decisions.

Reporting on the basis for decision making and outcomes is important to ensure that authority is exercised well over time (further discussion below).

DRAFT RECOMMENDATION 10.1

Australian, state and Northern Territory Governments should ensure that operational decisions are delegated to the relevant fishery management authorities to the extent possible.

Consultation

The Commission received submissions from stakeholders across Australia expressing concern about consultation processes in their jurisdictions. Concerns ranged from inadequate consultation (for example, Sunfish Queensland Inc., sub. 3) to fishers suffering from ‘consultation exhaustion’ (Western Australian Fishing Industry Council, sub. 45, p. 11). Most often, the concerns centred on the effectiveness of the consultation process.

As noted in previous chapters, effective consultation is central to the design and implementation of fisheries management controls, including allocation decisions. More generally, consultation allows stakeholders (box 10.2) to have a say on both the potential consequences and design of regulation. Studies have shown that the acceptance of, and compliance with, a regulatory decision is improved when stakeholders have been involved in making that decision (Newig and Fitsch 2009).

Box 10.2 Stakeholders in fisheries management

Stakeholders will vary depending upon the management decision being considered, and the specifics and location of a particular fishery. However, typical stakeholders include: commercial, recreational and Indigenous customary fishers; traditional owners; fish processors and receivers; seafood consumers; suppliers of fishing gear; conservation groups; individuals with an interest in the marine environment; non-extractive users of the marine environment; researchers; scientists; training organisations; and the broader community (as ‘owners’ of the resource).

The principles underpinning good consultation processes are well established. Consultation needs to be targeted, timed and facilitated in a manner that will enable stakeholders to be engaged and is appropriate for the decision being made. This means the nature of consultation will vary across fisheries and management decisions.

Strategic decisions should take into account community views and preferences. Given the number, dispersion and sometimes varying interests of fisheries stakeholders, drawing on the representations of sectoral peak bodies is one way jurisdictions have sought to improve the quality of consultation on strategic decisions while also reducing costs.

The consultation process for operational decisions can usually be more targeted than for strategic decisions. This is because the parameters for making the decision should already have been canvassed with the broader community. Advisory groups are a means through which this targeted consultation can be undertaken.⁵³ Advisory groups can be used for range of purposes, including as: a source of technical input/advice for strategic and operational decisions; interpreters of technical material for decision makers; and as a source of expert advice.

⁵³ Advisory groups in this context is a broad term intended to cover the array of advisory committees, working groups and technical committees that exist across the jurisdictions and their fisheries.

Peak bodies and advisory groups are discussed further below.

Use of peak bodies

While consulting peak bodies is a less costly way of seeking views, there are few Australian commercial or recreational fishing peak bodies that can claim to have membership comprising the majority of fishers within the respective sectors. The absence of comprehensive membership means that effective consultation with a sector cannot be achieved simply by liaising with a single ‘peak’ body.

In New South Wales, the major peak body (the Professional Fishermen’s Association Inc.) represents approximately 23 per cent of the state’s commercial fishers. There are a ‘diversity of often conflicting voices and views presented by various groups purporting to represent the industry’ (Macdonald 2015, p. ix). Similar issues exist in Queensland, where rival peak bodies have been established due to the differences among fishers:

The Fishermens Portal Inc.... was formed due to a lack of focus on the welfare of our commercial sector by seafood industry representative bodies (questionably referred to as peak bodies)... (The Fishermens Portal Inc., sub. 17, p. 1).

The Western Australian Department of Fisheries has sought to resolve this issue by engaging the Western Australian Fishing Industry Council (WAFIC) to provide consultation services.⁵⁴ A service level agreement requires WAFIC to consult with the entire commercial sector (or a sub-segment of the sector if directed) and convey views to the Department of Fisheries. To reduce the perception of a conflict of interest on the part of WAFIC (as both a contractor to the government and a body that independently advocates in the interests of its members), WAFIC has created a separate body (the Industry Consultation Unit) to be responsible for the provision of consultation services (sub. 45). Feedback to this inquiry suggests that these arrangements (and similar arrangements for recreational fishers through Recfishwest) are working well.

In the absence of a commercial fishing peak body capable of delivering consultation services, the New South Wales Department of Primary Industry released a request for tender for these services in 2013 (New South Wales Government 2014).⁵⁵ The use of a third party provider of consultation services has some advantages over using a peak body. For example, it avoids the issue of conflicts of interest. Making the service contestable also brings market discipline to costs and potentially enables access to a wider array of consultation techniques and approaches. However, third party consultants may lack the sectoral knowledge and context that brings value to the consultation (and collaboration) process.

⁵⁴ The department raises the revenue to fund the consultation services via licence fees on commercial fishers.

⁵⁵ 10 tenders were received, including from organisations other than fisher groups. However, none were successful. As at August 2016, the New South Wales Department of Primary Industry was considering further options for sectoral representation and consultation.

Advisory groups

The fisheries legislation of all jurisdictions provide for the formation of advisory groups. Some advisory groups are formed and defined by statute but, in most jurisdictions, the role of an advisory group is determined by the Minister/department.

Advisory groups are part of the ongoing management process for Commonwealth fisheries and are considered to be effective by those involved in their operation (Borthwick 2012). Advisory groups are also formed for specific tasks — for example, New South Wales convened the Structural Adjustment Review Committee to oversee, and provide advice to government on, the reform of commercial fisheries.

Concerns about standing advisory groups (typically established as Management Advisory Committees) for fisheries in New South Wales, Queensland, South Australia and Western Australia led to their disbanding or substantial restructure over the period 2003–2010. The concerns included a lack of clarity in their roles, sufficiency of expertise, the adequacy of representation of views, transparency in processes, and the costs of maintenance and support. Participants raised similar concerns with the Commission regarding the operation of some of the current advisory groups formed to advise governments on specific management issues and/or reforms.

Many of the concerns expressed can be avoided by good governance arrangements. In this regard, the Commonwealth's framework for its Management Advisory Committees (MACs) is best practice among the jurisdictions. The Commonwealth's framework includes:

- guidance on the role and operation of MACs — including terms of reference
- a policy for conflicts of interest; selection criteria and role descriptions for members; guidelines for providing advice; guidelines for interactions with stakeholders and other advisory groups; and a performance assessment regime (AFMA 2014c)
- timely publishing of committee meeting minutes to the web page of the relevant fishery.

In relation to appointments, members of any technical advisory group (such as a committee advising on the total allowable catch for a fishery) should be appointed based on their expertise. Where the advisory group is undertaking more of a representative function (such as providing advice on the interests of a fishing sector/group), the appointment of members could be made based on nominations from the relevant group. All members of an advisory committee, however, must be guided by the committee's terms of reference and their role descriptions in the undertaking of their duties.

To be effective, the governance arrangements need to be backed by a power for the Minister or department to dismiss advisory group members who breach the terms of their engagement.

DRAFT RECOMMENDATION 10.2

The governance arrangements of advisory groups formed under fisheries laws should include: clear terms of reference; a conflict of interest policy; clear role descriptions for members; fixed membership terms; performance assessment regimes; and reporting arrangements.

Members of advisory groups dealing with technical matters should be appointed based on their expertise.

Ministers or departments should have the power to dismiss advisory group members who breach the terms of their engagement.

Co-management

In Australian fisheries, the process of involving stakeholders in the management of fisheries has centred on co-management. Neville defined co-management as:

An arrangement in which responsibilities and obligations for sustainable fisheries management are negotiated, shared and delegated between government, fishers, and other interest groups and stakeholders (2008, p. 1).

The unique nature of individual fisheries means that the scope for co-management in Australia's fisheries varies. The expertise and motivations of stakeholder groups have a significant bearing on the extent to which suitable decisions or implementation tasks can be devolved. Many stakeholders, nevertheless, consider that there should be more opportunities for them to become involved.

Benefits of co-management

Co-management supports good outcomes by bringing stakeholder knowledge and expertise to bear in generating solutions best suited to local circumstances and fisheries. More generally, stakeholder involvement can deliver improvements in both the efficiency and effectiveness of fisheries management. Stakeholders most commonly espouse benefits of lower management costs, improved adaptability and flexibility in regulation, and improved relations between stakeholders and governments.⁵⁶ Successful co-management arrangements have also delivered other benefits, including improved fisher productivity and the supply of better information to decision makers (box 10.3).

⁵⁶ For example, Seafood Industry Victoria (sub. 44), Commonwealth Fisheries Association (sub. 49) and AFMA (sub. 50).

Box 10.3 **Examples of Australian co-management arrangements**

There are a number of examples where fishers and fisher groups are working collaboratively with fisheries managers but there are fewer co-management arrangements that involve delegated decision-making and/or implementation. Three examples of more devolved co-managements are detailed below.

Spencer Gulf and West Coast Prawn Fishery

Commercial fishers formed a 'Committee at Sea' (the Committee) in 1985 to provide real time management of fishing activity with a view to optimising both the catch and size of prawns taken within the fishery. The Committee is made up of nine members, the majority of whom are licence holders and the remainder boat skippers. The Committee manages the fishery against the approved harvest strategy on a daily and, at times, even hourly, basis. Management decisions undertaken by the Committee include closing areas to trawling in order to avoid taking small prawns.

AFMA/SETFIA co-management arrangement for snapper

The Australian Fisheries Management Authority (AFMA) and South East Trawl Fishing Industry Association (SETFIA) have entered into a co-management arrangement under which SETFIA can approve incidental catches of snapper in excess of the prescribed trip limits in certain circumstances. The arrangement was prompted by a desire to reduce the waste incurred by discarding snapper caught in excess of trip limits.

Further details on this arrangement are contained in appendix B (box B.2).

Recreational fisher data collection

Since 1994, a group of volunteer recreational fishers have been assisting the Western Australian Department of Fisheries in obtaining survey data on juvenile tailor within the Swan River. Using a common fishing method, the recreational fishers target juvenile fish at weekly events organised by the department. This initiative has provided the department with valuable data to assist in the management of the tailor species. It is also an example that, despite most analysis of co-management arrangements being applied to commercial fishers, arrangements can (and do) work with recreational fishers.

Sources: AFMA (2016g); SETFIA sub. 53; Smith (2006) and Zacharin et al (2008).

Further, as noted earlier, having stakeholders involved in making and implementing management decisions can increase compliance, and can foster better stewardship over the resource.

Challenges in implementing co-management arrangements

The challenges of co-management are neatly summarised by GA & MJ Stevenson:

Success in co-management relies entirely on the willingness of all stakeholders to work together... It only takes one or two individuals who insist on a selfish agenda to undermine the entire process. (sub. 26, p. 28)

There can be high transaction costs involved in organising fishers (or other stakeholders) into the cohesive unit required for a co-management arrangement. These costs can be ongoing — for example, the continuing administrative and internal compliance costs associated with the Spencer Gulf and West Coast Prawn Fishery’s Committee at Sea.⁵⁷ Stakeholders are more likely to bear these transaction costs where the benefits can be shown to outweigh the costs.

Co-management arrangements can create a free rider problem. For example, under the AFMA and South East Trawl Fishing Industry Association (SETFIA) co-management arrangement for snapper (box 10.3), fishers who are not members of SETFIA can receive approval to exceed the trip limit for snapper. These fishers did not contribute to SETFIA’s costs in negotiating the arrangement with AFMA nor do they pay a fee for using the service.

Commercial fishers also need to be mindful of the *Competition and Consumer Act 2010* (Cwlth) and whether an agreement among themselves could be considered to be anticompetitive.

Stakeholder leadership is critical to overcoming these challenges. Leaders that communicate clearly, facilitate debate and resolve disputes will lower set up and ongoing transaction costs (Emery et al. 2015; Pomeroy, Katon and Harkes 2001). Strong leaders also compel ongoing stakeholder support for, and compliance with, co-management arrangements (Nielsen and Olesen 2008). Robust succession plans are required to avoid arrangements failing following leadership change.

Encouraging co-management

Neville (2008) identified nine preconditions for a successful co-management agreement (box 10.4). These preconditions are based on international experience (McPhee 2009) and have been tested in three co-management trials in Commonwealth fisheries (Bolton et al. 2015). These preconditions have informed the policy approaches of the Commonwealth, New South Wales, Victoria, South Australia and Western Australia.

⁵⁷ Enforcing ongoing compliance of an agreement between fishers is also costly as, where it is possible, it is generally through the courts under contract law.

Box 10.4 Preconditions for successful co-management arrangements

Of the nine preconditions that contribute to the success of co-management arrangements, three are the responsibility of government(s):

- a willingness by governments to consider alternative management models involving greater shared responsibility
- the existence of a legislative basis to delegate powers
- the ability to generate, and commit to, legally binding undertakings through a memorandum of understanding, contract or other form of agreement between the parties.

Other preconditions are a matter for the stakeholder group alone — those being the need for:

- a significant proportion of members wanting to move to co-management
- an effective organisation structure with good governance and an ability to communicate with all fishers and other stakeholders
- sufficient resources and skills to implement and deliver services, or an ability to negotiate and attract such resources
- identified ‘champion(s)’ who can negotiate effectively with governments and build organisational ownership.

Finally, there are preconditions where there is a shared responsibility:

- ability for the stakeholder group to legally enforce agreements through civil, contract or company law
- existence of conflict resolution mechanisms.

The responsibility of government(s) in these final matters is as they relate to the co-management arrangement. For the stakeholder group, their responsibility extends to their own governance arrangements — that is, how they enforce compliance among their members and provide for resolution of internal conflict.

Source: Neville (2008).

Not every precondition must be met before a co-management arrangement is initiated. For example, the Spencer Gulf and West Coast Prawn Fishery’s Committee at Sea (box 10.3) is not reliant on a delegation of management functions from government. However, arrangements will usually have a greater chance of success if most/all preconditions are met.

As noted in box 10.4, governments are solely responsible for their willingness to consider co-management arrangements, and ensuring adequate legislation for the delegation of powers and forming of co-management contracts is in place.

A clear policy on co-management means that governments are effectively compelled to engage with a stakeholder group that satisfies the policy’s governance requirements and that wishes to work on activity flagged for co-management in the policy. Both South Australia and Western Australia have issued policy documents on co-management. South Australia’s policy (PIRSA 2013b) provides practical guidance to stakeholders on the types of activities that the Primary Industry and Regions (SA) would consider collaborating on

or delegating. It also includes details of the capability and governance standards expected of stakeholders.

Despite progress to date, some consider that governments could ‘do more’. For example:

While South Australia has a sound policy base for co-management, to date there has been little commitment to devolving responsibility and sharing of decision making. (Wildcatch Fisheries SA, sub. 10, p. 7)

If there is a clear desire by commercial fishers to develop a substantive co-management practice, clear direction from government and with advice, implementation and oversight from AFMA is needed. (Commonwealth Fisheries Association, sub. 49, p. 9)

Increasing the interaction between fisheries managers and stakeholders would assist in building the mutual trust required for successful co-management arrangements. This can be achieved in a number of ways — one example is AFMA’s placement of a liaison officer in the offices of SETFIA (sub. 53). More generally, fisheries managers should be open to working collaboratively with stakeholders in refining regulatory solutions. While there are costs to these approaches, those costs need to be balanced against the potential future benefits of improving the stakeholder group’s ability to contribute to policy outcomes.

The fisheries legislation of all jurisdictions except Victoria provide for the delegation of certain powers to non-government third parties. Of these powers, AFMA’s ability to ‘delegate any powers conferred on it under a plan of management for a fishery... to a primary stakeholder’⁵⁸ is best suited to co-management.

DRAFT RECOMMENDATION 10.3

Australian, state and Northern Territory Governments should have clear policies on co-management in fisheries. These policies should provide practical guidance to stakeholders on the types of activities where governments are willing to collaborate or delegate responsibilities. The policies should include details of the capability and governance standards that are expected of stakeholders seeking to enter into a co-management arrangement.

Reporting outcomes in fisheries

Reporting the performance of fisheries against objectives helps inform decision-making and management actions. In addition, by increasing information available to the

⁵⁸ The power is provided at s. 17(11) of the *Fisheries Management Act 1991*(Cwlth). Primary stakeholders’ are defined as: (a) the holder of a fishing concession in the fishery; or (b) an incorporated body that represents those holders (including a peak body, for example); or (c) a person prescribed by the regulations.

community, reporting fosters accountability on the part of fisheries managers. Reporting requirements should be commensurate with the size, risks and value of a fishery.

There is considerable variability in the nature of information reported by jurisdictions. Some, such as Western Australia and the Commonwealth, provide detailed and regular information on both stocks and fishery interactions. Others, such as New South Wales, produce information on an irregular basis and in a limited way (Hanich et al. 2014). The reporting for different varieties of rock lobster⁵⁹ shows that all jurisdictions report on a range of commercial and environmental indicators but there is much less reporting against social indicators (table 10.1).

The *National Guidelines for Harvest Strategies* (chapter 2, box 2.3) specify that an effective harvest strategy should include clear objectives consistent with overarching legislation and performance indicators for each objective. A clear set of performance indicators within a harvest strategy would enable fisheries managers to focus their reporting on those indicators. This would avoid the position described by Triantafillos et al. (2014), ‘few fisheries managers can confidently identify the social objectives of their management activities, let alone monitor progress towards achieving these objectives’.

10.3 Enforcement

Fisheries agencies follow similar risk-based approaches to enforcement that are based on education, general deterrence and targeted enforcement. This approach has generally produced high rates of compliance — well in excess of 90 per cent of inspections and interactions with fishers result in no action being taken. When non-compliance occurs, it is usually of a minor nature (for example, fishing without a recreational licence). Where offences are committed, responses from fisheries officers appear to be modulated — ranging from educative to punitive (figure 10.1 and section 4.4, chapter 4).

Enforcement activities also generally appear to be effective in relation to foreign boats. The extent of illegal fishing by foreign boats in northern Australian waters has decreased by over 97 per cent since 2005–06. Also, there is currently no illegal, unregulated or unreported fishing in the Southern Ocean (AFMA, sub. 50, attachment 1). This success has come in part through international co-operation (Doulman and Swan 2012), although increasing fuel prices from 2009–2014 are also likely to have played a role.

⁵⁹ The Commission selected rock lobster for analysis as it is a higher-value species that is fished across Australia with the exception of the Northern Territory.

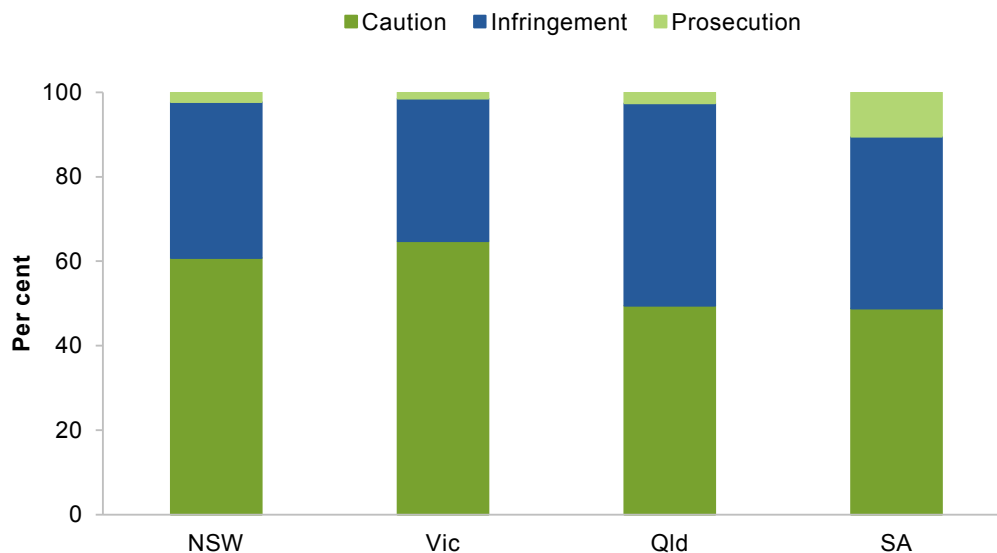
Table 10.1 Reporting for rock lobster fisheries^a

	<i>Cwlth</i> ^b	NSW	Vic	Qld	SA	WA	Tas
Environmental							
Bycatch impact assessment						✓	
Bycatch taken	✓			✓	✓	✓	✓
Bycatch — historic/trend					✓		✓
Interactions with threatened species	✓						✓
Stock assessment (target species)	✓	✓	✓		✓	✓	✓
Ecosystem assessment/effects				✓		✓	✓
Compliance with catch limits	✓	✓	✓		✓	✓	✓
Puerulus settlement		✓	✓		✓	✓	✓
Threshold and limit tests	✓	✓	✓	✓	✓	✓	✓
High grading					✓		
Social							
Consultation/engagement undertaken				✓		✓	
Estimated recreational catch		✓		✓	✓	✓	✓
Recreational participation						✓	✓
Indigenous catch		✓		✓			✓
Historical/trend analysis					✓	✓	
Assessment of social effects						✓	
Equitable treatment of fishers					✓		
Fisher wellbeing					✓		
Community impacts					✓		
Commercial							
Gross value of production	✓	✓	✓	✓	✓	✓	✓
Catch level	✓	✓	✓	✓	✓	✓	✓
Active commercial vessels	✓	✓	✓	✓	✓	✓	✓
Commercial effort (e.g. CPUE)	✓	✓	✓	✓	✓	✓	✓
Historical/trend analysis	✓	✓	✓	✓	✓	✓	✓
Profitability assessment	✓	✓				✓	✓
Management costs		✓			✓		
Trades of quota		✓					
Other							
External factors/influences						✓	
Illegal activity		✓		✓	✓		

CPUE Catch per unit effort. ^a The table excludes the Northern Territory as it does not have a rock lobster fishery. ^b Torres Strait Tropical Rock Lobster Fishery.

Sources: ABARES (2015b); DEDJTR Vic (2015c, 2015d); DoF WA (2015d); Econsearch (2015c); Hartmann et al. (2013); Linnane et al. (2015b); NSW Rock Lobster Fishery TAC Committee (2015); Queensland Government (2011).

Figure 10.1 Responses to non-compliance: 2011-12 to 2014-15



Data sources: Department of Primary Industries (NSW), pers. comm. 19 May 2016; Department of Economic Development, Jobs, Transport and Resources (Vic) pers. comm. 26 April 2016; Department of Agriculture and Fisheries (Qld) pers. comm. 6 June 2016; Primary Industries and Regions SA, pers. comm. 19 July 2016.

Despite the good compliance outcomes, concerns remain among both fishers and fisheries managers across Australia that illegal, unreported and unregulated (IUU) fishing is a significant problem. Particular concern exists in relation to the deliberate, illegal and large scale exploitation of high-value species (such as abalone, rock lobster and crab). There are potentially significant impacts from such illegal activity in terms of: the sustainability of species; the livelihood and fishing experience of legitimate fishers; broader environmental effects (given the unregulated methods of illegal fishers); and the safety of seafood consumers.

These concerns have manifested in specific offences for the ‘trafficking of fish’ in the fisheries laws of New South Wales, Victoria, South Australia, Western Australia and Tasmania. The essential aim of the offence is deterrence of illicit trade in commercial quantities of fish, and especially high-value fish. The maximum penalties for this offence include imprisonment and substantial fines (table 10.2). The jurisdictions with fish trafficking provisions also publicise prosecutions to give greater impetus to the deterrence effect of the penalties.

The jurisdictions specify different thresholds for trafficking offences. For example: for abalone in Western Australia the threshold is 10 times the recreational bag limit, in Victoria it is effectively 20 times the bag limit, and in New South Wales it is effectively 25 times the bag limit. Similarly, the actions that constitute ‘trafficking’ vary — in New South Wales it relates to the dishonest taking, sale, receipt or possession of fish in excess of the

threshold, while in Western Australia it relates to taking, possessing, selling, delivering, processing, transporting, concealing and conduct in preparation of trafficking. The Western Australian provisions also extend to persons who supervise trafficking activities, provide premises or finance for trafficking or otherwise know about the trafficking of fish.

Table 10.2 Fish trafficking penalties for individuals

	<i>Maximum penalty</i>
Cwth	No offence for trafficking
NSW	10 years imprisonment plus a monetary penalty of 10 times the market value of the fish
Vic	10 years imprisonment
Qld	No offence for trafficking
SA	Fine of \$100 000 or 4 years imprisonment ^a
WA	Fine of \$400 000 plus 4 years imprisonment (first offence). 10 years imprisonment for second and subsequent offences
Tas	Fine of \$785 000 and 2 years imprisonment
NT	No offence for trafficking

^a Relates to 'priority' species such as abalone.

Sources: Fisheries Management Act 1991 (Cwth); Fisheries Management Act 1994 (NSW); Fisheries Act 1995 (Vic); Fisheries Act 1991 (Qld); Fisheries Management Act 2007 (SA); Fisheries Resources Management Act 1994 (WA); Living Marine Resources Act 1995 (Tas); Fisheries Act 1988 (NT).

It is difficult to obtain reliable information on IUU fishing as, by its nature, the perpetrators seek to conceal their activities. However, IUU fishing likely occurs at varying levels of sophistication (box 10.5).

Studies, such as those completed by Putt and Anderson (2007) and Putt and Nelson (2008), show that considerable information about illegal activity can be drawn from fishing communities. Different fisheries agencies have adopted different methods through which the public can share information, including dedicated phone lines (FishWatch), notification forms on the agency websites and state fisheries' Facebook pages, and mobile phone applications (among other means). However, some of these channels are difficult to access — for example, it can require some navigation to locate the online notification forms on fisheries agency websites — and some stakeholders have raised concerns regarding the timeliness/responsiveness of authorities (section 4.4, chapter 4 also refers).

To make the best use of this information, fisheries agencies need to be sufficiently resourced for timely and proportionate follow-up action.

Box 10.5 Varying sophistication in the illegal take of abalone

Putt and Anderson (2007) describe a number of different instances of illegal, unreported and unregulated fishing. The most sophisticated was the illegal taking and export of abalone uncovered by Operation Oakum in 2002. The abalone was poached in Tasmania by out of state divers who dived at night and undertook surveillance of the police. A complex strategy followed that included hiding abalone in furniture crates bound for Hong Kong via Queensland and the manipulation of export documentation. Corruption appears to have been involved both in Australia and overseas with a former police inspector being implicated in Tasmania and a customs official in Hong Kong.

Less sophisticated, but still potentially significant operations are said to involve groups of people masquerading as recreational fishers and harvesting the bag limit each to combine and sell. In Victoria, one such 'crew' is said to have involved a total of 40 people and 10 vehicles travelling to remote parts of the coastline. To avoid detection some illegal divers are believed to be using re-breathers to hide their bubbles, working at night with underwater lights and/or using global positioning systems.

At the level of unsophisticated but still illegal activity are family-run abalone poachers who conceal the abalone in their clothes to avoid detection.

DRAFT RECOMMENDATION 10.4

Fisheries agencies should provide easily accessible channels through which the public can share information on illegal fishing. Governments should ensure their fisheries agencies are sufficiently resourced to enable timely and proportionate follow-up action on information supplied by the public.

10.4 Cost recovery and contestability of services

Cost recovery

Cost recovery refers to charging back the relevant costs of regulation and service provision to those who directly create the need for it. In the case of fisheries, regulation is required to manage the impact of fishing on the ecological sustainability of fisheries.

Good practice principles for cost recovery are well established (box 10.6). The efficiency and equity benefits of applying these principles are also well-established. In summary, cost recovery:

- promotes allocative efficiency because it ensures the costs of regulation are reflected in prices. Further, it avoids the generation of excessive demand for services that arise with unpriced services

-
- supports equity by reducing the taxation burden on those who do not directly and primarily benefit from regulation or services.

Box 10.6 Cost recovery: principles for implementation

The Commission (2001) examined cost recovery arrangements in government agencies and set out a number of principles for policymakers to follow. The principles include:

- cost recovery arrangements should apply to specific activities or products (those used directly by beneficiaries) and not the management agency as a whole.
- cost recovery charges should be linked as closely as possible to the costs of activities or products. Fees-for-services, reflecting efficiently-incurred costs, should be used wherever possible. Where this is not possible, specific taxation measures (such as levies) can be used but only where the basis for collection is closely linked to the costs involved.
- governments should not set targets requiring agencies to recover specific proportions of total agency costs. Further, agencies should not recover the costs of certain activities, such as parliamentary services or ministerial support.
- cost recovery should not be implemented where: it is not cost-effective; it would be inconsistent with policy objectives; or it would unduly stifle competition and industry innovation.

The Commission also advocated the use of a Cost Recovery Implementation Statement (CRIS). A CRIS transparently discloses an agency's major activities, which of these are cost-recovered and why.

Allocative efficiency and equity are compelling reasons to pursue cost recovery. But there are also other strong imperatives for adopting or improving cost recovery arrangements in some jurisdictions. These include:

- to support the provision of essential regulation and provision of services to fishers — including consultation processes to inform decision-making and the administration of access to fisheries for all fishers
- to increase the accountability of fisheries managers to fishers about what and how services are delivered. The transparent reporting of activities and costs can help to ensure that regulatory effort is proportionate given the value of the fishery, and places pressure on regulators and fisheries managers to seek efficient methods of regulation or service delivery
- to facilitate reform. This is especially so in the case of cross-jurisdictional fisheries, where the unequal treatment of fishers in relation to regulatory fees has impeded reform (chapter 6).

Applying cost recovery principles to fisheries

Cost recovery requires a means of identifying the beneficiaries of regulatory services. Commercial fishers are licensed in all jurisdictions, making them easily identifiable. This is not the case presently for recreational fishers, but the implementation of licensing

arrangements for recreational fishers (draft recommendation 4.1) will provide a means of recovering suitable costs from this sector.

The objective of the regulatory action should inform the scope and nature of any charging. The discussion below outlines some of the key management activities and who should contribute. Decisions on which activities and services will be cost-recovered should be transparently disclosed.

Research services

Fisheries management requires a range of research and data services to inform decision-making. One common input in higher-use fisheries is stock assessments of target species. As stock assessments are necessitated by the activity of fishing, their costs should largely be recovered from relevant fishers.

Where fisheries managers undertake stock assessments in fisheries subject to sectoral allocations, the costs of these activities should ideally be recovered from each sector in proportion to their allocations.

The primary aim of government-funded fisheries research should be to enhance the welfare of the wider community (including by helping to ensure wider economic, social and environmental policy goals of fisheries are met). In addition to research that may be taken to this end, governments may usefully:

- facilitate collaborative research where this would improve the quality of research outcomes and/or avoid wasteful duplication of research effort
- promote transparency and accountability in regard to program outcomes through effective governance, evaluation and reporting requirements
- facilitate future research efforts by providing for appropriate disclosure and dissemination of research results (PC 2011).

Fisheries research projects may provide both public and private benefits — for example, research into bycatch reduction devices that improve the efficiency of commercial fishers but also improve ecological outcomes (from which the wider community benefits). It is often difficult to determine the relative size of the public and private benefit from a piece of research, especially in advance of completing that research. In such cases, a practical approach is to opt for no cost recovery where the benefits to the broader public are likely to be substantial and/or the specific beneficiaries are not identifiable.

Enforcement and compliance

The benefits of enforcement of (and education on) fisheries laws are not confined to certain individuals. For example, it is the Australian community as a whole (not just fishers) that

benefit when illegal fishing is prevented within the Australian Fishing Zone. Given this, the cost of enforcement should not be recovered from fishers.

However, the cost of some compliance activities may be recovered, for example, where the regulatory activities predominantly relate to ensuring compliance with conditions on fishers' entitlements to fish and costs are clearly attributable to users. These include monitoring compliance against quota, and the cost of Vessel Monitoring Systems.

Policy and management systems

Ministerial support and policy development costs should not be recovered from fishers, given they are core functions of governments. However, costs associated with administering licensing systems, cost recovery systems and quota management systems may be recovered in full or part from licensees and quota holders.

Directions for the recreational sector

As discussed in chapter 4, the costs of administering licensing systems should be recovered from recreational fishers. Recreational fishing licences should be available at low cost for the majority of fishers. This would also reflect the low marginal cost of issuing each licence.

Directions for the commercial sector

The management costs recovered from commercial fishers vary across the jurisdictions. AFMA (2014a) recovered over 30 per cent of total management costs from commercial fishers in 2013–14 while only nominal costs were recovered in the Northern Territory in the same year (Department of Primary Industry and Fisheries (NT), pers. comm. 3 June 2016). In many jurisdictions the extent of costs recovered were 20 per cent or less of the total costs of regulating seafood production.

Applying best practice cost recovery approaches to the commercial sector will entail a considerable shift from the present arrangements for some jurisdictions (box 10.7), but should be pursued where cost-effective.

The Commission notes that some jurisdictions and fisheries recover costs by charging management fees, setting these, for example, as a percentage of GVP. Flat fees are administratively simpler, but:

- forego the efficiencies arising from transparently basing fees on the costs of specific services or products for regulated parties
- impose less discipline on governments to separately account for costs genuinely associated with the provision of essential services to fishers, and other costs that may be incurred to meet broader policy goals (and which should be funded by governments)

-
- relatedly, diminish the discipline to scrutinise costs associated with meeting the policy/management goals of fisheries, and thereby review of those goals
 - setting fees according to regulatory costs in general without regard to different costs (needs) in individual fisheries, is likely to result in cross-subsidisation across fisheries.

Box 10.7 Cost recovery arrangements: commercial fishing

Jurisdictions applying cost recovery

Commonwealth fisheries and those in Victoria and South Australia are subject to cost recovery policies based on the best practice principles outlined in box 10.6. AFMA and Victoria's Department of Economic Development, Jobs, Transport and Resources both publish details of the major fisheries management activities, whether they are funded by the industry (through levies or fee for service) or from general revenue, and the reasons for the funding decision. South Australia does not publish all of these details but does publish information about the cost recovery program, outlining activities delivered to each fishery and relevant costs.

Other methods for gaining industry contributions

Queensland, Western Australia and Tasmanian fishers contribute to the costs of management through fees. The link between fees and the cost of regulation is not obvious from publicly available information.

The review of Queensland fisheries by MRAG Asia Pacific (2014, p. 13) recommended introducing cost recovery in Queensland's commercial fisheries. The subsequent *Green Paper on fisheries management reform in Queensland* (DAF Qld 2016b) highlighted the funding of fisheries management as a matter requiring further consideration.

Western Australia changed from an activity based cost recovery regime to a fee system in 2010. Each fishery in Western Australia pays a fixed proportion (currently 5.75 per cent) of their gross value of production, which contributes to fisheries management costs.

No industry contribution to management costs

The Northern Territory does not have cost recovery arrangements. Licence fees for all fisheries are set by the Minister each year in consultation with industry. These fees are paid into a Fishing Industry and Development Trust Fund which is used to fund projects. Only a nominal contribution is made by fishers to management costs of their fisheries.

In transition

New South Wales commercial fisheries are currently undergoing reform, part of which includes developing a new cost recovery policy. Pending the finalisation and implementation of the new policy, an increase in fees has been applied to recover a larger share of management costs.

Sources: ABARES (2015); AFMA (2014a); DoF WA (2014); DPIPWTE Tas (2014a); Department of Economic Development, Jobs, Transport and Resources (Vic) pers. comm. 26 April 2016; Department of Agriculture and Fisheries (Qld) pers. comm. 6 June 2016; Department of Primary Industries (NSW), pers. comm. 19 May 2016; Primary Industries and Regions SA, pers. comm. 19 July 2016; Primary Industries and Regions SA, pers. comm. 27 July 2016; Department of Primary Industry and Fisheries (NT), pers. comm. 3 June 2016; DoF WA (sub. 21); Government of South Australia (sub. 63).

Graduated (for example, tiered) fee systems may lessen these costs. However, the above broader impacts, rather than just the budgetary costs of systems, should be taken into

account by Queensland, Western Australia, Tasmania and the Northern Territory in appraising the relative merits of approaches to recuperating costs.

It is important, whether under conventional cost recovery or alternative arrangements, that governments provide information on what services are delivered (and why) and their costs. Participants to the inquiry raised concerns about the lack of transparency of some current policies.⁶⁰ In addition to ensuring accountability to those who pay for services, transparency is clearly important for ongoing trust and cooperation between regulators and regulated parties.

Where cost recovery arrangements exist, governments should publish a statement outlining all services or regulatory activities for which costs are recovered and why and the amount and extent of costs recovered. Where an alternative approach is taken governments should make clear how that approach, and fees, reflect (and recover) efficiently-incurred recoverable costs for essential services. This requires action by all governments except for the Australian and Victorian Governments.

Participants also raised concerns about the impact of cost recovery on the viability of commercial fishing operations.⁶¹ Cost recovery will deliver limited efficiency and equity benefits if regulatory arrangements are not well targeted and designed. Full cost recovery arrangements may not be viable in some jurisdictions (or fisheries) until major reforms have been implemented (such as in New South Wales).

DRAFT RECOMMENDATION 10.5

State and the Northern Territory Governments should implement best practice cost recovery arrangements where cost-effective. Where indirect methods of obtaining sectoral contributions towards costs are used, governments should set fees with reference to efficiently-incurred costs for essential services.

Governments should transparently disclose the services or regulatory activities for which costs are recovered, and the amount and extent of costs recovered.

Making some services contestable

Governments regulate fisheries to address the market failures arising from the common-pool nature of fisheries and the externalities from fishing activities. While some regulatory functions are clearly the responsibility of governments, some tasks (such as stock assessments, research and consultation services) may be delivered by third parties or

⁶⁰ For example, Wildcatch Fisheries SA Inc (sub. 10), Southern Rock Lobster Limited (sub. 22), South Australian Rock Lobster Advisory Council Inc. (sub. 28), Seafood Industry Victoria (sub. 44), Western Australian Fishing Industry Council (sub. 45).

⁶¹ For example, Women's Industry Network Seafood Community (sub. 12) and The Fishermens Portal Inc. (sub. 17).

subject to greater competitive discipline by offering them to the market. The example of FishServe from New Zealand shows the scope for contracting services to third parties and the cost savings that may result from making services contestable (box 10.8).

AFMA ‘periodically tests the market to determine whether the services it provides can be delivered by the private sector as effectively and at a lower cost’ (sub. 50, p. 11). The services tested or under consideration for testing include: logbook services; electronic monitoring; observer services; and research. Subject to the inclusion of quota management and data collection/management services, Commonwealth fishers see these services as bringing the greatest potential savings from contestability (Commonwealth Fisheries Association, sub. 49; SETFIA, sub. 53). As noted above, consultation services is another area where there may be benefits from contestability.

Box 10.8 FishServe (New Zealand)

FishServe is the trading name of a privately owned New Zealand company. FishServe provides a range of services to the New Zealand Ministry for Primary Industries including: the issuance of fishing permits; vessel registrations; managing and maintaining the registers for annual catch entitlements and quota shares (including transfers); issuing then processing completed fishing returns; and collection of revenue on behalf of the Ministry.

With FishServe responsible for registry services, the annual cost to industry fell from NZ\$8.7 million in 2000-01 to NZ\$5.0 million in 2005-06. Meanwhile, the volume registry transactions for which data was transferred electronically increased from 68 per cent to 95 per cent over the same period.

Sources: Fishserve (2016); Harte (2008).

The opportunities to make services contestable will change over time as new approaches and technology emerge. Fisheries managers need to be aware of both the current and emerging opportunities and pursue those opportunities where it is beneficial to do so.

Making scientific research contestable

Competition is commonly expected to bring market discipline to the cost of research services and access to a wider array of techniques, expertise and approaches. For these reasons, a number of stakeholders have been seeking increased contestability in the supply of research.⁶²

But ‘in house’ scientific expertise (such as the South Australian Research and Development Institute (SARDI)) also provide benefits for the management of fisheries. These include the cross-pollination of ideas and expertise between fisheries managers and scientists. The use of government research services avoids many of the costs associated

⁶² For example, South Australian Rock Lobster Advisory Council Inc. (sub. 28); Seafood Industry Victoria (sub. 44); Commonwealth Fisheries Association (sub. 49); and SETFIA (sub. 53).

with sourcing suitable third party providers (for example, tendering and due diligence) and then managing contracts (including ensuring delivery of research to the standards and timeline established in the terms of engagement). Finally, there are not always competitive alternative suppliers available (box 10.9).

There are other benefits in having a single, well known and well regarded supplier of scientific advice such as the Commonwealth Scientific and Industrial Research Organisation (CSIRO), SARDI and the Research Division of the Department of Fisheries (Western Australia). The strong 'brand' of these bodies bolsters confidence in a scientific process that is not well understood by many in the broader community. The certainty of demand for services within a government research body also increases the likelihood of government investing in the body, which supports the body's ability to attract and retain talented researchers. This investment also supports longer term research projects that might otherwise not proceed when work is resourced and allocated on a 'contract-by-contract' basis.

Box 10.9 Experience with contestable research

The experience with contestable research in Australia has been mixed. On one hand:

... at industry's urging AFMA tendered the assessment out to external contractors. The outcome was that only a single tender was received, from the incumbent contractor, and that the cost increased by 20 per cent. (South East Trawl Fishing Industry Association, sub. 53, p.4)

On the other hand:

... in 2010 SETFIA independently commissioned its own pink ling assessment (supported by AFMA) from New Zealand at a cost of about one third of the incumbent contractor at the time (South East Trawl Fishing Industry Association, sub. 53, p.4).

Similarly, in New Zealand between 2000 and 2008, 241 research projects were tendered but 159 only attracted a single tender (these 159 projects accounted for 84 per cent of the value of the work) (Harte 2008). This study predated the introduction of New Zealand's quality assurance standard for scientific research.

Public confidence in scientific research, and the providers of that research, is an important consideration. A robust and widely accepted national quality assurance standard for scientific research would reduce the need to rely on established suppliers in order to maintain public confidence in the research process. Thus, adopting a robust quality assurance standard would support making scientific research contestable.

A quality assurance standard for scientific research was introduced in New Zealand in 2011 (Ministry of Fisheries (New Zealand) 2011b). The standard deals with matters including: peer review; researcher qualifications; laboratory and equipment certifications; governance; project management; data collection and handling; acceptable technical protocols; and documentation of outcomes.

A quality assurance standard is presently under development in Australia with a project budget of \$100 800 (FRDC 2014a). The scope of the project includes an agency-specific

implementation plan for AFMA. The low cost implies that other jurisdictions should be able to implement the standard at a relatively low cost.

The benefits of in house expertise are not voided by making research contestable. Further, the use of in house expertise for projects would remain the preferred course where the expected gains from making that project contestable are not expected to exceed the additional administration costs.

A Conduct of the inquiry

The Commission received the terms of reference for this inquiry on 23 December 2015. It subsequently released an issues paper on 16 February 2016 inviting public submissions and highlighting particular matters on which it sought information.

In total, 64 public submissions were received and placed on the inquiry website. A list of all public submissions is contained in table A.1.

The Commission also provided a facility on the inquiry website for interested stakeholders to complete a survey or provide general comments. 38 people completed the survey for recreational fishers, 14 people completed the survey for commercial fishers and three people provided a ‘general comment’.

During the course of the inquiry, the Commission held informal consultations and meetings with governments, regulatory bodies and peak bodies, as well as a number of businesses, organisations and individuals. Tables A.2 lists these participants.

The Commission thanks all those who contributed to this inquiry.

Table A.1 Public Submissions

<i>Participants</i>	<i>Submission no.</i>
Amateur Fishermen's Association of NT Inc.	20
Association of Marine Park Tourism Operation	1
Australian Barramundi Farmers Association	34
Australian Fisheries Management Authority	50
Australian Marine Conservation Society	33
Australian Prawn Farmers Association	23
Australian Southern Bluefin Tuna Industry Association	59
Brisbane Valley Anglers Fishstocking Association Inc.	4
Carefish	24
Commonwealth Fisheries Association	49
Coolum and North Shore Coast Care	14
Commonwealth Scientific and Industrial Research Organisation	61
Department of Agriculture and Water Resources	56
Department of Fisheries (WA)	21
Department of Primary Industries, Parks, Water and Environment (Tas)	48
Department of Primary Industry and Fisheries (NT)	46
Department of the Environment	54
Environmental Defenders Office (Tas) Inc.	18
Federation of Victorian Traditional Owner Corporations	40
Fisheries Research and Development Corporation (FRDC) Indigenous Reference Group	57
GA and MJ Stevenson	26
Government of South Australia	63
Great Barrier Reef Marine Park Authority	11
Humane Society International	31
John Clunies-Ross	5
Kenneth Collins	6
Merimbula Big Game and Lakes Angling Club Inc.	27
National Aquaculture Council Inc.	2
National Seafood Industry Alliance Incorporated	58
Northern Land Council	39
Northern Territory Seafood Council	43
NSW Department of Industry	7
NSW Wild Caught Fishers Coalition	41
Pearl Producers Association	52
Prof Caleb Gardner and Dr Emily Ogier	16
Professional Fishermen's Association of NSW	38
Queensland Government	60
Queensland Seafood Industry Association	29

(continued next page)

Table A.1 (continued)

<i>Participants</i>	<i>Submission no.</i>
Queensland Seafood Industry Association	36
RecFish SA	35
Richey Fishing Co Pty Ltd	30
Ridley Corporation	32
Robert A Rose	51
Seafood Industry Victoria	44
Shark Bay Prawn Trawler Operators' Association	55
South Australian Oyster Growers Association	19
South Australian Rock Lobster Advisory Council Inc.	28
South East Trawl Fishing Industry Association	53
Southern Rocklobster Limited	22
Sunfish Queensland Inc.	3
Sydney Fish Market	13
Tasmanian Association for Recreational Fishing Inc (TARFish)	42
Tasmanian Rock Lobster Fishermen's Association	37
Tasmanian Salmonid Growers Association	8
Tasmanian Seafood Industry Council	47
The Fishermens Portal Inc.	17
Torres Strait Regional Authority	9
Vegan Australia	15
Victorian Recreational Fishing Peak Body (VRFish)	25
Western Australian Fishing Industry Council	45
Wildcatch Fisheries SA Inc.	10
Women's Industry Network Seafood Community	12
West Coast Professional Fishers Association	64
WWF and TRAFFIC	62

Table A.2 Stakeholder consultations

Participants

ACT

Australian Bureau of Agricultural and Resource Economics and Sciences
Australian Fisheries Management Authority
Australian Maritime Safety Authority
Australian Recreational Fishers Foundation
Australian Fishing Trade Association
Commonwealth Fisheries Association
Department of Agriculture and Water Resources (Cwlth)
Department of Environment (Cwlth)
Fisheries Research and Development Corporation
Wendy Craik

New South Wales

Australia's Oyster Coast Limited
Bermagui Fisherman's Co-op
Clarence River Fisherman's Co-operative
Coffs Harbour Co-op
Dr Bob Kearney
Eden Sports and Game Fishing Club
Narooma Oyster Farms
Department of Primary Industry
Professional Fisherman's Association
Southland Fish Supplies
Wagonga Aboriginal Lands Council

Northern Territory

Amateur Fishermen's Association of the Northern Territory
Department of Primary Industries and Fisheries
Northern Land Council
Seafood Council

South Australia

Australian Southern Bluefin Tuna Industry Association
Australian Tuna Fisheries (Stehr Group)
Clean Seas
Oyster Growers Association
Recreational Fish SA
Rock Lobster Advisory Council
Sardine Industry Association
South Australian Oyster Research Council
Spencer Gulf Prawn Fishery
Wildcatch Fisheries SA

(continued next page)

Table A.2 (continued)

Participants

Queensland

Association of Marine Park Operators
Australian Prawn Farmers Association
Centre for Sustainable Tropical Fisheries and Aquaculture
Fisheries Research and Development Corporation: National Indigenous Stakeholders Forum
Game Fishing Association
Great Barrier Reef Marine Park Authority
Queensland Seafood Industry Association
Seavine Marine
Sunfish Qld
Tropical Finfish

Tasmania

Commonwealth Scientific and Industrial Research Organisation
Department of Primary Industries, Parks, Water and the Environment
Environment Tasmania
Institute for Marine and Antarctic Studies
Recreational Fishers Association
Tasmanian Seafood Industry Council

Victoria

Farout Charters
Lakes Entrance Co-op

Western Australia

888 Abalone Pty Limited
Abalone Industry Association
Aquaculture Council of WA
Austral Fisheries
Department of Fisheries
George Kailis
Marine Stewardship Council
Maxima Opportunity Group
Recfishwest
Shark Bay Prawn Trawlers Association
Western Australia Fishing Industry Council

Teleconference

Abalone Industry Association SA
Australian Institute of Marine Sciences

(continued next page)

Table A.2 (continued)

Participants

Australian Marine Conservation Society
Commonwealth Scientific and Industrial Research Organisation
Department of Economic Development, Jobs, Transport and Resources (Vic)
Humane Society International
New Zealand Ministry for Primary Industries — Fisheries Management
Organisation for Economic Co-operation and Development
Pew Charitable Trusts
Primary Industry and Regions (SA)
Queensland Department of Agriculture and Fisheries
Sea Shepherd
Small Pelagic Fisheries Association
South East Trawl Fishermens' Industry Association
Sydney Fish Market

Community forums

Coffs Harbour, New South Wales
Narooma, New South Wales

B Case studies on shared fisheries

This appendix contains case studies on the shared management arrangements for southern bluefin tuna (SBT), eastern school whiting, snapper, gummy shark, southern rock lobster and southeast Australian scallops. They illustrate the range of problems presenting in the management of shared fisheries.

The appendix also considers in more detail the problem of trip limits and illustrates the drafting errors within some Offshore Constitutional Settlement (OCS) fisheries arrangements.

B.1 Case study 1: southern bluefin tuna

SBT is a highly migratory species that is targeted by fishers on the high seas and within the Exclusive Economic Zones of Australia, New Zealand, Indonesia and South Africa. The SBT's range extends from its spawning grounds in the north-east Indian Ocean. From there, juvenile SBT move south along the Western Australian coast and onto either South Africa or eastwards along Australia's continental shelf. SBT move into Tasmanian and New South Wales waters in the colder months. The Tasman Sea is considered the likely eastern boundary for the stock (Cardno Ecology Lab 2012).

SBT is a high-value species. It is sought by commercial fishers, aquaculturists and recreational fishers, as well as being the subject of illegal, unreported and unregulated fishing activity.

Fishing of SBT is managed against the quota issued to countries under the Convention for the Conservation of Southern Bluefin Tuna (CCSBT – box B.1). The quota for Australia was 5665 tonnes in 2015 (CCSBT 2016b).

As signatory to the CCSBT, the Australian Government is responsible for ensuring Australia's compliance with catch limits. This is problematic given the reportedly significant proportion of catch taken by recreational fishers, who are not regulated by the Commonwealth (see below).

The OCS fisheries arrangements

OCS fisheries arrangements affecting the management of SBT have been signed between the Commonwealth and each state (except for New South Wales) and the Northern

Territory (table B.1). These arrangements give jurisdiction over SBT to the Commonwealth but, in practice, the Commonwealth only manages the commercial catch.

Box B.1 **Convention for the Conservation of Southern Bluefin Tuna**

The Commission for the Conservation of Southern Bluefin Tuna (CCSBT) was formed in 1994 when Australia, Japan and New Zealand formalised a voluntary agreement for the management and conservation of southern bluefin tuna (SBT). The voluntary agreement dates to the 1980s when it was effected to deal with concerns over the sustainability of SBT.

The Republic of Korea, Indonesia, Taiwan, Philippines, South Africa and the European Union have joined the CCSBT over time either as members or ‘cooperating non-members’.

The objective of the CCSBT is to ‘ensure, through appropriate management, the conservation and optimum utilisation of the global SBT fishery’. In support of this objective the CCSBT:

- sets a total allowable catch and allocates that catch among the members
- conducts and coordinates a scientific research program in support of the CCSBT’s objectives
- provides a forum for the discussion of SBT conservation issues and acts as a coordination mechanism for members’ activities in the SBT fishery
- cooperates and liaises with other regional tuna fishery management organisations.

Source: CCSBT (2016a).

The OCS fisheries arrangements for SBT do not specify the fishing methods to which they apply. A literal interpretation of the arrangements is that they apply to all fishing within the prescribed areas (which includes all coastal waters except those of New South Wales). It follows that these arrangements apply to both recreational fishing and commercial fishing. The memoranda of understanding (MoUs) supporting the OCS fisheries arrangements for Victoria, South Australia and Tasmania state that the Commonwealth reserves its rights to implement controls on recreational fishing. MoUs for the other jurisdictions are silent on the subject.

Table B.1 OCS fisheries arrangements for southern bluefin tuna

	<i>NSW</i>	<i>Vic</i>	<i>Qld</i>	<i>SA</i>	<i>WA</i>	<i>Tas</i>	<i>NT</i>
Year arrangement took effect	n.a	1997	1995	1997	1995	1997	1995
Agreement relates to tuna and tuna-like species			Yes		Yes		Yes
Agreement relates to finfish		Yes		Yes		Yes	

SBT was excluded from the scope of the New South Wales’ OCS fisheries arrangements for finfish. This means that jurisdiction over SBT reverts to the default position under the OCS — that is, New South Wales has jurisdiction over SBT within coastal waters and the Commonwealth has jurisdiction beyond the coastal waters. There is no MoU between the Commonwealth and New South Wales to guide the management of SBT.

Recreational fishing of southern bluefin tuna

The catch of SBT by recreational fishers has reportedly been increasing due to advances in boating and navigation technologies, which have allowed fishers greater access to Commonwealth waters. All jurisdictions have recognised the need to better manage access to SBT, but there have been few practical steps to improve management against Australia's quota.

In 2014, Australia was allocated a total allowable SBT catch of 5193 tonnes by CCSBT (CCSBT 2016b). The total allowable catch set by the Australian Fisheries Management Authority (AFMA) for commercial fishing for the corresponding fishing season was 5312 tonnes — this was the CCSBT allocation plus an allowance for 'under-catch' against quota from the previous year (ABARES 2015b). Accordingly, Australia has been assigning its full allocation to the commercial sector. While data on the 'take' of SBT by recreational fishers is limited, the information available suggests that this can be significant.

- Over 200 tonnes of SBT were estimated to be caught and retained by recreational fishers in Victoria in 2011 (Green et al. 2012b).
- In Tasmania, over 70 tonnes of SBT were caught and retained by recreational fishers in 2011-12 (Tracey et al. 2013).

The recreational controls for SBT instituted by states and territories vary (table B.2).

Table B.2 Recreational controls on southern bluefin tuna

	<i>Bag limit</i>	<i>Possession limit</i>	<i>Boat limit</i>
NSW	1	1	-
Vic	2 ^a	2 fish; or, 160 kilograms	-
Qld	No controls ^b		
SA	2 ^c	-	6 ^c
WA	3 ^d	-	-
Tas	2 ^a	2 ^a	4 (but only 2 over 1.5 metres long)
NT	No controls ^b		

^a Applies to a combined total of yellowfin, bigeye and southern bluefin tuna. ^b SBT seldom, if ever, enters waters off the coast of Queensland or the Northern Territory. ^c Applies to a combined total of yellowfin and southern bluefin tuna. ^d Applies to a combined total of 'large pelagic finfish'.

Sources: Cardo Ecology Lab (2012); DEDJTR Vic (2015b); DoF WA (2016b); DPI NSW (2016d); DPIPWE Tas (2015b); PIRSA (2015d).

Status of southern bluefin tuna

The SBT's high value and biological characteristics make it vulnerable to overexploitation but its range outside of Australia's waters makes its conservation reliant on the actions of

other nations. ABARES (2015b, p. 391) notes that, '[t]he spawning stock biomass of southern bluefin tuna remains at a low level and, as a result, the stock remains classified as overfished'.

SBT was nominated in 2003 for listing as a threatened species under the *Environment Protection and Biodiversity Act 1999* (Cwlth) (EPBC Act) and recommended for inclusion on the list as 'endangered' by the Threatened Species Scientific Committee. The Minister rejected this recommendation on the basis that it may weaken Australia's ability to influence the global management of the stock. Part of the Minister's decision was based on the view that the cessation of fishing for SBT in Australian waters would likely see Australia's CCSBT quota reallocated to another country (or countries) and so see no net decrease in the take of SBT (Cardno Ecology Lab 2012).

In 2010, SBT was listed as 'conservation dependent' under the EPBC Act. This does not preclude fishing for the species but requires a management plan to be in place for its recovery.

B.2 Case study 2: eastern school whiting

Eastern school whiting occur in state and Commonwealth waters ranging from southern Queensland to western Victoria, including through Tasmanian waters. In 2013, the total commercial catch was approximately 1235 tonnes (FRDC 2014c). Recreational fishers also catch a small amount, estimated to be fewer than 15 tonnes per annum (FRDC 2014c; Industry & Investment (New South Wales) 2010c). The majority of catch (over 98 per cent) is taken by commercial fishers operating in either Commonwealth or New South Wales fisheries. Concerns relating to management solely relate to these fisheries.

The main concern in relation to this stock stems from the Commonwealth controlling catch by issuing fishers quota out of a total allowable catch limit while New South Wales controls its fishers' take through boat and gear restrictions. This results in risks of catches being above or below the recommended biological catch, lost productivity and some inequity.

Management arrangements

Eastern school whiting is subject to an OCS fisheries arrangement agreed between the Commonwealth and New South Wales on 25 July 1990. This arrangement:

- applies to 'all species of fish of the family *Sillaginidae*' (of which eastern school whiting is a member)
- gives jurisdiction to New South Wales for:
 - all fishing methods within three nautical miles of the low water mark

-
- all fishing methods except purse-seining and pelagic longlining in waters no deeper than 4000 metres (ranging approximately 60–80 nautical miles from the coast) and north of Barrenjoey Point (near Sydney)
 - all fishing methods except trawling, purse-seining, Danish-seining and pelagic longlining in waters no deeper than 4000 metres and south of Barrenjoey Point.⁶³

By default, the Commonwealth has jurisdiction over all fishing occurring more than more than three nautical miles from the low water mark that does not fall under New South Wales' jurisdiction. This means that commercial fishers looking to take eastern school whiting from within and beyond the New South Wales coast require a New South Wales shareholding/endorsement and a Commonwealth quota holding. Further, different rules apply depending upon whether a fisher is operating in a New South Wales or Commonwealth fishery.

There are no ancillary agreements in place between the Commonwealth and New South Wales to guide management arrangements.

Impact on management

Setting and meeting of Commonwealth catch limits

Eastern school whiting is taken by commercial fishers in the Commonwealth Trawl Sector (CTS) of the Southern and Eastern Scalefish and Shark Fishery (SESSF — a Commonwealth fishery) and the Ocean Trawl Fishery (OTF — a New South Wales fishery). The stock is managed under a total allowable catch (TAC) and quota regime in the CTS, and via limits on boats and fishing gear, but without a catch limit, in the OTF.

In setting its TAC for school whiting in the CTS, AFMA first establishes an overall sustainable catch (referred to as a 'recommended biological catch' (RBC)) and then deducts an estimate of all sources of mortality aside from Commonwealth fishers (such as New South Wales commercial fishers and discards). The remaining RBC is then allocated to Commonwealth fishers according to their quota holdings.

In the absence of a catch-sharing arrangement for eastern school whiting, AFMA applies an estimate (based on past catch history) as the New South Wales catch share. Over the past few years, basing estimates on historic catch has not unduly limited Commonwealth fishers, with both groups catching below their allotted shares (table B.3). Still, the sustainability of the stock, and productive utilisation of it, is dependent on actual catch by New South Wales fishers.

⁶³ Within the arrangement, the geographic boundaries are defined by latitude and longitude references rather than references to locations (such as Barrenjoey Point).

Table B.3 Catch history: eastern school whiting

Tonnes

	<i>RBC</i>	<i>Commonwealth</i>		<i>New South Wales</i>	
		TAC	Catch	Notional TAC	Catch
2010-11	1660	641	388	1019	1045
2011-12	1660	641	359	1019	920
2012-13	1660	641	507	1019	860
2013-14	1660	809	558	851	536
2014-15	1660	809	795	851	not avail

RBC Recommended biological catch. **TAC** Total allowable catch.

Sources: ABARES (2012, 2013, 2015b); DPI NSW (2013a; 2015); FRDC (2014c); Shelf Resource Assessment Group (2014).

Contributions toward management costs

Stock assessments for eastern school whiting are undertaken by AFMA (the latest in 2010) and consider the catch in both Commonwealth and New South Wales fisheries (FRDC 2014c). New South Wales implicitly relies upon AFMA’s stock assessments in its management of the eastern school whiting. AFMA’s last stock assessment was funded by Commonwealth-managed fishers (80 per cent) and the Australian Government (20 per cent) (AFMA 2012b). This means that Commonwealth fishers pay most of the costs of a stock assessment but receive only a residual interest in the catch allowance resulting from that assessment. Commonwealth fishers have raised questions about the equity of such arrangements (SETFIA, sub. 56 and Shelf Resource Assessment Group (2012)), as has the Commonwealth Department of Agriculture and Water Resources:

Equity issues may be confounded because there are no formal arrangements for cost recovery from non-Commonwealth resource users (including from state fisheries or recreational fisheries) to support data collection, research, stock assessment and overall management of Commonwealth-managed stocks ... (ABARES within DAWR sub. 56, p. 30).

Single jurisdiction trip requirement

The management plan for the SESSF requires fishers operating in both Commonwealth and state fisheries to unload any fish of a quota species taken under a state permit before fishing under a Commonwealth quota for the same species. This measure is, in part, aimed at preventing fishers falsely claiming that some of their catch was taken from a state-managed fishery and thereby avoiding the Commonwealth’s quota controls. Fishers may seek AFMA’s approval to waive this requirement, but such an approval must be provided in writing before the commencement of the fishing trip.

In practice, this requirement means fishers need to nominate the jurisdiction in which they will be fishing before they leave port and take separate trips for fishing in different

fisheries. For example, a trawler leaving a southern New South Wales port must travel through the OTF to get to the CTS. If a trawler has rights to fish for eastern school whiting in both the CTS and OTF they can only trawl in one fishery on any single trip. Hence ‘the fisher may be required to travel past productive fishing grounds, even when they also have rights to catch the species within that area’ (DAWR, sub 56 — attachment, p. 11).

In June 2016, AFMA commenced a seven month trial to allow so-called ‘dual jurisdiction trawl trips’ in Commonwealth and New South Wales waters. Fishers can nominate to participate in the trial and, if selected, will be required to carry an AFMA observer on board when completing a dual jurisdiction trip. Other trial controls include: that trawling can only occur within one fishery and cannot occur across the ‘border’ of the OTF and CTS; a requirement that fish taken in the OTF and CTS be stored separately; and that fishers are to accurately record catches from both jurisdictions (AFMA 2016i).

B.3 Case study 3: snapper

Snapper has a wide distribution across Australia. It is found in the waters off Western Australia, South Australia, Victoria, Tasmania, New South Wales and Queensland. The biological structure of the stock is complex. For example:

- fish over the range of Proserpine (north Queensland) to Wilsons Promontory (Victoria) are considered to be a single biological stock (the ‘east coast snapper stock’)
- there is an ‘eastern biological stock’ and a ‘western biological stock’ in Victorian waters
- there are three separate biological stocks in Shark Bay (Western Australia) (FRDC 2014c).

Snapper is targeted by commercial, recreational and Indigenous customary fishers using a number of different methods.

Management arrangements

In jurisdictions other than Victoria, South Australia and Tasmania, the relevant OCS fisheries arrangements for snapper are those referring to ‘fish of the family *Osteichthyes*’. The Victorian, South Australian and Tasmanian arrangements specifically include a reference to snapper. In summary, the OCS fisheries arrangements provide:

- New South Wales jurisdiction as for case study 2
- Victoria with jurisdiction to the limit of the Australian Fishing Zone (AFZ) for all fishing methods except trawling
- Queensland with jurisdiction to the limit of the AFZ for all fishing methods (exclusions apply for the Torres Strait fisheries but that area is beyond the range of snapper)

-
- South Australia with jurisdiction to the limit of the AFZ for all commercial fishing methods
 - Western Australia with jurisdiction over commercial fishing to the limit of the AFZ. Exclusions include trawling beyond the 200 metre isobath, fishing within the Northern Shark Fishery, fishing (except using hand lines, troll lines, drop line and pelagic longlines used under an AFMA licence)⁶⁴ within the Southern Demersal Gillnet and Longline Fishery
 - Tasmania with jurisdiction to the limit of the AFZ for all fishing methods.

All OCS fisheries arrangements preclude the states having jurisdiction over the bycatch of AFMA-licenced fishers targeting Commonwealth species.

Impact on management

Catch limits: east coast snapper biological stock

While there is a single biological stock of snapper along the east coast of Australia, it is managed separately (and differently) by New South Wales, Victoria and Queensland. Each jurisdiction conducts its own stock assessment using different methods and at different times. The most recent assessments were by Victoria and Queensland in 2011. A cross-jurisdictional assessment is being planned (FRDC 2015a).

The combined expenditure of the jurisdictions is likely to be higher than it would be if a single assessment were undertaken. Further, management decisions are potentially being made without sufficient regard for the sustainability of the stock over its entire range.

Across the three jurisdictions (and after allowing for bycatch in Commonwealth waters), the capture of snapper is dominated by recreational fishers. In 2013, the estimated catch by recreational fishers in the three jurisdictions was 975 tonnes against a commercial catch of 442 tonnes (FRDC 2014c).

Bycatch

While snapper is not targeted by Commonwealth fishers, it is taken as bycatch. Commonwealth fishers are subject to a 200 kilogram trip limit on snapper to deter them from targeting snapper. The South East Trawl Fishing Industry Association (SETFIA 2013) estimated that complying with this trip limit saw Commonwealth fishers discard over ten tonnes of (dead) snapper in a year in east Bass Strait alone. AFMA (2012a) has previously sought a catch sharing arrangement with the states with a view to reducing wasteful discarding practices but was unable to do so because the states

⁶⁴ The exclusion for the use of pelagic longlining under an AFMA licence appears to be a drafting error and is discussed in section B.8.

manage snapper in different ways. As an interim measure, a co-management agreement has been made between SETFIA and AFMA to better manage the issue of discarding (box B.2).

Decisions made by AFMA have also had unintended consequences for snapper. A decision by AFMA in 2012 to close key habitat areas off the South Australian coast to gillnet fishing as a means of reducing the bycatch (and death) of sea lions saw a switch to hooks by Commonwealth fishers operating in the affected areas. The switch to hooks has seen increasing snapper bycatch being taken in the Commonwealth fisheries (DAWR sub. 56, pp. 10–11).

Box B.2 AFMA/SETFIA co-management arrangement for snapper

The co-management agreement between Australian Fisheries Management Authority (AFMA) and South East Trawl Fishing Industry Association (SETFIA) relates to the operation of Commonwealth trawlers in Victorian waters. The aim of the agreement is to reduce discarding by allowing certain incidental catches of snapper in excess of the 200 kilogram limit to be landed.

SETFIA administers the agreement and is responsible for approving snapper landings in excess of 200 kilogram trip limit subject to the following conditions being met:

- the proposed incidental snapper catch being reported prior to landing
- the skipper of the reporting boat having satisfactorily completed a SETFIA-nominated educational course prior to the catch being taken or undertaking to do so by an agreed date
- SETFIA being satisfied that the boat has complied with the SETFIA Snapper Code of Conduct
- SETFIA being satisfied that the boat was not targeting snapper and that the trawling occurred solely in either the eastern or western zone of the fishery.

SETFIA is also responsible for: ensuring all applications made by fishers are treated equally irrespective of whether the fisher is a member of SETFIA; ensuring accurate records are maintained; advising AFMA by email of approvals prior to the boat arriving in port; and advising AFMA in writing of all applications under the agreement, irrespective of whether approval is granted.

The arrangement ceases if the combined total catch of snapper taken by Commonwealth trawlers in Victorian waters exceeds 35 tonnes in any one fishing season. The 200 kilogram trip limit remains in force if the arrangement ceases. After 18 months in operation, only three exemptions to exceed the prescribed trip limit had been granted by SETFIA.

Sources: AFMA (2016g); SETFIA sub. 53.

B.4 Case study 4: gummy shark

Gummy shark is taken from temperate waters off the coasts of southern Queensland, New South Wales, Victoria, Tasmania, South Australia and Western Australia. The gummy shark population from southern New South Wales to Western Australia comprises a single ('southern') biological stock. A second ('eastern') biological stock extends north from

around Newcastle in New South Wales. Gummy shark is taken using hook, gillnet and trawl fishing methods (FRDC 2014c).

The total commercial catch of gummy shark in 2013 was just over 2070 tonnes. The majority was taken by the Commonwealth (1506 tonnes), Western Australia (416 tonnes) and South Australia (104 tonnes). The full recreational catch is not known but it has been estimated at around 20 tonnes for South Australia (FRDC 2014c).

Management arrangements

Jurisdiction over the gummy shark is determined under various OCS fisheries arrangements:

- New South Wales's jurisdiction is as for case study 2.
- Western Australia has jurisdiction over most gummy shark stocks off its coast. Exceptions include trawling methods outside coastal waters where jurisdiction falls to the Commonwealth.
- Victoria, South Australia and Tasmania have jurisdiction over gummy sharks within their internal waters — this is particularly significant for South Australia, where relatively gummy sharks are taken in the Gulf of St. Vincent and Spencer Gulf.

Victoria, South Australia and Tasmania (with the exception of their internal waters) ceded jurisdiction over the gummy shark to the Commonwealth via OCS fisheries arrangements in 2000 and 2001. This decision was made as a consequence of the 'depletion of biomass due to catch rates, slow growth rates of the species, and the fact that they produce few young at a time' (*Rhodes v Australian Fisheries Management Authority* [2006] FCA 1220 at [9]).⁶⁵ The Tasmanian Department of Primary Industries, Parks, Water and Environment has stated that a quota system (as employed by AFMA) was considered the best means to deal with the pressure on the stock (sub. 48).

This change in management has contributed to arresting the depletion of gummy shark biomass with the FRDC (2014c) concluding that the exploitation of gummy shark was now 'sustainable'.

Memoranda of Understanding

The OCS fisheries arrangements for Victoria, South Australia and Tasmania are supported by MoUs dealing with the management of bycatch. Arrangements to deal with the bycatch of gummy shark are important as the OCS fisheries arrangements have resulted in the Commonwealth and states sharing jurisdiction over expanses of water. This means fishers

⁶⁵ These concerns related to both the gummy shark and school shark with the school shark being the subject to the same OCS fisheries arrangements as the gummy shark.

targeting another species (such as snapper) under a state endorsement may inadvertently take gummy shark as bycatch. The problem is most acute in South Australia.

The MoU set bycatch limits for school shark and gummy shark for fishers targeting other species. The MoU also provide:

- that the states may choose how to manage the recreational catch of gummy shark in Commonwealth waters adjacent to their respective coastlines
- for the development of arrangements to determine global catch limits, a means for apportioning limits across the jurisdictions and enforcing those limits.

In practice, a proportion of the RBC is notionally allocated to each state by AFMA before determining the allowable catch for Commonwealth fishers (AFMA 2015b). The effectiveness of these arrangements has been questioned by industry members:

... SA state fishers in internal waters are taking large amounts of Gummy Shark with no requirement to hold quota and have exceeded the state allocation under the MOU between the Commonwealth and South Australia. (AFMA 2014b, p. 4)

Subsequent to this concern being raised by Commonwealth fishers, AFMA received assurance from Primary Industries and Regions (South Australia) (PIRSA) that their shark fishers would be restraining their catches to the state's notional allocation (AFMA 2014b).

Management arrangements in New South Wales and Western Australia

Both the eastern and southern biological stocks are present in New South Wales. New South Wales has jurisdiction over both. Catches are relatively small (less than two per cent of the total catch) and, while there may be benefits in moving the management of the southern biological stock to the Commonwealth's jurisdiction (as in Victoria, South Australia and Tasmania), the size of the catch makes this a lower-priority consideration.

In Western Australian, the stock is managed on a standalone basis in accordance with a discrete stock assessment process. AFMA (2012a) considers that Western Australia should cede jurisdiction over the gummy shark to the Commonwealth as this would allow the entire southern biological stock (except for a small portion in New South Wales waters) to be managed under a single regime by a single jurisdiction. However, stakeholders have not raised concerns about the costs arising from the dual Commonwealth/Western Australia management arrangements and there is no evidence of pressure on the stock's biomass. Such an arrangement would also cut across the relative simplicity of the overall OCS fisheries arrangements in Western Australia — arrangements that have been particularly successful in removing the problems associated with the management of shared fisheries (chapter 6).

Impact on management

Single jurisdiction trips

Similar to eastern school whiting (case study 2), gummy shark fishers are only allowed to fish in a single jurisdiction on each fishing trip. This results in the need to take separate trips for those holding both Commonwealth and state fishing rights, as well as wasteful bycatch outcomes (box B.3). The bycatch outcomes are particularly acute in South Australia. This situation arises as ‘[d]espite South Australian and Commonwealth fishery both being quota managed there is no quota trading nor dual endorsement of boats which might allow a single boat to fish in both fisheries simultaneously’ (DAWR, sub 56 — attachment, p. 11).

Box B.3 **Single jurisdiction trip requirement — gummy shark**

A fisher can hold both Commonwealth quota for gummy shark within the Shark Gillnet and Shark Hook sectors (SGSHS) of the Southern and Eastern Scalefish and Shark Fishery and an endorsement for snapper within South Australia’s Marine Scalefish Fishery (MSF). The SGSHS and MSF ‘exist’ in the same waters off the South Australian coast and both extend to the limit of the Australian Fishing Zone.

The fisher can use the same boat and gear (say 400 longline hooks) to fish in either the SGSHS or the MSF, but they cannot fish in both concurrently. They must nominate a fishery before leaving port.

If the fisher decides to target snapper, they will nominate the MSF as the fishery for their trip. If during that trip they bring up 11 gummy sharks in their catch, six would be discarded as there is a five gummy shark trip limit for the MSF (in coastal waters). The fisher is compelled to discard the fish even if they have available Commonwealth quota for the species because they are fishing under the MSF ‘rules’.

This situation is common to a number of state managed-species in the MSF.

B.5 Case study 5: southern rock lobster

The southern rock lobster is distributed around Australia’s southern mainland, Tasmania and New Zealand. It is considered to be a single biological stock across this range (FRDC 2014c; PIRSA 2015e). The majority of Australia’s commercial catch of southern rock lobster in 2012-13 occurred in South Australia (1552 tonnes) and Tasmania (1064 tonnes). Catches in Victoria and Western Australia were more modest at 306 tonnes and 45 tonnes, respectively (FRDC 2014c).

The concerns raised with the Commission relate to the lobster fisheries in Victoria, South Australia and Tasmania. Accordingly, the following analysis focusses on these jurisdictions.

Management arrangements

The respective OCS arrangements for Victoria, South Australia and Tasmania provide those states with jurisdiction over the capture of southern rock lobster both within and beyond the three nautical mile limit. The South Australian and Tasmanian arrangements (both signed in 1996) relate to ‘all activities by way of fishing’. The Victorian arrangement (signed in 1997) gives jurisdiction to Victoria for all methods except trawling.

Current management arrangements

The southern rock lobster is best managed in zones defined by unique biological, geological and ecological characteristics. This is because it is common for the characteristics of rock lobster populations to vary significantly across locations — for example, growth rates vary with the depth of water as does the age of maturity. Different locations also result in different rates of egg production by females (Green et al. 2012a). Recognising these differences, the South Australian Rock Lobster Fishery was separated into two zones (‘northern’ and ‘southern’) for management purposes in 1968 (PIRSA 2015e). Within Victoria and Tasmania, the management of the southern rock lobster is also undertaken according to regions or zones.

The need to manage rock lobster differently in different zones means that bringing the stock under one jurisdiction may not significantly reduce the variety of controls with which fishers need to comply. Table B.4 lists the zones in use for South Australia and Victoria along with a small sample of the management controls. Some Tasmanian controls align with Victoria’s (for example, minimum size limits), while others vary (such as the closed season — 1 May to 15 November for Tasmania’s western region and 1 May to 30 November for the eastern region). In addition to controls over catch, other management methods can vary across jurisdictions and within jurisdictions — for example, there is a vessel monitoring requirement in place for the northern zone in South Australia but not in South Australia’s southern zone.

Scientific research

The southern rock lobster is one of Australia’s most data-rich and best studied stocks (Gardner and Ogier, sub. 16, p. 2). There is a high level of cooperation between the jurisdictions on scientific research, for example:

- Tasmania, Victoria and South Australia cooperate on research, stock assessments and management objectives (Department of Primary Industries, Parks, Water and Environment (Tasmania), sub. 48). All three jurisdictions employ the same stock assessment model and researchers meet regularly to share information
- the South Australia Research and Development Institute (SARDI), which prepares the stock assessments for both South Australian zones, has also undertaken Victoria’s stock assessments (for example, Linnane et al. (2013))

The cooperation between the jurisdictions represents one of the better examples of management alignment, although there are obvious transaction costs associated with sharing and jointly assessing information, coordinating actions and cooperating on initiatives.

Table B.4 Selected management arrangements for rock lobster

	<i>South Australia</i>		<i>Victoria</i>	
	<i>Northern zone</i>	<i>Southern zone</i>	<i>Western zone</i>	<i>Eastern zone</i>
Closed season	1 June to 31 October ^a	1 June to 30 September	1 June to 15 November for females 15 September to 15 November for males	
Minimum size limit	105 mm carapace length	98.5 mm carapace length	105 mm carapace length for females 110 mm carapace length for males	
Minimum number of pots	20 per licence ^b	40 per licence ^b	20 per boat	15 per boat
Maximum number of pots	100 per licence ^b	100 per licence ^b	140 per boat	120 per boat
Catch per unit effort limit reference point for spawning stock	0.70 kilograms per pot	0.50 kilograms per pot	20 per cent of the biomass in 1951	20 per cent of the biomass in 1951
2014-15 Total allowable commercial catch	323.2 tonnes	1245.7 tonnes	230 tonnes	59 tonnes

^a In June 2016 PIRSA announced that the 'outer region' of the northern zone would not be closed over winter. ^b Up to two boats may be registered under a licence.

Sources: DPI Vic (2009); Linnane, McGarvet and Feenstra. (2015); Linnane et al. (2015a); PIRSA (2013a, 2014, 2016).

B.6 Case study 6: southeast Australian scallops

Commercial scallop beds are fished in Commonwealth, Victorian and Tasmanian waters. The scallops in Port Phillip Bay (Victoria) and the D'Entrecasteaux Channel (Tasmania) are genetically distinct from each other as well as most other scallops in south-eastern Australia (FRDC 2014c). The gross value of production (GVP) across Commonwealth, Victorian and Tasmanian scallop fisheries has not exceeded \$7 million since 2003-04 (Sen 2011).

In 2011, there was a total of 229 entitlements across the three jurisdictional fisheries. These were owned by 99 entities (Sen 2011). Over 65 per cent of entitlements were held by operators working in two or more fisheries. Cross-jurisdiction holdings have been favoured as a means to build a viable aggregate quota holding in scallops and to diversify the risks associated with scallop fishery closures.

Management arrangements

The 1986 OCS fisheries arrangement for scallops places jurisdiction over the stock with the Commonwealth, Victoria and Tasmania, depending on the location. The Commonwealth has responsibility for scallops in the central portion of Bass Strait, and Tasmania and Victoria responsibility for areas within 20 nautical miles of their respective coasts. No fishing methods are specified within the arrangement.

Each jurisdiction undertakes its own stock assessment, has a management advisory committee and operates separate (and different) licensing and compliance regimes (including different log book requirements and data storage processes).

The high-level management arrangements for the three scallop fisheries are reasonably well aligned (table B.5) as the three jurisdictions have worked together for some time, including by commissioning common research and attending each other's advisory meetings (AFMA sub. 50). However, there is less coordination on lower-level operational matters such as pre-season and in-season surveys, governance arrangements and the criteria to be satisfied before opening an area to fishing (Sen 2011).

The management costs across the three jurisdictions for the period 2006-07 to 2010-11 were estimated by Sen (2011) to be between \$865 000 and \$985 000 per annum (or 13-33 per cent of GVP depending on the year). There is some evidence that the ratio of management costs to GVP has increased since 2011 — for example, the 2013-14 management costs for the Commonwealth fishery reached 60 per cent of GVP (Department of Agriculture and Water Resources, sub. 56).

Impact on management

Several stakeholders (for example, Richey Fishing Co Pty Limited (sub. 30) and Tasmanian Seafood Industry Council (sub. 47)) raised concerns about unnecessary costs arising from the three separate systems used to manage scallop fisheries.

The scope for reduction in costs is somewhat limited by the nature of scallop management:

- some costs, such as surveying scallop beds, are fixed. If surveying is presumed to be undertaken efficiently in each jurisdiction, there would be little to be gained from moving to a single jurisdiction.⁶⁶
- given the separate biological stocks across the waters of the three jurisdictions, different fishing zones (and rules within those zones) would likely be in effect even if

⁶⁶ The scallop fishery is characterised by the inability of researchers to accurately predict the location or abundance of new beds. This is because scallop spat drift in the water column for several weeks before settling to the bottom. If their resting place is suitable as a scallop bed, a bed will become established otherwise the spat die. The strong currents in the Bass Strait mean that it is almost impossible to predict where the scallop spat will land.

the scallops were managed under a single jurisdiction. Fishers may still have to comply with different harvest rules even if stocks were placed under a single jurisdiction.

Table B.5 Management of scallops in southeast Australia

	<i>Commonwealth</i>	<i>Victoria</i>	<i>Tasmania</i>
Fishing methods			
<i>Commercial</i>			
Dredge	✓	✓	✓
<i>Recreational</i>			
Diving	n.a ^a	✓	✓
Management arrangements			
<i>Commercial</i>			
Limited entry	✓	✓	✓
Size limits (mm)	85	80	90
Gear restrictions	✓	✓	✓
Spatial closures	✓	✓	✓
Temporal closures	✓		✓
Relative abundance estimates	✓	✓	✓
Quota decrementation	Weighed at wharf and then at fisher receiver premises	Weighed within 20 minutes of landing	Weighed at wharf
Logbooks	✓	✓	✓
EPBC Act export accreditation	✓	✓	✓
Discard rate	<20%	<20%	<20%
Observers deployed	✓		
Summary fishery details			
2015 total allowable catch (tonnes)	2500	135.0 ^c	1033
2014 total allowable catch (tonnes)	1500 ^b	136.5 ^c	1240
Number of active boats	13	2	13

^a The Australian Government does not manage recreational fishing in Commonwealth waters. Recreational fishing in Commonwealth waters is managed by the state or territory immediately adjacent to those waters, under its management regulations. ^b Excludes research and exploratory quota. ^c An exploratory fishing allowance of 1.5 tonne per licence.

Sources: ABARES (2015b); AFMA (2016b, 2016c); DEDJTR Vic (n.d); DEPI Vic (2014); DPIPWE Tas (2014c); FRDC (2014c); Sen (2011)

That said, there are likely avoidable costs to both governments and fisheries under the current arrangements. For fishers holding fishing rights across multiple jurisdictions, there are costs associated with multiple consultation processes for harvest strategies and TAC determinations, as well as complying with different licensing systems. For governments, there are the transaction costs of sharing information and negotiating management approaches.

There have been four attempts to either better coordinate the OCS fisheries arrangement for scallops or integrate management into a single jurisdiction model (1986, 1994, 2004 and 2011). These have failed due to:

- differing motivations of scallop fishers in each state — for example, in the early 1990s, Victorian fishers were more dependent on scallops for their income compared to the fishers in Tasmania, who generally had more diversified interests. This led to strong differences in opinion over matters such as the length of the fishing season and minimum size limits
- concerns from Tasmanian fishers in 2004 that reform would see additional effort in Tasmanian waters and an unwillingness by Tasmanian fishers to be managed by AFMA
- a lack of resources on the part of fisheries managers to progress reform (Sen 2011).

With each scallop fishery having been subject to multiple closures over the period 1987-2010, no jurisdiction appears to have produced superior management outcomes. The FRDC (2014c) has assigned a stock status of ‘undefined’ across the three jurisdictions due to insufficient information being available to classify the status of the stock.

B.7 Trip limits — New South Wales and Commonwealth

A trip limit is a restriction on how much fish of a particular species (typically defined by weight) can be caught and landed on a daily basis or per fishing trip. Trip limits were first introduced to trawl fisheries in New South Wales at the request of AFMA in 1993. They now cover a range of commercial species across a number of states, including orange roughy, pink ling, blue-eye trevalla, blue grenadier and flathead.

AFMA’s request for trip limits was originally aimed at protecting the integrity of the Commonwealth’s quota system in situations where the subject species was also targeted in adjoining New South Wales trawl fisheries. Without trip limits or a means of tracking fishers (and the location of their catch),⁶⁷ a fisher who held rights to fish in both Commonwealth and New South Wales waters could declare their catch to have been taken from New South Wales-controlled waters (even if it was not) and so avoid the constraints of the Commonwealth quota system. However, there are fishers who only hold an endorsement to fish in the New South Wales fishery and so face no such incentive, yet they are subject to the same trip limits.

Under the trip limits, fishers in operating in the New South Wales fishery cannot land more than 50-1000 kilograms of catch, depending upon the species, on any day. Fishers who also hold Commonwealth quota cannot move into Commonwealth waters to continue fishing without unloading fish caught in the New South Wales fishery.

⁶⁷ Trip limit requirements were instituted before the introduction of vessel monitoring systems in Commonwealth fisheries (which commenced in the late 1990s).

Trip limits often result in discarding of catch to ensure the limit is complied with. Where a non-discriminatory fishing method such as trawling is in use, the risk of breaching a trip limit and discarding will be higher.

In May 2013, the New South Wales Minister agreed to delay a proposed abolition of trip limits on state-only operators. The delay was to allow time for discussions with AFMA, Commonwealth fishers and recreational fishers to address their concerns with this proposal and, in turn, to develop more ‘effective, efficient cross-jurisdictional management arrangements’ (DPI NSW 2013c). To date, however, these have not eventuated.

B.8 Drafting issues

A number of concerns relating to outdated and inaccurate provisions in OCS fisheries arrangements have been drawn to the Commission’s attention. The more significant instances are described below.

The 200 metre depth contour in Western Australia

The Commonwealth is responsible for trawling in waters that are more than 200 metres deep off the Western Australian coast. In waters less than 200 metres deep, jurisdiction falls to Western Australia. This arrangement was agreed in 1988. In 1995, Geoscience Australia refined the definition of the 200 metre depth contour (the 200-metre isobath) but this new definition has not been applied to lines of jurisdictional responsibility. The continued application of the previous definition of the 200-metre isobath means that both Commonwealth and Western Australian trawlers have been operating outside their approved jurisdiction relative to that which would apply under the 1995 Geoscience Australia definition of the 200-metre isobath (AFMA 2016h).

Discussions between AFMA and the Department of Fisheries (Western Australia) to address this issue commenced in 2004 (AFMA 2010). In January 2015, the Western Australian Fisheries Minister announced that agreement had been reached that will ‘correct errors and update the inshore boundaries of two Commonwealth trawl fisheries off Western Australia and will eliminate uncertainties for both State and Commonwealth operators’ (Baston 2015). As at July 2016, some 12 years after discussions first commenced and over one year after the Minister’s announcement, the agreed changes are yet to be formalised in an OCS fisheries arrangement.

Bight redfish

The 1996 OCS arrangement between the Commonwealth and South Australia provides for ‘red snapper’ (*Centroberyx gerrardi*), also known as the red bightfish, to be managed under state law. In practice, management of red bightfish is undertaken by the

Commonwealth under a quota arrangement within the Great Australian Bight Trawl Sector of the SESSF.

With the courts having upheld the jurisdiction over fisheries as defined in OCS fisheries arrangements, there is a risk that current management arrangements implemented by the Commonwealth for the bight redfish could be held as invalid if challenged.

Definition of New South Wales waters under the OCS fisheries arrangements

Each of the New South Wales OCS fisheries arrangements, which were agreed in 1991, seal the southern boundary of New South Wales' waters with an east/west line along the latitude of 37°35'. However, this latitude strikes land in the vicinity of Mallacoota in Victoria. In contrast, the *Petroleum (Submerged Lands) Act 1967* (Cwlth) describes the southern border of New South Wales waters as proceeding north-westerly along the geodesic (from Latitude 37° 35' South, Longitude 150° 10' East) to the intersection of the coastline at mean low water by the boundary between the states of New South Wales and Victoria.

On a strict interpretation of the current OCS fisheries arrangements there is the possibility of New South Wales fishers operating in Victorian waters.

Exclusions under Western Australia's OCS fisheries arrangement for fish and other aquatic biological resources

This arrangement was gazetted in February 1995 and provides Western Australia with jurisdiction over a range of fish species. The arrangement includes a number of exclusions to Western Australia's jurisdiction. In particular, at 2. (e) the following are excluded:

- ... all fish in the Class Osteichthyes and Class Chondrichthyes in waters of the fishery described in schedule 4 when demersal gillnet and lines of all kinds are used other than:
 - (i) handlines;
 - (ii) troll lines;
 - (iii) drop lines; and
 - (iv) pelagic longlines used in accordance with the exercise of a right conferred by a fishing concession granted by the Australian Fisheries Management Authority under the Management Act to permit the use of pelagic longlines for the taking of tuna and tuna-like species ...

The effect of paragraph (iv) is to give Western Australia jurisdiction over a fishing method used under a Commonwealth licence. This reading of paragraph (iv) may be overridden by other OCS arrangements that positively assign jurisdiction for these methods to the Commonwealth but, in any event, the phrasing here appears to go against the intent of the drafters.

References

- ABARES (Australian Bureau of Agricultural and Resource Economics and Sciences) 2012, *Fishery Status Reports 2011*, December, Canberra.
- 2013, *Fishery Status Reports 2012*, October, Canberra.
- 2015a, *Agricultural Commodity Statistics 2015*, http://www.agriculture.gov.au/abares/publications/display?url=http://143.188.17.20/anrdl/DAFFService/display.php?f_id=pb_agicstd9abcc0022015_11a.xml (accessed 5 June 2016).
- 2015b, *Fishery Status Reports 2015*, October, Canberra.
- ABC (Australian Broadcasting Corporation) 2015, *Shooting fur seals in Coorong and lower lakes of SA favoured by MP pushing private member's bill*, <http://www.abc.net.au/news/2015-07-01/shooting-fur-seals-coorong-lower-lakes-private-members-bill/6585088> (accessed 1 July 2016).
- ABS (Australian Bureau of Statistics) 2012, *Year Book Australia, 2012 - Forestry and Fishing*, Cat. no. 1301.0, Canberra.
- 2015, *Counts of Australian Businesses, including Entries and Exits, Jun 2010 to Jun 2014*, 2 March, Cat. no. 8165.0, Canberra.
- 2016, *Counts of Australian Businesses, including Entries and Exits, June 2011 to June 2015*, 26 February, Cat. no. 8165.0, Canberra.
- ACCC (Australian Competition and Consumer Commission) 2016, *Country of origin*, <https://www.accc.gov.au/consumers/groceries/country-of-origin> (accessed 15 July 2016).
- AFMA (Australian Fisheries Management Authority) 2010, *Western Australia Offshore Constitutional Settlement industry meeting - 7 December 2010: Chair's summary*, December, Canberra, <http://www.afma.gov.au/wp-content/uploads/2010/06/WA-OCS-Meeting-Chairs-Summary-FINAL.pdf?9370a8>. (accessed 14 January 2016).
- 2012a, *AFMA Submission - Inquiry into the Role of Science in Relation to Fisheries and Aquaculture*, Canberra.
- 2012b, *AFMA Submission - Review of Commonwealth Fisheries: Legislation, Policy and Management*, Canberra.
- 2012c, *Submission to the Review of the Fisheries Management Act 1991 and Fisheries Administration Act 1991*, Canberra.
- 2014a, *Annual Report 2013-14*, Canberra.
- 2014b, *Shark Resource Assessment Group (Shark RAG) - Meeting No. 2 2014*, Meeting Minutes, 20 November, Melbourne.

-
- 2015a, *Australian Sea Lion Management Strategy - Southern and Eastern Scalefish and Shark Fishery*, Canberra.
- 2015b, *Harvest Strategy Framework*, February, Canberra.
- 2015c, *Management Advisory Committees*, October, Fisheries Management Paper 1, Canberra.
- 2016a, *AFMA Submission - EPBC Act Reassessment Southern Bluefin Tuna Fishery*, April, Canberra.
- 2016b, *Bass Strait Central Zone Scallop Fishery*, <http://www.afma.gov.au/fisheries/bass-strait-central-zone-scallop-fishery/> (accessed 3 August 2016).
- 2016c, *Bass Strait Central Zone Scallop Fishery: Management Arrangements Booklet*, July, Canberra.
- 2016d, *Fish receivers permits*, <http://www.afma.gov.au/fisheries-services/fishing-rights-permits/> (accessed 14 April 2016).
- 2016e, *Frequently Asked Questions about the Draft Torres Strait Fishery (Quotas for Tropical Rock Lobster (Kaiar)) Management Plan 2016*, Canberra.
- 2016f, *Revised Draft Vessel Management Plan for the FV Geelong Star*, Version 2.0, Canberra.
- 2016g, *Southern and Eastern Scalefish and Shark Fishery 2016: Management Arrangements Booklet*, April, Canberra.
- 2016h, *Status of AFMA's initiatives*, Australian Fisheries Management Authority (AFMA), <http://www.afma.gov.au/about/reducing-red-tape/afma-reduce-red-tape/status-afmas-initiatives/> (accessed 8 May 2016).
- 2016i, *Trial to Allow Fishing in Commonwealth and NSW Waters on the Same Trip*, 15 April.
- ALRC (Australian Law Reform Commission) 2015, *Connection to Country: Review of the Native Title Act 1993 (Cth)*, ALRC Report 126, Australian Law Reform Commission, Sydney NSW.
- ANAO (Australian National Audit Office) 1996, *Commonwealth Fisheries Management: Australian Fisheries Management Authority*, Performance Audit Report No. 32, Australian Government Publishing Service.
- Anderson, E. 2015, 'Seals wreak havoc on Coorong', *Stock Journal*, 20 April.
- Andrews, D. (Premier of Victoria) 2015, *Target one million plan a boon for fishers and families*, <http://www.premier.vic.gov.au/target-one-million-plan-a-boon-for-fishers-and-families/> (accessed 26 July 2016).
- ANZECC (Australian and New Zealand Environment and Conservation Council) 1998, *Guidelines for Establishing the National Representative System of Marine Protected Areas*, December.

-
- ASBTIA (Australian Southern Bluefin Tuna Industry Association) 2012, *Submission to the Review of Commonwealth Fisheries Management Legislation*, 12 October.
- ATSISJC (Aboriginal & Torres Strait Islander Social Justice Commissioner) 2008, *Native Title Report 2007*, 2/2008, Australian Human Rights and Equal Opportunity Commission.
- Australian Venture Consultants Pty Ltd 2015, *Western Australian Marine Science Blueprint. Online Appendix 5: Western Australian Marine Aquaculture Sector*, January, <http://www.wamsi.org.au/blueprint-marine-science-2050> (accessed 19 May 2016).
- Baker, R. and Ruting, B. 2014, *Environmental Policy Analysis: A Guide to Non-market Valuation*, Staff Working Paper, January, Productivity Commission, Melbourne.
- Baston, K. (Minister of Agriculture and Food (Western Australia)) 2015, *Joint Media Statement - Strengthened Arrangements to Benefit Fisheries off Western Australia*, Media Release, 21 January.
- Bath, A., Skirtun, M. and Green, R. 2015, *Australian Fisheries Economic Indicators Report 2014: Financial and Economic Performance of the Eastern Tuna and Billfish Fishery*, ABARES.
- Bignell, L. and Hunter, I. (Minister for Fisheries and Minister for Sustainability Environment and Conservation) 2015, *Licence fee relief for fishers in the Coorong*, http://www.environment.sa.gov.au/Home/Full_newsevents_listing/News_Events_Listing/150912-coorong-licence-fee-relief (accessed 12 August 2016).
- Blewett, N. (Chair), Goddard, N., Pettigrew, S., Reynolds, C. and Yeatman, H. 2011, *Labelling Logic - Review of Food Labelling Law and Policy*, Canberra.
- Bolton, S., Jarrett, A., Moore, J., Sumner, D., Bray, S., Barwick, M. and Andersen, J. 2015, *Co-management in Commonwealth Fisheries*, March, FRDC Project No 2008/045, Fisheries Research and Development Corporation, Canberra.
- Borthwick, D. 2012, *Review of Commonwealth Fisheries: Legislation, Policy and Management*, December.
- Brennan, S. 2012, 'Commercial native title fishing rights in the Torres Strait and the question of regulation versus extinguishment', *Indigenous Law Journal*, vol. 8, no. 2, pp. 17–19.
- Calogeras, C., Carne, B., Denny, B. and Lovett, D. 2015, *Facilitation of the FRDC Indigenous Reference Group to Progress RD&E Outcomes*, FRDC Project, March, 2010/405, FRDC.
- Campbell, D. 2002, 'The Indigenous Sector: An Economic Perspective', in Hundloe, T. (ed), *Valuing Fisheries. An Economic Framework*, University of Queensland Press, St Lucia, pp. 166–186.
- Cardno Ecology Lab 2012, *Southern Bluefin Tuna: Species Impact Statement*, Job Number: EL0910048, St. Leonards, NSW.

-
- Cartwright, I. 2005, 'The Australian Northern Prawn Fishery', in Cunningham, S. and Bostock, T. (eds), *Successful Fisheries Management: Issues, Case Studies and Perspectives*, Eburon Academic Publishers, Delft, Netherlands.
- CCSBT (Commission for the Conservation of Southern Bluefin Tuna) 2014, *Report of the Twenty First Annual Meeting of the Commission*, 13 October, Auckland, New Zealand.
- 2016a, *CCSBT Commission for the Conservation of Southern Bluefin Tuna*, <https://www.ccsbt.org/en/content/home> (accessed 10 May 2016).
- 2016b, *Total Allowable Catch - CCSBT Commission for the Conservation of Southern Bluefin Tuna*, <https://www.ccsbt.org/en/content/total-allowable-catch> (accessed 10 May 2016).
- Chester, D., Frydenberg, J. and Canavan, M. (Minister for Infrastructure and Transport, Minister for Resources, Energy and Minister for Northern Australia) 2016, *More than \$130 million for Northern Territory Roads*, <http://nationals.org.au/1954-2/> (accessed 23 June 2016).
- Chilvers, B.L. and Goldsworthy, S.D. 2015, *Arctophalus Forsteri: The IUCN Red List of Threatened Species 2015*, e.T41664A45230026.
- Colbeck, R. (Minister for Tourism and International Education and Minister Assisting the Minister for Trade and Investment) nd, *Frequently asked questions - Geelong Star*, http://www.richardcolbeck.com.au/current_issues/geelong_star_faqs (accessed 27 June 2016).
- Commonwealth of Australia 2015, *South-east marine region profile: A description of the ecosystems, conservation values and uses of the South-east Marine Region*, <https://www.environment.gov.au/system/files/resources/7a110303-f9c7-44e4-b337-00cb2e4b9bf/files/south-east-marine-region-profile.pdf> (accessed 8 June 2016).
- Costello, C. and Mangin, T. 2015, *Country-level Costs vs. Benefits of Improved Fishery Management*, May.
- CSIRO (Commonwealth Science and Industrial Research Organisation) 2015, *The Environmental, Social and Economic Impacts of Large-Capacity Fishing Vessels Commonly known as 'Supertawlers' Operating in Australia's Marine Jurisdiction*, CSIRO Submission 15/544.
- DAF Qld (Department of Agriculture and Fisheries (Queensland)) 2015a, *Mud Crab Fishery*, <https://www.daf.qld.gov.au/fisheries/monitoring-our-fisheries/data-reports/sustainability-reporting/queensland-fisheries-summary/mud-crab-fishery> (accessed 7 June 2016).
- 2015b, *Overview: Queensland commercial fisheries*, <https://www.daf.qld.gov.au/fisheries/monitoring-our-fisheries/data-reports/sustainability-reporting/queensland-fisheries-summary/queensland-fisheries-summary> (accessed 7 June 2016).
- 2015c, *Statewide Recreational Fishing Survey 2013-14*.

-
- 2016a, *Fish stock assessment reports*, <https://www.daf.qld.gov.au/fisheries/monitoring-our-fisheries/data-reports/sustainability-reporting/stock-assessment-reports> (accessed 21 July 2016).
- 2016b, *Green Paper on Fisheries Management Reform in Queensland*, <https://publications.qld.gov.au/dataset/green-paper-on-fisheries-management-reform-in-queensland/resource/fef6ebad-2317-4c0a-99e1-585598bf1a1e> (accessed 27 July 2016).
- 2016c, *Queensland Aquaculture Policy Statement*, <https://publications.qld.gov.au/dataset/queensland-aquaculture-policy-statement> (accessed 2 May 2016).
- DAFF (Department of Agriculture, Fisheries and Forestry) 2007, *Commonwealth Fisheries Harvest Strategy: Policy and Guidelines*, September.
- DAFF Qld (Department of Agriculture, Fisheries and Forestry (Queensland)) 2014, *Submission to the Senate Rural and Regional Affairs and Transport References Committee Inquiry into the current requirements for labelling of seafood and seafood products*.
- Danenberg, N. and Mueller, S. 2011, *Omnibus Consumer Research Findings - Wave 2*, May, Project No. 2008/779, Australian Seafood Cooperative Research Centre and the UniSA Ehrenberg-Bass Institute for Marketing Science, Canberra, <http://www.seafoodcrc.com/southern-bluefin-tuna/consumer-research/2008-779-omnibus-consumer-research-findings-wave-2.html> (accessed 4 August 2016).
- DAWR (Department of Agriculture and Water Resources) 2015, *National Aquaculture Strategy*, <http://www.agriculture.gov.au/fisheries/aquaculture/national-aquaculture-strategy> (accessed 6 October 2015).
- 2016a, *Exporting Fish and Fish Products*, <http://www.agriculture.gov.au/export/controlled-goods/fish> (accessed 14 April 2016).
- 2016b, *Meeting of Fisheries Ministers*, <http://www.agriculture.gov.au/about/media-centre/communiqués/fisheries-ministers-meeting-29-april-16> (accessed 10 May 2016).
- DEDJTR Vic (Department of Economic Development, Jobs, Transport and Resources (Victoria)) 2014, *Scallop Fishery Overview*, <http://agriculture.vic.gov.au/fisheries/commercial-fishing/scallop/fishery-overview> (accessed 25 February 2016).
- 2015a, *Aboriginal fishing*, <http://agriculture.vic.gov.au/fisheries/aboriginal-fishing> (accessed 1 July 2016).
- 2015b, *Tuna (Southern bluefin, yellowfin and big eye)*, <http://agriculture.vic.gov.au/fisheries/recreational-fishing/catch-limits-and-closed-seasons/marine-and-estuarine-scale-fish/?a=208179> (accessed 10 May 2016).
- 2015c, *Commercial fish production*, <http://agriculture.vic.gov.au/fisheries/commercial-fishing/fisheries-victoria-commercial-fish-production> (accessed 23 June 2016).
- 2015d, *Fishery Overview: Rocklobster*, <http://agriculture.vic.gov.au/fisheries/commercial-fishing/rock-lobster/fishery-overview> (accessed 22 June 2016).

-
- n.d, The Victorian Scallop (Ocean) Fishery Information to inform assessment of the Victorian Scallop (Ocean) Fishery under the Environment Protection and Biodiversity Conservation Act 1999.
- Department of Industry (New South Wales) 2015, *Fisheries Resource Sharing in NSW*, IND-O-175.
- DEPI Vic (Department of Environment and Primary Industries (Victoria)) 2014, *Fishery Overview*, text, <http://agriculture.vic.gov.au/fisheries/commercial-fishing/scallop/fishery-overview#arrangements> (accessed 10 May 2016).
- DEWNR SA (Department of Environment Water and Natural Resources) 2014, *National parks South Australia - zones*, <http://www.environment.sa.gov.au/marineparks/About/zones> (accessed 1 August 2016).
- DEWR (Department of Environment and Water Resources) 2007, *Guidelines for the Ecologically Sustainable Management of Fisheries (2nd edition)*, Canberra.
- DIIS (Department of Industry, Innovation and Science) 2015, *Country of origin labelling - Consultation Regulation Impact Statement*, December.
- Director of National Parks 2013, *South-east Commonwealth Marine Reserves Network Management Plan 2013-23*.
- DoA (Department of Agriculture) 2014, *Australian Food Statistics 2012-13*, Canberra.
- 2015, *Australia's Seafood Trade*, January.
- Dobbs, K. 2007, *A Reef-wide Framework for Managing Traditional Use of Marine Resources in the Great Barrier Reef Marine Park*, Great Barrier Reef Marine Park Authority, Townsville.
- DoE (Department of the Environment) 2001, *Impact of aquaculture*.
- 2008, *World Conservation Union (IUCN) protected area categories 2008*, <https://www.environment.gov.au/node/20957> (accessed 18 July 2016).
- 2012, *Commonwealth marine reserves - background*, <https://www.environment.gov.au/topics/marine/marine-reserves/overview/background> (accessed 1 August 2016).
- 2015, *National Review of Environmental Regulation - Interim Report*.
- DoF WA (Department of Fisheries (Western Australia)) 2009, *Customary Fishing Policy*, 21 December.
- 2012a, *A Resourced-Based Management Approach For Recreational Fishing in Western Australia 2012-17*, Fisheries Management Paper No. 252, February.
- 2012b, *Allocation processes*, <http://www.fish.wa.gov.au/Sustainability-and-Environment/Sustainable-Fisheries/Sharing%20our%20fisheries/Pages/Allocation-process.aspx> (accessed 22 July 2016).
- 2013, *State-wide Survey of Boat Based Recreational Fishing in Western Australia 2013/14*, Fisheries Research Division, Western Australian Fisheries and Marine Research Laboratories, Western Australia.

-
- 2014, *Annual Report 2013-14*, http://www.fish.wa.gov.au/Documents/annual_reports/annual_report_2013-14.pdf (accessed 7 June 2016).
- 2015a, *Aquaculture in Western Australia: Statement of Commitment*.
- 2015b, *Customary fishing - frequently asked questions*, <http://www.fish.wa.gov.au/Fishing-and-Aquaculture/Customary-Fishing/Pages/Customary-Fishing-FAQ.aspx> (accessed 14 October 2015).
- 2015c, *Harvest Strategy Policy and Operational Guidelines for the Aquatic Resources of Western Australia*, Fisheries Management Paper no. 271, Perth.
- 2015d, *Status Reports of the Fisheries and Aquatic Resources of Western Australia 2014/15*.
- 2016a, *Dhufish recreational fishing*, <http://www.fish.wa.gov.au/Species/WA-Dhufish/Pages/Dhufish-Recreational-Fishing.aspx> (accessed 27 June 2016).
- 2016b, *Recreational fishing guide 2016*, http://www.fish.wa.gov.au/documents/recreational_fishing/rec_fishing_guide/rules_guide_statewide.pdf (accessed 10 May 2016).
- 2016c, *Shark Bay pink snapper frequently asked questions*, <http://www.fish.wa.gov.au/Fishing-and-Aquaculture/Recreational-Fishing/Recreational-Fishing-Rules/Shark-Bay-pink-snapper/Pages/Shark-Bay-pink-snapper-frequently-asked-questions.aspx> (accessed 22 June 2016).
- Dominion Consulting 2005, *The Importance of Recreational Fishing Expenditure to the Economies of Two Coastal Towns in Northern and Southern New South Wales: Port Macquarie and Narooma/Bermagui*.
- DoSG Tas (Department of State Growth, Tasmania) 2015, *Value of Tasmania's International Exports by Product 2012-13 to 2014-15*.
- Doulman, D. and Swan, J. 2012, *A Guide to the Background and Implementation of the 2009 FAO Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing*, Food and Agriculture Organisation of the United Nations, Rome.
- DPI NSW (Department of Primary Industries (New South Wales)) 2013a, *NSW Commercial Fisheries Reform Agenda Item 7: Setting the ITCALs*, November.
- 2013b, *NSW Recreational Fishing Catch and Release Handbook*, New South Wales.
- 2013c, *Recent Developments Concerning NSW Trip Limits for the Southern Fish Trawl, Ocean Trawl and Ocean Trap and Line Fisheries*, OUT13/11908, 24 May, OUT13/11908.
- 2014, *NSW Oyster Industry Sustainable Aquaculture Strategy Second Edition*.
- 2016a, *Commercial fisheries business adjustment program*, <http://www.dpi.nsw.gov.au/fishing/commercial/reform> (accessed 14 July 2016).
- 2016b, *Cultural fishing*, <http://www.dpi.nsw.gov.au/fishing/aboriginal-fishing/cultural-fishing> (accessed 1 July 2016).

-
- 2016c, *Marine fish - aquaculture prospects*, <http://www.dpi.nsw.gov.au/fishing/aquaculture/publications/species-saltwater/marine-fish> (accessed 3 June 2016).
- 2016d, *Saltwater bag and size limits*, <http://www.dpi.nsw.gov.au/fishing/recreational/fishing-rules-and-regs/saltwater-bag-and-size-limits> (accessed 10 May 2016).
- DPI Vic (Department of Primary Industries (Victoria)) 2009, *Victorian Rock Lobster Fishery Management Plan 2009*, Fisheries Victoria Management Report Series No. 70., <http://agriculture.vic.gov.au/fisheries/policy-and-planning/fisheries-management-plans/victorian-rock-lobster-management-plan/victorian-rock-lobster-fishery-management-plan-Jul-2009> (accessed 29 June 2016).
- DPIE (Department of Primary Industries and Energy) 1989, *New Directions for Commonwealth Fisheries Management in the 1990s*, December, Fyshwick.
- DPIF NT (Department of Primary Industry and Fisheries (Northern Territory)) 2015a, *Northern Territory Fishery Resource Sharing Framework*.
- 2015b, *Status of Key Northern Territory Fish Stocks Report 2013*, August, 114, Darwin.
- 2016, *Indigenous fishing*, <https://dpif.nt.gov.au/strategies-and-projects/indigenous-fishing> (accessed 1 July 2016).
- n.d., *Fishing arrangements*, <http://www.fishing.nt.gov.au/high-court-decision.html> (accessed 27 June 2016).
- DPIPWE Tas (Department for Primary Industries, Parks, Water and Environment (Tasmania)) 2014a, *Annual Report 2014-13*.
- 2014b, *Primary Produce Safety Act 2011. Accreditation Fees and Charges*, March.
- 2014c, *Scallop Fishery*, <http://dPIPWE.tas.gov.au/sea-fishing-aquaculture/commercial-fishing/scallop-fishery> (accessed 25 February 2016).
- 2015a, *Aboriginal Fishing*, <http://dPIPWE.tas.gov.au/sea-fishing-aquaculture/recreational-fishing/aboriginal-fishing> (accessed 1 July 2016).
- 2015b, *Southern bluefin tuna*, <http://dPIPWE.tas.gov.au/sea-fishing-aquaculture/community-resources/fish-facts/southern-bluefin-tuna> (accessed 10 May 2016).
- 2016, *Rock lobster total allowable catch*, <http://dPIPWE.tas.gov.au/sea-fishing-aquaculture/commercial-fishing/rock-lobster-fishery/rock-lobster-total-allowable-catch> (accessed 8 July 2016).
- DTIRIS NSW (Department of Trade and Investment, Regional Infrastructure and Services (NSW)) 2016, *Annual Report 2014-15*, Sydney NSW.
- Dupe, C. 2016, 'Prawn farm workers to be housed at camp near town centre', *The Kimberley Echo*, <https://au.news.yahoo.com/thewest/wa/a/31596834/prawn-farm-workers-to-be-housed-at-garrjang-workers-village/> (accessed 22 June 2016).

-
- Durette, M. 2007, *Indigenous Property Rights in Commercial Fisheries: Canada, New Zealand and Australia Compared*, CAEPR Working Paper, 37, Centre for Aboriginal Economic Policy Research, Canberra.
- Ecologically Sustainable Development Steering Committee 1992, *National strategy for ecologically sustainable development*, <http://www.environment.gov.au/about-us/esd/publications/national-esd-strategy> (accessed 11 August 2016).
- Econsearch 2015a, *Economic Indicators for the Commercial Fisheries of South Australia - Summary Report 2013-14*.
- 2015b, *Economic Indicators for the South Australian Sardine Fishery 2013/14*, 22 April.
- 2015c, *Economic Indicators for the South Australian Southern Zone Rock Lobster Fishery 2013/14*.
- EDO Tas (Environmental Defenders Office Tasmania) 2015, *Submission to Senate Standing Committee on Environment and Communications inquiry into the Regulation of Fin-Fish Aquaculture in Tasmania*, 1 June, Hobart.
- Emery, T., Gardner, C., Cartwright, I. and Hart, A. 2015, *Roadblocks to the Adoption of Economics in Fisheries Policy*, September, 2013/748.20 ASCRC, Fisheries Research and Development Corporation.
- European Commission 2014, *Communication from the Commission to the European Parliament and the Council - Concerning a Consultation on Fishing Opportunities for 2015 Under the Common Fisheries Policy*, COM(2014)338, Brussels.
- EY 2015, *Economic study of recreational fishing in Victoria*, <http://agriculture.vic.gov.au/fisheries/policy-and-planning/publications-and-resources/fisheries-reports/your-licence-fees-at-work-reports/2009-2010/economic-study-of-recreational-fishing-in-victoria-headline-results-vrfish> (accessed 12 August 2016).
- FAO (Food and Agricultural Organization of the United Nations) 1995, *Code of Conduct for Responsible Fisheries*, Rome.
- 1996, *World food summit plan of action*, <http://www.fao.org/docrep/003/w3613e/w3613e00.htm> (accessed 5 June 2016).
- 2014, *State of World Fisheries and Aquaculture 2014*, Rome.
- Feary, S. 2015, *Sea Countries of New South Wales: A Benefits and Threats Analysis of Aboriginal People's Connections with the Marine Estate*.
- Ferrier Hodgson 2016, *Western Kingfish Limited*, <http://www.ferrierhodgson.com/au/publications-no-longer-used-page/specialisation-case-studies/rural-and-agribusiness/western-kingfish-limited> (accessed 20 May 2016).
- Finn, M., Flood, M., Stobutzki, I., Maloney, L., Ward, P., Andrews, J., Begg, G., Fletcher, W., Gardner, C., Roelofs, A., Saisbury, K., Saunders, T., Stewart, J. and Smith, T. 2015, *Status of Key Australian Fish Stocks (SAFS) Reports 2014 and Beyond*, FRDC.
- Fisheries and Oceans Canada 2010, *Survey of Recreational Fishing in Canada*, Canada.

-
- 2012, *Aboriginal Fisheries Strategy*, <http://www.dfo-mpo.gc.ca/fm-gp/aboriginal-autochtones/afs-srapa-eng.htm> (accessed 5 July 2016).
- FishServe 2016, *About us - FishServe*, <https://www.fishserve.co.nz/About> (accessed 18 June 2016).
- Ford, J. and Gilmour, P. 2013, *The State of Recreational Fishing in Victoria*, April, Victorian National Parks Association, Melbourne.
- FRDC (Fisheries Research and Development Corporation) 2012, *FRDC: Fisheries Resource Access and Allocation Project*, July.
- 2014a, *Current Research Projects: Development of Guidelines for Quality Assurance of Australian Fisheries Research and Science Information*, Project No. 2014-009.
- 2014b, *How does the size of the Australian seafood industry compare to others around the world?*, http://www.frdc.com.au/knowledge/q_and_as/Pages/size-of-Australian-seafood-industry-compare.aspx (accessed 29 July 2016).
- 2014c, *Status of Key Australian Fish Stocks Reports 2014*, Canberra.
- 2015a, *Current Research Projects: Informing inter-jurisdictional snapper management in eastern Australia*, Project No. 2015-216.
- 2015b, *Knowledge for Fishing and Aquaculture into the Future - FRDC's Research, Development and Extension Plan 2015-20*, Canberra.
- and Ridge Partners (Fisheries Research and Development Corporation and Ridge Partners) 2015, *2014 Australian F&A Sector Overview*.
- FSANZ (Food Standards Australia New Zealand) 2016, *Country of origin labelling*, <http://www.foodstandards.gov.au/consumer/labelling/coo/Pages/default.aspx> (accessed 12 April 2016).
- Gage, N. 2016, *Coorong seals: Underwater cracker trials to scare fur seals from fishing catches 'not working'*, <http://www.abc.net.au/news/2016-06-07/trials-protect-coorong-fishing-area-from-fur-seals-not-working/7483458> (accessed 7 January 2016).
- George, D. and New, R. 2013, *Australian Fisheries Surveys Report 2012: Financial and Economic Performance of the Eastern Tuna and Billfish Fishery, the Commonwealth Trawl Sector and the Gillnet, Hook and Trap Sector*, ABARES.
- , Vieira, S. and New, R. 2012, *Australian Fisheries Surveys Report 2011, Results for Selected Fisheries 2008–09 to 2010–2011*, ABARES.
- Georgeson, L., Moore, A., Ward, P., Stenekes, N., Kancans, R., Mazur, K., Curtotti, R., Tracey, S., Lyle, J., Hansen, S., Chambers, M., Finn, M. and Stobutzki, I. 2015, *A Framework for Regular National Recreational Fishing Surveys*, November, ABARES Commonwealth of Australia, Canberra.
- GHD 2014, *NSW Fishing Cooperative Viability Study - Final report*, May.
- Giri, K. and Hall, K. 2015, *South Australian Recreational Fishing Survey 2013/14*, Internal Report Series No. 62, Fisheries Victoria, Victoria.

-
- Green, B., Gardner, C., Linnane, A., Hobday, D., Chandrapavan, A., Punt, A., McGarvey, R., Hartmann, K., Treloggen, R., Reville, H., Hoare, M. and Hawthorne, P. 2012a, *Spatial Management of Southern Rock Lobster Fisheries to Improve Yield, Value and Sustainability*, Project No. 2006/220, Australian Seafood Cooperative Research Centre.
- Green, C., Brown, P., Giri, P., Bell, J. and Conron, S 2012b, *Quantifying the recreational catch of southern bluefin tuna off the Victorian coast*, <http://agriculture.vic.gov.au/fisheries/recreational-fishing/recreational-fishing-grants-program/your-licence-fees-at-work-2012-13/quantifying-the-recreational-catch-of-southern-bluefin-tuna> (accessed 10 May 2016).
- Griffiths, S., Sahlqvist, P., Lyle, J., Venables, W., Pollock, K., Sawynok, W. and Moeseneder, C. 2014, *A Coordinated National Data Collection for Recreational Fishing in Australia*, FRDC final report, CSIRO.
- Gullet, W. 2008, *Fisheries Law in Australia*, First, LexisNexis Butterworths, Chatswood.
- 2009, ‘Regulating fishing in Australia: from mullet size limits to international hot pursuits’, *Dialogue*, vol. 28(1), pp. 26–35.
- Hanich, Q., Gullet, W., Leadbitter, D., McIlgorm, A. and Sant, G. 2014, ‘Best practice, wicked problems and Australian fisheries: strengthening leadership, transparency and implementation’, in Lindenmeyer, D., Dovers, S. and Morton, S. (eds), *Ten Commandments Revisited: Securing Australia’s Future Environment*, CSIRO Publishing.
- Harte, M. 2008, ‘Assessing the road towards self-governance in New Zealand’s fisheries’, *Case Studies in Fisheries Self-governance*, FAO Fisheries Technical Paper, Food and Agriculture Organization of the United Nations, pp. 323–334.
- Hartmann, K., Gardner, C. and Hobday, D. 2013, *Fishery Assessment Report: Tasmanian Rock Lobster Fishery 2011/12*, May, Institute for Marine and Antarctic Studies, University of Tasmania, Hobart, Tasmania.
- Hawke, A. 2009, *Report of the Independent Review of the Environmental Protection and Biodiversity Conservation Act 1999*, Final Report.
- Henry, G. and Lyle, J. 2003, *The National Recreational and Indigenous Fishing Survey*, Tasmanian Aquaculture and Fisheries Institute, University of Tasmania.
- Hobday, A., Ogier, E., Flemming, A., Hartog, J., Thomas, L., Stobutzki, I. and Finn, M. 2016, *Fisheries Status Report: Healthcheck for Australian Fisheries*, FRDC.
- HRSCARFF (House of Representatives Standing Committee on Agriculture, Resources, Fisheries and Forestry) 2012, *Netting the Benefits: Inquiry into the Role of Science for the Future of Fisheries and Aquaculture*, November.
- Hundloe, T. 2002, *Valuing Fisheries. An Economic Framework*, University of Queensland Press.
- 2004, *Is My Fish Worth More than Yours?*, Fisheries Research and Development Corporation, Canberra.

-
- Hutton, T., Thebaud, O., Fulton, B., Pascoe, S., Innes, J., Kulmala, S. and Tudman, M. 2010, *Use of Economic Incentives to Management Fisheries Bycatch: An Application to Key Sectors in Australia's Southern and Eastern Scalefish and Shark Fisheries*, CSIRO.
- IBIS World 2015, *Seafood processing in Australia: Market research report*, <http://www.ibisworld.com.au/industry/default.aspx?indid=111> (accessed 13 April 2016).
- IMAS (Institute for Marine and Antarctic Studies) 2015, *Submission to the Senate Inquiry on the Environmental, Social and Economic Impacts of Large-Capacity Fishing Vessels Commonly known as 'Supertawlers' Operating in Australia's Marine Jurisdiction*, University of Tasmania, Hobart.
- Industry & Investment (New South Wales) 2010a, *Blue-eye trevalla*, http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0003/375861/Blue-eye-Trevalla.pdf (accessed 19 May 2016).
- 2010b, *Silver trevally*, http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0003/375942/Silver-Trevally.pdf (accessed 19 May 2016).
- 2010c, *Status of Fisheries Resources in NSW 2008/09*, Cronulla.
- Inns, J. 2013, *Māori in the Seafood Sector (Fisheries and Aquaculture) – the Year in Review*, Maori Law Review.
- International Dolphin Conservation Program 2014, *The Agreement on the International Dolphin Conservation Program (AIDCP) and the AIDCP Dolphin Safe Label*.
- Jackson, G., Sumner, N., Cribb, A. and Norriss, J. 2005, *Comparing Conventional 'Social Based' and Alternative Output-based Management Models for Recreational Finfish Fisheries Using Shark Bay Pink Snapper as a Case Study*, Final Report, Project No. 2003/066, Fisheries Research and Development Corporation.
- Jacquet, J. and Pauly, D. 2008, 'Trade secrets: Renaming and mislabeling of seafood', *Marine Policy*, vol. 32, pp. 309–318.
- Joint Select Committee on Northern Australia 2016, *Scaling Up - Inquiry into Opportunities for Expanding Aquaculture in Northern Australia*, February, Canberra.
- Joll, L. 2006, *The Inter-sectoral Resource Sharing Process for Tuna and Tuna Like Species in Western Australia - The WA Perspective*, March.
- Jose, L. 2016, *Mid West aquaculture trial harvest: Thousands of yellowtail kingfish ready to hit the Australian Market*, <http://www.abc.net.au/news/2016-05-16/wa-yellowtail-kingfish-aquaculture-harvest/7416232> (accessed 13 July 2016).
- Keep Australia Fishing and, *Keep Australia Fishing*, <http://www.keeptaustraliafishing.com.au/> (accessed 28 May 2016).
- Kirchner, M. 2010, *The Aboriginal Right to Sell Fish - Ahousaht Nation et al. v. Canada*, Ratcliff & Company.

-
- Kleisner, K., Brennan, C., Garland, A., Lingard, S., Pauly, D. and Zeller, D. 2015, *Australia: Reconstructing Estimates of Total Fisheries Removal 1950-2010*, Working Paper Series, 2015-02, Fisheries Centre, The University of British Columbia.
- Kompas, T. 2011, *The Importance of 'Maximum Economic Yield' in Fisheries Management*, Crawford School of Economics and Government.
- Lee, C. and Nel, S. 2001, *A National Aquaculture Development Strategy for Indigenous Communities in Australia*, Department of Agriculture, Fisheries and Forestry, Canberra.
- Lenanton, R., St John, J., Wise, B., Keay, I. and Gaughan, D. 2009, *Maximising Survival of Released Undersize West Coast Reef Fish*, Fisheries Research Report No. 191, Fisheries Research and Development Corporation, Western Australia.
- Linnane, A., Chick, R., Walker, T., Trinnie, F. and Reilly, D. 2013, *Victorian Rock Lobster Fishery Stock Assessment Report 2013*, February.
- , McGarvey, R. and Feenstra, J. 2015, *Northern Zone Rock Lobster (*Jasus edwardsii*) Fishery Status Report 2014/15*, November, SARDI Publication No. F2007/000714-9, Primary Industries and Regions (SA), Henley Beach, South Australia.
- , ———, ——— and Hawthorne, P. 2015a, *Southern Zone Rock Lobster (*Jasus edwardsii*) Fishery Status Report 2014/15*, November, SARDI Publication No. F2007/000715-9, Primary Industries and Regions (SA), Henley Beach, South Australia.
- , ———, McLeay, L., Feenstra, J. and Reilly, D. 2015b, *Victorian Rock Lobster and Giant Crab Fisheries Status Report - 2013/2014 Fishing Year*, September, SARDI Publication No. F2012/000434-4, SARDI Research Report Series No. 863, West Beach, South Australia.
- Little, L., Punt, A., Dichmont, C., Fulton, E., Dowling, N., Smith, D., Sporcic, M. and Gorton, R. 2015, 'Decision trade-offs for cost-constrained fisheries management', *ICES Journal of Marine Science*, vol. 73, pp. 494–502.
- Lyle, J.M., Stark, K.E. and Tracey, S.R. 2014, *2012-13 Survey of Recreational Fishing in Tasmania*, The Institute for Marine and Antarctic Studies, University of Tasmania.
- Macdonald, I. (Minister for Fisheries, Forestry and Conservation) 2005, 'Ministerial Direction', Canberra, *Commonwealth of Australia Gazette (No. S234)*, 20 December.
- Macdonald, N. 2015, *Development of an Industry Representative Framework for Co-management in NSW*, March, FRDC Project No. 2013/226, Fisheries Research and Development Corporation, Deakin.
- Maxima Opportunity Group 2015, *Media Release: Traditional Owners encouraged by WA State Government commitment to aquaculture*, 4 August, <http://www.aarlimayi.com.au/pdfs/media-release-2015-08-04.pdf> (accessed 13 July 2016).
- Mazur, K. and Curtotti, R. 2016, *A Theoretical Framework for Resource Sharing Between Commercial and Recreational Fishers*, ABARES.

-
- McLennan, M.F., Campbell, M.J. and Sumpton, W.D. 2014, 'Surviving the effects of barotrauma: assessing treatment options and a "natural" remedy to enhance the release survival of line caught pink snapper', *Fisheries Management and Ecology*, vol. 21, no. 4, pp. 330–337.
- McPhee, D. 2008, *Fisheries Management in Australia*, Federation Press, Leichardt.
- 2009, *Development of Co-management Arrangements for Queensland Fisheries: Stage 1 – Picking the Winners*, FRDC Project No. 2005/026, Fisheries Research and Development Corporation.
- Ministerial Council on Forestry Fisheries and Aquaculture 1999, *National Policy on Fisheries Bycatch*, August, Department of Agriculture, Fisheries and Forestry.
- Ministry of Fisheries (New Zealand) 2011a, *Annual Report - 2010/11*, September, Wellington, New Zealand.
- 2011b, *Research and Science Information Standard for New Zealand Fisheries*, April, Wellington, New Zealand.
- 2015, *Commercial Fishing*, <http://www.fish.govt.nz/en-nz/Commercial/default.htm> (accessed 29 July 2016).
- MPI NZ (Ministry for Primary Industries (New Zealand)) 2012, *Operational Plan to Manage the Incidental Capture of New Zealand Sea Lions in the Southern Squid Trawl Fishery (SQU6T)*, MPI Technical Paper, 2013/23, Wellington, New Zealand.
- 2015, *Annual report 2014/15*, Wellington, New Zealand.
- MRAG Asia Pacific 2014, *Taking Stock: Modernising Fisheries Management in Queensland*, December.
- Museum Victoria 2010, *Aboriginal people and trade*, <https://museumvictoria.com.au/discoverycentre/discovery-centre-news/2010-archive/aboriginal-trade/> (accessed 6 May 2016).
- Nana, G. 2014, *Fishing Businesses, Communities and Jobs - Where are Māori?*, Māori Fisheries Conference 2014.
- National Native Title Tribunal 2004, *Fishing principles to guide Indigenous involvement in marine management*, The Principles Communiqué on Indigenous Fishing, http://www.nntt.gov.au/News-and-Publications/latest-news/Pages/Fishing_principles_to_guide_Indigenous_i.aspx (accessed 14 June 2016).
- nd, *About Indigenous Land Use Agreements (ILUAs)*, <http://www.nntt.gov.au/ILUAs/Pages/default.aspx> (accessed 1 July 2016).
- Nemes, V., Plott, C. and Stoneham, G. 2008, *Electronic BushBroker exchange: Designing a combinatorial double auction for native vegetation offsets*, <https://excen.gsu.edu/plott.pdf> (accessed 27 July 2016).
- Neville, P. 2008, *Co-management: Managing Australia's Fisheries Through Partnership and Delegation: Report for the Fisheries Research and Development Corporation's*

-
- National Working Group on the Fisheries Co-management Initiative*, Project no. 2006/068, Fisheries Research and Development Corporation, Deakin.
- New South Wales Food Authority 2016, *Seafood labelling on the menu in NSW. Ministerial (media release)*, <https://foodauthority.nsw.gov.au/news/newsandmedia/ministerial/2016-05-30-seafood-labelling-on-the-menu-in-nsw> (accessed 27 June 2016).
- New South Wales Government 2012, *Government Response to the Recommendation of the Independent Review of NSW Commercial Fisheries Policy, Management and Administration 2012*.
- 2014, *eTendering - Archived Tender Detail View - DTIRIS13/32*, <https://tenders.nsw.gov.au/?event=public.rft.showArchived&RFTUUIID=7BDC5EDC-F7C2-EF2A-5A6FDB1DA5BD04BB> (accessed 28 May 2016).
- 2015, *NSW food regulation - Licence fees*, <http://www.legislation.nsw.gov.au/#/view/regulation/2015/622> (accessed 28 July 2016).
- New South Wales Rock Lobster Fishery TAC Committee 2015, *Total Allowable Catch Committee Report and Determination for 2015/16: Rock Lobster Fishery*, 20 July.
- New Zealand Inland Revenue 2011, *Māori Authorities: A guide to the Māori Authority Tax Rules*, May, IR 487, <https://www.ird.govt.nz/resources/0/d/0db021804ba3deaab061bd9ef8e4b077/ir487.pdf> (accessed 14 July 2016).
- Newig, J. and Fitsch, O. 2009, 'Environmental governance: participatory, multi-level – and effective?', *Environmental Policy and Governance*, vol. 19, no. 3, pp. 197–214.
- Nielsen, J. and Olesen, C. 2008, 'Self-regulation of the Danish matjes herring fishery from success to collapse', *Case Studies in Fisheries Self-governance*, FAO Fisheries Technical Paper, Food and Agriculture Organization of the United Nations, Rome.
- Nisga'a Tribal Council 1998, *Understanding the Nisga'a Treaty*.
- NOAA (National Oceanic and Atmospheric Administration) 2014, *Recompression devices: Helping anglers fish smarter*, http://www.fisheries.noaa.gov/stories/2014/06/06_13_14recompression_devices_video.html (accessed 27 June 2016).
- 2015, *Status of Stocks 2015*.
- NOO (National Oceans Office) 2002, *Ocean Management – The Legal Framework*, The South-east Regional Marine Plan Assessment Reports, Hobart, <https://www.environment.gov.au/system/files/resources/3ca9aa21-03da-4220-9e1e-24470ed46cde/files/legal.pdf> (accessed 6 June 2016).
- Northern Territory Government 2011, *Indigenous Community Marine Ranger Program*.
- NSW DPI (Department of Primary Industries (New South Wales)) 2015, *Status of Fisheries Resources in NSW 2013-14*, Department of Primary Industries (NSW Government), Mosman.
- OECD (Organisation of Economic Co-operation and Development) 2015, *OECD Review of Fisheries - Policies and Summary of Statistics*, Paris.

-
- Parks and Wildlife Service Tasmania 2015, *National parks and reserves declared under the Nature Conservation Act 2002*, <http://www.parks.tas.gov.au/indeX.aspx?base=5710> (accessed 1 August 2016).
- Parks Victoria 2015, *Marine protected areas*, <http://parkweb.vic.gov.au/explore/find-a-park/marine-protected-areas> (accessed 1 August 2016).
- PC (Productivity Commission) 2001, *Cost Recovery by Government Agencies*, Inquiry Report, Report No. 15, Canberra.
- 2004, *Assessing Environmental Regulatory Arrangements for Aquaculture*, Research Paper, Canberra.
- 2007, *Annual Review of Regulatory Burdens on Business: Primary Sector*, Research Report, 5 November, Canberra.
- 2011, *Rural Research and Development Corporations*, Inquiry Report, Report No. 52, Canberra.
- 2016, *Regulation of Australian Agriculture*, Draft Report, Canberra.
- Perks, C. and Vieira, S. 2010, *Australian Fisheries Surveys Report 2010: Results for Selected Fisheries, 2007–08 and 2008–09, Preliminary Estimates for 2009–10*, ABARES.
- PIRSA (Department for Primary Industries and Regions (South Australia)) 2011, *Allocation Policy: Allocation of Access to Fisheries Resources between Fishing Sectors*, July, Adelaide.
- 2013a, *Management Plan for the South Australian Commercial Southern Zone Rock Lobster Fishery*, October, Paper Number 63, South Australian Fisheries Management Series, Adelaide.
- 2013b, *Policy for the Co-management of Fisheries in South Australia*, October, Adelaide.
- 2014, *Management Plan for the South Australian Commercial Northern Zone Rock Lobster Fishery*, November, Paper Number 71, South Australian Fisheries Management Series, Adelaide.
- 2015a, *Fish processors*, http://www.pir.sa.gov.au/fishing/commercial_fishing/fisheries/fish_processors (accessed 8 December 2015).
- 2015b, *Guidelines for Implementing the South Australian Fisheries Harvest Strategy Policy*, December, Government of South Australia, Adelaide.
- 2015c, *South Australian Fisheries Harvest Strategy Policy*, December, Government of South Australia, Adelaide.
- 2015d, *Southern Bluefin Tuna*, Collection, http://www.pir.sa.gov.au/fishing/fishing_limits/southern_bluefin_tuna (accessed 10 May 2016).
- 2015e, *Status of South Australian Fisheries Report: Fisheries Snapshot for 2012-13*, Adelaide.

-
- 2016, *Rock Lobster research leads to positive management change*, http://www.pir.sa.gov.au/alerts_news_events/news/fisheries_and_aquaculture/rock_lobster_research_leads_to_positive_management_change (accessed 27 June 2016).
- Pomeroy, R., Katon, B. and Harkes, I. 2001, 'Conditions affecting the success of fisheries co-management: lessons from Asia', *Marine Policy*, no. 25, pp. 197–208.
- PrimeSafe Victoria 2015, *Seafood licensing*, <https://www.primesafe.vic.gov.au/licensing/seafood/processor/> (accessed 28 July 2016).
- Punt, A.E., Dichmont, C.M., Hurst, R., Mace, P.M. and Smith, D.C. 2016, 'Fishing systems in Australia and New Zealand: Success and challenges', *Fisheries Research*, vol. (forthcoming).
- Putt, J. and Anderson, K. 2007, *A National Study of Crime in the Australian Fishing Industry*, Report No. 76, Research and Public Policy Series, Australian Institute of Criminology, Canberra.
- and Nelson, D. 2008, *Crime in the Australian fishing Industry*, December, Report No. 366, Australian Institute of Criminology.
- QCA (Queensland Competition Authority) 2014, *Aquaculture regulation in Queensland*, Final Report, September, Brisbane.
- Queensland Government 2011, *Annual Status Report: Commercial Crayfish and Rocklobster Fishery*.
- Reefish Australia 2010, *Recreational Fishing in Commonwealth Water: a Preliminary Assessment*, Brisbane.
- Recreational Fishing Advisory Committee 2010, *Recreational Fishing In Australia 2010 and Beyond*, March.
- Ridge Partners 2015, *2014 FRDC F&A Sector Overview*, http://www.frdc.com.au/mwg-internal/de5fs23hu73ds/progress?id=HMDKaRevQ10R2BAJ_3JLsj74q1v7kBGkxTifF0ogACA, (accessed 8 February 2016).
- Roberts, A. and Schilling, K. 2010, *Aboriginal Women's Fishing in New South Wales - A Thematic History*, New South Wales Government, South Sydney.
- Safe Food Queensland 2015, *Frequently Asked Questions. Seafood*, http://www.safefood.qld.gov.au/index.php?option=com_content&view=article&catid=88&id=198&Itemid=34 (accessed 9 May 2016).
- Safe Work Australia 2015, *Work-related traumatic injury fatalities report, 2014*, <http://www.safeworkaustralia.gov.au/sites/swa/about/publications/pages/work-related-traumatic-injury-fatalities-australia-2014> (accessed 7 June 2016).
- Savage, J. and Hobsbawn, P. 2015, *Australian Fisheries and Aquaculture Statistics 2014*, December, ABARES, Canberra.
- Schnierer, S. and Egan, H. 2015, *Indigenous Cultural Fishing and Fisheries Governance*, FRDC Project, 12 February, 2012/216, Fisheries Research and Development Corporation, Deakin.

-
- Sen, S. 2011, *Options for Improving Management of the Commercial Scallop Resource in South-East Australia*, December.
- SETFIA (South East Trawl Fishing Industry Association) 2013, *Snapper public submissions 2013*, <http://agriculture.vic.gov.au/fisheries/policy-and-planning/fisheries-consultation/completed-consultation/snapper-public-submissions-2013> (accessed 11 May 2016).
- Shelf Resource Assessment Group 2012, *2011 Stock Assessment Summaries for the Southern and Eastern Scalefish and Shark Fishery*, February.
- 2014, *Shelf Resource Assessment Group - October 2014 Meeting Minutes*, 28 October, CSIRO, Hobart.
- Sim-Smith, C. and Forsythe, A. 2013, *Comparison of the International Regulations and Best Management Practices for Marine Finfish Farming*, October, MPI Technical Paper No: 2013/47, New Zealand Ministry of Primary Industries.
- Skirtun, M. and Green, R. 2015, *Australian Fisheries Economic Indicators Report 2014: Financial and Economic Performance of the Southern and Eastern Scalefish and Shark Fishery*, ABARES.
- , Stephan, M. and Mazur, K. 2014, *Australian Fisheries Economic Indicators Report 2013: Financial and Economic Performance of the Northern Prawn Fishery*, ABARES.
- Sloan, S.R., Smith, T., Gardner, C., Crosthwaite, K., Triantafillos, L., Jeffriess, B. and Kimber, N. 2014, *National Guidelines to Develop Fishery Harvest Strategies*, FRDC Report - Project 2010/061, March, Primary Industries and Regions, South Australia, Adelaide, South Australia.
- Smallwood, C.B., Pollock, K.H., Wise, B.S., Hall, N.G. and Gaughan, D.J. 2011, *Quantifying Recreational Catch and Effort: A Pilot Study of Shore-based Fishers in the Perth Metropolitan Area*, Fisheries Research Report No. 216, Government of Western Australia, Department of Fisheries, Western Australia.
- Smith, K. 2006, 'WA research angler program - getting volunteers involved in fisheries research', in Phelan M and Bajhau, H. (eds), *Australian Society for Fish Biology Workshop Proceedings: 11-15 July, 2005*, vol Fisheries Incidental Publication No. 25, Northern Territory Department of Primary Industry and Fisheries, Darwin, Northern Territory, pp. 66–74.
- Spencer, S. and Kneebone, M. 2007, *FoodMap - A comparative Analysis of Australian Food Distribution Channels*, Department of Agriculture, Fisheries and Forestry.
- SRRATRC (Senate Rural and Regional Affairs and Transport References Committee) 2014, *Current Requirements for Labelling of Seafood and Seafood Products*, December, Parliament of Australia.
- Stevens, R., Cartwright, I. and Neville, P. 2012, *Independent Review of NSW Commercial Fisheries Policy, Management and Administration*, March.

-
- Strathearn, P. 2016, 'Coorong, lakes fishery under threat', *The Murray Valley Standard*, 7 May.
- Synergies Economic Consulting 2015, *Working for Our Country: A Review of the Economic and Social Benefits of Indigenous Land and Sea Management*.
- Tracey, S., Lyle, J., Ewing, G., Hartmann, K. and Mapleston, A. 2013, *Offshore Recreational Fishing in Tasmania 2011/12*, Institute of Marine and Antarctic Studies, University of Tasmania, Hobart.
- Triantafillos, L., Brookes, K., Schirmer, J., Pascoe, S., Cannard, T., Dichmont, C., Thebaud, O. and Jebreen, E. 2014, *Developing and Testing Social Objectives for Fisheries Management*, FRDC Project No. 2010/040, Fisheries Research and Development Corporation, Deakin.
- Tsolos, A. and Boyle, M. 2015, *Non-confidential 2014/15 Data Summary of the South Australian Charter Boat Fishery*, November, SARDI Aquatic Sciences, Henley Beach, South Australia.
- Victoria State Government 2015, *Recreational Fishing Licence Trust Account 2014/15 - A Report to each House of Parliament on the Disbursement of Recreational Fishing Licence Revenue*.
- Vieira, S. and Perks, C. 2009, *Australian Fisheries Surveys Report 2009: Survey Results for Selected Fisheries, 2006-07 and 2007-08, Preliminary Estimates for 2008-09*, Australian Bureau of Agricultural and Resource Economics.
- Ward, P., Mazur, K., Stenekes, N., Kancans, R., Curtotti, R., Summerson, R., Gibbs, C., Marton, N., Moore, A. and Roach, J. 2012, *A Socioeconomic Evaluation of Three Eastern Australian Game-fishing Regions*, ABARES report to client prepared for the Fisheries Research and Development Corporation, August, Canberra.
- West, L.D., Lyle, J.M., Matthews, S.R., Stark, K.E. and Steffe, A.S. 2012, *Survey of Recreational Fishing in the Northern Territory, 2009-10*, Northern Territory Government.
- , Stark, K.E., Murphy, J.J., Lyle, J.M. and Ochwada-Doyle, F.A. 2015, *Survey of Recreational Fishing in New South Wales and the ACT 2013/14*, Fisheries Final Report Series No. 149, Department of Primary Industries (NSW Government), NSW.
- White, M. 2009, *Australian Offshore Laws*, Federation Press, Leichardt.
- Woodhouse, F. 2002, *National Competition Policy Review of Commonwealth Fisheries Legislation*, September.
- Wright, G. and O'Neill, T. 2013, *Culture, Food, Flavour, Fun: Documenting Customary Practices to Optimise Rights of Access, Allocation, and Opportunity in Western Australia's Integrated Fisheries Management (IFM) Programme, 2006/067*, FRDC, Canberra.
- Zacharin, W., Dixon, C. and Smallridge, M. 2008, 'Towards self-management for the Western King Prawn Fishery in Spencer Gulf, South Australia', *Case Studies in Fisheries Self-governance*, FAO Fisheries Technical Paper, Food and Agriculture Organization of the United Nations.