

Fisheries

- 3.1 Our understanding of fisheries management and the surrounding marine environment has evolved over time. Although our scientific knowledge of fisheries and the ocean has vastly improved over the last few decades there are still data gaps. There are also challenges in how the data is used to inform management and policy decisions, including in how we manage the environmental impacts of fishing. How scientific research priorities are determined and how to gather the skills necessary to complete this work is an additional challenge faced by the sector.
- 3.2 This chapter focuses on the relationship between science and key fisheries management challenges, including:
- gathering information on fish species;
 - measuring fish stocks;
 - measuring the sustainability of the marine environment;
 - managing uncertainty and the precautionary principle;
 - marine protected areas;
 - recreational fishing;
 - the effects of climate change and scientific responses; and
 - research and public education relating to fisheries science, including the demand for research, maximising capacity and developing priorities.
- 3.3 The legislative framework and governance arrangements behind these areas are dealt with in Chapter 6. International cooperation and aid in fisheries science and management is discussed separately in Chapter 5.

Science and fisheries management

Gathering information on fish species

- 3.4 Science in fisheries begins with acquiring basic taxonomic information about fish and their habitats. This includes accurate species identification; understanding variables affecting the distribution and abundance of fish and their larvae; knowledge of life histories; knowing prey and predator dynamics and understanding phylogenetics (evolutionary relationships among groups of organisms).¹
- 3.5 ‘Accurate species identification is fundamentally important to effective fisheries management and aquaculture,’ the Australian Museum submitted.²
- 3.6 A submission from the Western Australian Museum observed that what can appear to be one species of fish may actually be several species and ‘each of these species might require different management practices or habitat protection, which would be overlooked without accurate taxonomy.’³ Mr Neil Stump (Tasmanian Seafood Industry Council) said:
- There needs to be recognition that there should be ongoing investment in base level science. ... We have to know life history characteristics and population dynamics of different fish species.⁴
- 3.7 Dr Jeffrey Leis (Australian Museum) said that understanding the spatial distribution of larvae needs similar attention; otherwise there is no certainty species can properly replenish:
- The young may recruit into seagrass beds in estuaries and then move as juveniles out onto reefs, where the adults complete their lifecycle and spawn again. So each one of those habitats has to be in good condition, otherwise the species cannot complete their lifecycle and we will not have sustainable fisheries.⁵
- 3.8 Dr Leis added that without adequate knowledge, there is a risk of ‘lumping’ separate species together as one, which in turns risks ‘not

1 Australian Museum, Submission 5, pp.3-4; see also Australian Marine Sciences Association, Submission 14, p.2.

2 Australian Museum, Submission 5, p.2; see also AMSA, Submission 5, p.2.

3 Western Australian Museum, Submission 3, p.1.

4 Mr Neil Stump, *Committee Hansard*, 12 July 2012, p.55.

5 Dr Jeffrey Leis, *Committee Hansard*, 20 August 2012, p.13.

getting the fisheries management plans right' and of falling short on the responsibility to have 'carriage for biodiversity'.⁶

Measuring fish stocks

- 3.9 For the fishing industry, fisheries managers and government regulators reliable fish stock information is vital.
- 3.10 The importance of good quality information was captured well by Mr Neil Stump (Tasmanian Seafood Industry Council), who said:
- We always require more knowledge and better tools that allow us to make more accurate, informed, decisions in relation to the stock assessment process.⁷
- 3.11 The CSIRO submitted that Australia 'has a strong and proven capability in modelling and assessment of fisheries that is being replicated around the world.'⁸ However, the CSIRO also stated that scientific knowledge and investment 'varies considerably across species and fisheries'⁹ depending on economic value or conservation status.¹⁰
- 3.12 The Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) currently produces an annual fishery status report for fisheries in Commonwealth waters. This report provides a measure of sustainability and, in a general sense, performance against the objectives of the *FM Act*.¹¹ However, this report does not include data on State and Territory fisheries. ABARES informed the Committee that there will be a consolidated stock report for all Australian fisheries released for the first time in 2012.¹²
- 3.13 The States and Territories produce separate stock or status reports for fisheries within their own waters. The type and frequency of these reports vary, and the large data gathering task means that the quality of information is sometimes poor. For example, NSW reports performance information every two years for individual fish species targeted by recreational and commercial fishers in NSW-managed waters. The latest report, for 2008-09, found that of 108 species assessed, around one third of

6 Dr Jeffrey Leis, *Committee Hansard*, 20 August 2012, p.13.

7 Mr Neil Stump, *Committee Hansard*, 12 July 2012, p.55.

8 CSIRO, Submission 23, p.6.

9 CSIRO, Submission 23, p.6.

10 CSIRO, Submission 23, p.6.

11 ABARES, 'Fishery Status Reports 2010: Status of Fish Stocks Managed by the Australian Government', October 2011, p.1 and p.28.

12 Dr Ilona Stobutzki, *Committee Hansard*, 12 September 2012, p.9.

species are fully fished (or less) and 11 species were classified as being overfished.¹³ Half were 'undefined or uncertain', which was attributed to:

...the large number of species required to be assessed (greater than 100), the limited resources available to do assessments, difficulties with the proper identification and correct reporting of many closely related and little studied species, and the ongoing need for detailed biological studies for many species.¹⁴

- 3.14 Western Australia, by contrast, annually reports performance for individual fisheries as well as assessments of ecological assets within bioregions, to demonstrate performance against an EBFM framework. Greater than 90 per cent of its commercial fisheries met performance targets in the 2010-11 period.¹⁵ The information in the report also satisfies reporting requirements for *EPBC Act* assessments in accordance with SEWPaC's 'Guidelines for the Ecologically Sustainable Management of Fisheries'.¹⁶
- 3.15 Dr James Findlay (AFMA) said Australia's fisheries management system is 'the envy of much of the world'¹⁷, in part, due to fish stock data being used in complex modelling. He outlined the general modelling process for the Committee:

We rely on fisheries-dependent information – that is, information we get from the fishers themselves – as well as fisheries-independent information, so surveys and other data. Increasingly these days there is a reliance on remotely sensed data. That information is put into reasonably complex risk models to give us scenario-based planning exercises that say how much fish will deliver how much return at how much risk to the future productivity of the stock. We follow that very closely.¹⁸

13 NSW Department of Industry and Innovation, 'Status of Fisheries Resources in NSW 2008-09', February 2011, pp.v-vi.

14 NSW Department of Industry and Innovation, 'Status of Fisheries Resources in NSW 2008-09', February 2011, pp.vi. The report cautioned that while a species' status may be uncertain, this should not be presumed to mean overfishing, 'as many of the species are landed in very small quantities', though nor to mean lightly fished, 'until sufficient information is available'.

15 'WA Department of Fisheries, 'State of the Fisheries and Aquatic Resources Report 2010/11', August 2011, p.6.

16 SEWPaC, 'Guidelines for the Ecologically Sustainable Management of Fisheries', (Edition 2), p.4.

17 Dr James Findlay, *Committee Hansard*, 30 May 2012, p.11.

18 Dr James Findlay, *Committee Hansard*, 30 May 2012, p.13.

- 3.16 Dr Patrick Hone (Fisheries Research and Development Corporation - FRDC) argued that the strength of the science is closely related to high standards of fisheries management:

The science platform that Australia has is very good. It supports a very sustainable industry. There is no doubt that the science and the sustainability are in step – it is a very close partnership. We live in a very different industry from a lot of industries. We work in a public resource. We are under scrutiny every day of our lives. The science plays a very important part of that scrutiny. You cannot have fisheries management without science.¹⁹

- 3.17 Despite Australia being generally recognised as a world leader in fisheries science, Professor Euan Harvey (UWA Oceans Institute) told the Committee that in some areas of fisheries science there are gaps and in other areas there is almost zero knowledge. He said:

We are still at a point of discovery even with things like fish. We are still trying to figure out the distribution of some of those species and there are huge gaps in fundamental biology such as age and growth and having an understanding of diet. That is just for the target species.²⁰

- 3.18 He said that for many non-target species of fish, 'we have virtually zero knowledge, except people know they occur'.²¹ Professor Harvey said knowledge of habitats was also limited:

We are also at the point where we do not understand what the habitat requirements are of those different species at different life stages. ... Even for many of the key target species, we still do not know where they are recruiting.²²

- 3.19 The CSIRO's submission noted that one predominant gap of knowledge is the recreational fishing catch, which 'remains highly uncertain for many species, though in some cases it is known to be significant.'²³ (Recreational Fishing is discussed in more detail later in this chapter).

- 3.20 The Institute of Marine and Antarctic Studies (IMAS) submitted that at the level of individual species, 'scientific knowledge tends to be limited to biological information used for setting regulations that protect

19 Dr Patrick Hone, *Committee Hansard*, 20 June 2012, p.9.

20 Prof Euan Harvey, *Committee Hansard*, 9 July 2012, p.22.

21 Prof Euan Harvey, *Committee Hansard*, 9 July 2012, p.22.

22 Prof Euan Harvey, *Committee Hansard*, 9 July 2012, p.22.

23 CSIRO, Submission 23, p.5; see also JCU, Submission 28, p.2.

reproduction.’²⁴ IMAS also commented that ‘many stocks of fish aren’t included in Australian fisheries statistics because they are not targeted.’²⁵

- 3.21 IMAS also argued that reliance on catch data, though widely used to infer the abundance of fish is a ‘mistake’, because environmental changes can have a ‘profound effect on abundance’.²⁶ Further, IMAS submitted that catch rates are more likely linked to market conditions rather than necessarily the status of fish stocks:

Stability of wild total catch is widely interpreted to mean that the opportunity for producing food from wild harvests has reached its peak. This ignores the economic drivers of catch and the fact that many Australian fisheries have reduced catch over the last few decades in response to declining prices.²⁷

- 3.22 However, Dr Mike Hall (Australian Institute of Marine Science – AIMS) commented that fisheries management is always based around models and estimates because, essentially, ‘you are trying to predict population size for an organism you cannot really see at all or count very easily.’²⁸
- 3.23 Professor Michael Harte (World Wildlife Fund – WWF) said that ideally, there would eventually be ‘a real-time indication of what has been caught’. This would support active fisheries management; however, ‘we do not have that kind of sophisticated data collection at the moment’, he said.²⁹

Measuring the sustainability of the marine environment

- 3.24 In addition to considering the quantity of fish available for sustainable harvest, fisheries managers consider the broader state of the environment when setting catch limits.
- 3.25 The Committee heard of the importance of collecting broader environmental data, but also of challenges faced in collecting this data and then using it to implement ecosystems based management approaches.

24 IMAS, Submission 27, p.5.

25 IMAS, Submission 27, p.13.

26 IMAS, Submission 27, p.4.

27 IMAS, Submission 27, p.3.

28 Dr Mike Hall, *Committee Hansard*, 31 July 2012, p.6.

29 Prof Michael Harte, *Committee Hansard*, 29 June 2012, p.28.

- 3.26 DAFF's submission stated that 'the systematic collection of data is fundamental to understating and managing Australia's fisheries and their interactions with the environment'³⁰.
- 3.27 However, DAFF's submission also states that 'routine monitoring of marine ecosystems, particularly the biological components, is not undertaken in Australia'³¹. DAFF explained that indirect 'ecosystems effects' of fishing are often difficult to assess because marine ecosystems are highly complex and there is relatively sparse data, combined with limited understanding of the structure and function of these ecosystems'.³²
- 3.28 According to the WWF, 'the questions addressed by fisheries science now relate to whole regional ecosystems rather than single species'.³³ Consequently:
- This involves understanding and responding to both the ecosystem conditions that may affect fish stocks and their productivity and the effects of fishing activities on marine ecosystems.³⁴
- 3.29 The CSIRO concurred, submitting that the movement to ecosystem approaches to fisheries management has:
- ...shifted the science focus towards, on the one hand, understanding the broader ecological impacts of fishing, and on the other to improving of the role that biodiversity and ecosystem function might play in supporting fisheries production.³⁵
- 3.30 Dr Anthony Smith (CSIRO) referred to 'the so-called shifting baselines' within the state of the environment. He explained:
- Over periods of decades and even centuries, we know that our ecosystems are changing. Species mixes are changing. ... It is a dynamic environment. Our assessment methods are trying to take that into account. ... For good fisheries management it is going to need to be more flexible to be able to take account of those shifts that are happening spatially.³⁶

30 DAFF, Submission 24, p.3.

31 DAFF, Submission 24, p.3.

32 DAFF, Submission 24, p.1.

33 WWF, Submission 11, p.1.

34 WWF, Submission 11, p.3.

35 CSIRO, Submission 23, p.5.

36 Dr Anthony Smith, *Committee Hansard*, 12 July 2012, pp.13-14.

- 3.31 Tracing these baselines inserts a new layer of difficulty into fisheries management. 'In terms of understanding the shifts, we are at an early stage of that,' Dr Smith said.
- 3.32 Some witnesses were of the view that even though more knowledge would ideally be useful, scientific effort will need to be prioritised because available resources are not limitless.
- 3.33 Neil Loneragan and Alan Lymbery, from the Murdoch University Centre for Fish, Fisheries and Aquatic Ecosystem Research, submitted:
- The commercial sector faces declining returns... This reduces the funds available from the commercial industry to contribute to research and this places a priority on the science being targeted and cost-effective.³⁷
- 3.34 Mr Richard Stevens (WA Fishing Industry Council – WAFIC) stated: 'The industry's capacity to fund research and science is declining.'³⁸ The WWF similarly agreed that industry's capacity to fund research is 'limited'.³⁹
- 3.35 Mr Brian Jeffriess (Commonwealth Fisheries Association – CFA) went further in stating that the requirements of the *EPBC Act* are 'taking money away from straight scientific research' related to improving productivity.⁴⁰
- 3.36 The costs involved in measuring fish stocks and ecosystem impacts have been known for some time. As early as 1998-99 AFMA stated in its Annual Report that:
- Neither the Government nor the fishing industry has the capacity to fund the amount of research required to gain a full understanding of fish stocks and the marine ecosystem, if indeed that is possible.⁴¹

Managing uncertainty and the precautionary principle

- 3.37 During the inquiry, there was debate surrounding the costs and benefits of the precautionary principle and its effects on the fishing industry. Questions surrounding whether the appropriate level of precaution is being factored into management decisions has also been the subject of extensive public scrutiny and media attention.

37 Centre for Fish, Fisheries and Aquatic Ecosystem Research, Submission 8, p.1.

38 Mr Richard Stevens, *Committee Hansard*, 9 July 2012, p.7.

39 WWF, Submission 11, p.3.

40 Mr Brian Jeffriess, *Committee Hansard*, 20 August 2012, p.18.

41 AFMA, 'Annual Report 1998-99', p.9.

3.38 In 2005, the United Nations Educational, Scientific and Cultural Organisation (UNESCO) commissioned a group of experts to draft a new form of precautionary principle.⁴² A new form of words for a 'working definition' was proposed, as follows:

When human activities may lead to morally unacceptable harm that is scientifically plausible but uncertain, actions shall be taken to avoid or diminish that harm.

Morally unacceptable harm refers to harm to humans or the environment that is:

- threatening to human life or health, or
- serious and effectively irreversible, or
- inequitable to present or future generations, or
- imposed without adequate consideration of the human rights of those affected.

The judgement of plausibility should be grounded in scientific analysis. Analysis should be ongoing so that chosen actions are subject to review. Uncertainty may apply to, but need not be limited to, causality or the bounds of the possible harm. Actions are interventions that are undertaken before harm occurs that seek to avoid or diminish the harm. Actions should be chosen that are proportional to the seriousness of the potential harm, with consideration of their positive and negative consequences, and with an assessment of the moral implications of both action and inaction. The choice of action should be the result of a participatory process.⁴³

3.39 Within Australia the precautionary principle was defined within the *Intergovernmental Agreement on the Environment*, which was agreed on 1 May 1992 by the Australian Local Government Association, the States, Territories and the Australian Government.⁴⁴

3.40 The same definition was included in the *FM Act* and *EPBC Act*, as:

'If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a

42 UNESCO Commission on the Ethics of Scientific Knowledge and Technology, *The Precautionary Principle* (UNESCO, Paris, 2005).

43 UNESCO Commission on the Ethics of Scientific Knowledge and Technology, *The Precautionary Principle* (UNESCO, Paris, 2005), p.14.

44 *National Environment Council Protection Act 1994*, schedule, clause 3.5.1.

reason for postponing measures to prevent environmental degradation.⁴⁵

- 3.41 Other related Australian policy documents have elaborated on the definition and application of the precautionary principle, including: the 1998 Oceans Policy, the 2007 Harvest Strategy Policy; and the 2007 Guidelines for the Ecologically Sustainable Management of Fisheries.
- 3.42 The 1998 Oceans Policy added the following caveats to the application of the precautionary principle. Firstly:
- If the potential impact of an action is uncertain, priority should be given to maintaining ecosystem health and productivity.
- 3.43 Secondly:
- If there is a risk of serious and irreversible environmental damage resulting from an ocean use, that use should be permitted only if the damage can be mitigated, or it is limited in its extent, and there is an overriding net community benefit from the use.
- 3.44 And lastly:
- Ocean users carry a responsibility to assure the ecological sustainability of their operations and an obligation to identify and implement precautionary measures.⁴⁶
- 3.45 When released, the 2007 Harvest Strategy Policy was prefaced with the following statement:
- By its nature, fisheries management is an activity involving substantial elements of risk and uncertainty. ...it is necessary to develop a consistent framework which will deliver an evidence-based, precautionary approach to achieving long-term sustainability and profitability drawing on available information.⁴⁷
- 3.46 The 2007 Guidelines for the Ecologically Sustainable Management of Fisheries appeared to express less latitude when uncertainty arises:
- Sources of uncertainty within the data should be identified and where possible quantified. Until research on the specific stock provides information, a precautionary approach should set

45 *Fisheries Management Act 1991, s.3A; Environment Protection and Biodiversity Conservation Act 1999, s.3A.*

46 Australian Government, 'Australia's Oceans Policy: Vol. 1', 1998, pp.38-39.

47 DAFF, 'Commonwealth Fisheries Harvest Strategy: Policy and Guidelines', September 2007, p.2.

conservative limits to account for the unknown level of uncertainty.⁴⁸

- 3.47 The precautionary principle is either replicated or referred to in all state and territory legislation (although there are differences within the exact text used). In two cases, the precautionary principle has been expressly modified from its original form: WA's *Fish Resources Management Act 1994* confines the principle to 'cost effective measures to ensure the sustainability of fish stocks or the aquatic environment'⁴⁹ and Queensland's *Fisheries Act 1994* expanded the principle to cover the risk of 'possible environmental degradation'.⁵⁰ Other areas of common ground were the objectives of achieving optimum resource benefits or utilisation, ensuring equity of access or allocations (with consideration of relevant interests) and protecting biodiversity and or ecosystems. Some jurisdictions⁵¹ included an objective regarding safeguarding the wellbeing of future generations. The Tasmanian *Living Marine Resources Act 1995* was to some extent an exception; although having regard for various objectives; the only mandatory aim is the furtherance of 'the objective of resource management.'⁵²
- 3.48 Despite the long history and documentation of the precautionary principle in Australia, some witnesses argued that the concept was subjective or that governments have been applying excessive restrictions and limits on fishing activity. There was concern that the level of evidence required to prove minimal impact is unattainable and too costly, even though Australia's fisheries are acknowledged as having the highest management standards.
- 3.49 Dr Warwick Fletcher (WA Department of Fisheries) said the precautionary principle could be a subjective concept:

You can set precautionary levels of consequence within your risk analysis and then actually undertake it under that rate. For many things you do not have to have absolute, full certainty to do all these things. ...I think that in many respects that precautionary approach or precautionary principle has been somewhat changed through time to mean whatever someone wants it to mean.⁵³

48 SEWPaC, 'Guidelines for the Ecologically Sustainable Management of Fisheries', (Edition 2), p.2.

49 *Fish Resources Management Act 1994* (WA), s.4A.

50 *Fisheries Act 1994* (Qld), s.3.

51 Queensland, Western Australia, New South Wales and Victoria.

52 *Living Marine Resources Act 1995* (Tas) s.7.

53 Dr Warwick Fletcher, *Committee Hansard*, 9 July 2012, p.55.

- 3.50 The Australian Marine Science Association's submission that good science was necessary to avoid 'overly conservative and risk-averse management decisions' or 'poorly informed management decisions'.⁵⁴ Its submission also predicted that future fisheries management would encompass an even higher level of risk management, due to 'cumulative anthropogenic disturbances in coastal ecosystems' and 'impacts related to climate change.'⁵⁵
- 3.51 Dr Walter Starck (private capacity) said that the precautionary principle 'has sort of morphed into the idea that if there is any hypothetical objection then you cannot do anything until you can prove that there is no problem.'⁵⁶ He said that management processes should be 'empirically based', and include direct industry involvement, 'not just consultation'.⁵⁷
- 3.52 Mr Richard Stevens (WAFIC) said:
- If it is over-precautionary then business just cannot invest. They cannot keep doing these endless surveys and studies, when your regulators say, 'Well, do it, and then we'll have a look,' and then, five years later, 'Do it again and we'll have another look.'⁵⁸
- 3.53 Mr Dean Logan (Australian Marine Alliance) agreed and went further by stating:
- Fisheries management is, in our view, somewhat sidelined. I think the process has been controlled – and I do not say this lightly – by environmental ideologues in departments here in Canberra who are so far removed from the notion of primary production that it is scary.⁵⁹
- 3.54 Dr Starck concluded that Australia is effectively saving fish 'for the Asians to catch and sell back to us.'⁶⁰ Professor Bob Kearney said overfishing in Australian waters is a perception:
- There are very, very few fisheries that are seriously overfished. ... We have not had one that has been fished to a level where it has not recovered. And the government is responsible for making

54 AMSA, Submission 14, p.8.

55 AMSA, Submission 14, p.3.

56 Dr Walter Starck, *Committee Hansard*, 31 July 2012, p.29.

57 Dr Walter Starck, *Committee Hansard*, 31 July 2012, p.30.

58 Mr Richard Stevens, *Committee Hansard*, 9 July 2012, p.13.

59 Mr Dean Logan, *Committee Hansard*, 29 June 2012, p.16.

60 Dr Walter Starck, *Committee Hansard*, 31 July 2012, p.31.

them recover. We already have all of those steps in place and all of that legislation there.⁶¹

3.55 And, he argued, fisheries is subject to far tighter laws than land-based agriculture:

Wild caught fisheries do not start like agriculture does by clearing the land, introducing foreign species... There is not a single agriculture industry in Australia that would be allowed to operate if it had to operate under the conditions of the *FM Act*.⁶²

3.56 WWF submitted that there is 'considerable uncertainty attached too much of the scientific advice provided to stakeholders and managers.' WWF was concerned that 'management responses are delayed pending the delivery of scientific advice or the resolution of some of the uncertainty in that advice.'⁶³

3.57 Professor Michael Harte (WWF) explained that without active management, the industry could be unprepared for changing conditions:

It does not matter where the source of those changes comes from – whether they are human induced, fishing induced or whether they are environmentally induced in the broader sense, beyond our control, perhaps – we really have to understand the role of uncertainty and ensure that our systems are robust and resilient in the face of that uncertainty, otherwise we will be caught out by surprise.⁶⁴

3.58 He said that in practice, 'the largest impacts on the reef may not be fishing' and fishing and aquaculture operations need to respond accordingly.⁶⁵ He said these could be 'pollutants from agriculture just being washed off the land'. In one case:

When I chaired the aquaculture council in New Zealand, there was a very rich oyster-growing area near Whangarei that unfortunately was closed down because of effluent run-off from septic tanks. It was nothing to do with fishing but the response had to be to close that sector down because it no longer met the health requirements

61 Prof Bob Kearney, *Committee Hansard*, 29 June 2012, p.19.

62 Prof Bob Kearney, *Committee Hansard*, 29 June 2012, p.21.

63 WWF, Submission 11, pp.4-5.

64 Prof Michael Harte, *Committee Hansard*, 29 June 2012, p.26.

65 Prof Michael Harte, *Committee Hansard*, 29 June 2012, p.26.

for safe seafood. That was not the fault of the fishermen. They had done nothing wrong. They actually had excellent practices.⁶⁶

3.59 Ms Tooni Mahto (Australian Marine Conservation Society) said:

I understand that funding is limited, and I understand that it is very limited in state fisheries, but we do not believe it is not an acceptable situation to effectively say, 'Because there's no funding and it's a low-value fishery, we'll just keep on going with our fingers crossed.' We absolutely believe that good science is the foundation of good fisheries management.⁶⁷

3.60 In the view of her organisation, Ms Mahto said that in cases, at a state level, there had been undue 'influence' on fisheries managers that have raised a 'barrier to effective management of the resource'. There should be 'valuable stakeholder engagement in fisheries management, rather than fisheries management being led predominantly by vested interests of certain groups,' she said.⁶⁸

Marine protected areas

3.61 Issues around Marine Protected Areas (MPAs) were raised by many submissions and witnesses. The Committee heard that despite their long history internationally and in Australia much controversy remains about the rationale and value of MPAs.

3.62 The definition of an MPA is:

an area of land and/or sea especially dedicated to the protection and maintenance of biological diversity and of natural and associated cultural resources, and managed through legal or other effective means.⁶⁹

3.63 This definition was originally developed by the 1994 World Conservation Union's (IUCN) and has since been adopted by Australia.

3.64 The concept of MPAs was endorsed in Australia's 1998 Oceans Policy and the legal framework was established in 1999 through the *EPBC Act*.

66 Prof Michael Harte, *Committee Hansard*, 29 June 2012, p.26.

67 Ms Tooni Mahto, *Committee Hansard*, 15 August 2012, p.11.

68 Ms Tooni Mahto, *Committee Hansard*, 15 August 2012, p.11.

69 SEWPaC, 'Marine Protected Areas', at <http://www.environment.gov.au/coasts/mpa/about/index.html>

3.65 Australia's target date for a fully representative system of MPAs is 2012.⁷⁰

3.66 The relationship between productivity from the oceans and bioregional planning was highlighted in the 1998 Oceans Policy:

The collapse of a number of major marine ecosystems and fisheries resources in the northern hemisphere, with the associated economic damage and social dislocation, is a stark warning of the vulnerability of marine systems. ...we are not immune from such threats. ... The Commonwealth's commitment to integrated and ecosystem-based planning and management will be implemented through the introduction of a major Regional Marine Planning process.⁷¹

3.67 Mr Stephen Oxley (SEWPaC) outlined the background of MPAs (or marine reserves) for the Committee:

...bioregionalisation, which essentially divides our marine environment into areas that essentially have the same ecological processes or ecosystems, is the foundation on which the marine reserves network is being established. Then we have worked the lessons we learned from the creation of the south-east marine reserves network in the mid-2000s to develop and then publish in 2007 the goals and principles for the establishment of the National Representative System of Marine Protected Areas in Commonwealth waters.⁷²

3.68 SEWPaC's website states that bioregional plans have a threefold purpose:

- support strategic, consistent and informed decision-making under Commonwealth environment legislation in relation to Commonwealth marine areas;
- support efficient administration of the *EPBC Act* to promote the ecologically sustainable use of the marine environment and its resources; and
- provide a framework for strategic intervention and investment by government to meet policy objectives and statutory responsibilities.⁷³

70 SEWPaC, 'National Representative System of Marine Protected Areas', at <http://www.environment.gov.au/coasts/mpa/nrsmpa/index.html>

71 Australian Government, 'Australia's Oceans Policy: Vol. 1', 1998, p.11.

72 Mr Stephen Oxley, *Committee Hansard*, 19 September 2012, p.1.

73 SEWPaC, 'Marine Bioregional Planning', at <http://www.environment.gov.au/coasts/marineplans/index.html>

3.69 MPAs should also yield information and data for researchers in the future. A supplementary submission from SEWPaC explained:

A monitoring strategy is being developed for the management of the national Commonwealth marine reserves network. This monitoring strategy will enable the review of effectiveness of management in reserves over time. Monitoring of the marine environment is a challenging task, both scientifically and logistically.⁷⁴

3.70 This information and datasets will be made publicly available, which will allow open access to the science informing marine management.⁷⁵ Professor Euan Harvey (UWA Oceans Institute) commented that MPAs have a secondary benefit for scientific research by eliminating fishing pressure as a variable from areas under study.⁷⁶

3.71 Throughout the inquiry a number of witnesses made claims that the restraints imposed due to MPAs have been excessively precautionous, even when risks of fishing-related impacts appear exceedingly remote.

3.72 Mr Brian Jeffriess (CFA) said areas have been closed to fishing without basis and in ignorance of available information. He said:

Green parks are desirable in many ways, but where a fishery is absolutely no threat of any type to the ecosystem, why would it be excluded from that area?⁷⁷

3.73 Mr Jeffriess added: 'It is an ad hoc process... You try and explain that to a fisherman. They lose confidence and faith in the whole system.'⁷⁸

3.74 IMAS submitted that in practice, 'scientific knowledge is not commonly used to develop ecosystem and biodiversity indicators.' According to IMAS, 'there has been a long history of marine protected area monitoring in Tasmania,' yet 'the results of this monitoring have not been used in setting performance measures for protecting ecosystems or biodiversity.'⁷⁹

3.75 Professor Colin Buxton (IMAS) said MPAs are unnecessary:

If you have good fisheries management, which we argue is predominantly the case in Australia, then fisheries management is

74 SEWPaC, Submission 49.

75 SEWPaC, Submission 49.

76 Prof Euan Harvey, *Committee Hansard*, 9 July 2012, p.24.

77 Mr Brian Jeffriess, *Committee Hansard*, 20 August 2012, p.25.

78 Mr Brian Jeffriess, *Committee Hansard*, 20 August 2012, p.27.

79 IMAS, Submission 27, p.5.

usually based on ensuring that your spawning stock biomass is not below a certain level. If your spawning stock biomass is not below a certain level then there cannot possibly be any limitation on recruitment. That is the fundamental basis of all fisheries management. That is widely accepted through all of the scientific literature. So if you have that good fisheries management in place then you do not have a constraint of inadequate recruitment and therefore you do not expect the reserve to make any difference.⁸⁰

- 3.76 Mr Dean Logan (AMA) said the closing areas to fishing causes an effect that reverses the intended benefits:

If you look at the maps that have been proposed you will see that a lot of the best fishing grounds have been taken, which means that those who wish to stay in the industry will aggressively fish areas that they can fish a lot harder to get to the quotas that they need to put food on the table.⁸¹

- 3.77 Mr Richard Stevens (WAFIC) said: 'The problem is if you invest and then somebody dumps a giant marine park over it. Then all your investment is wasted.'⁸²

- 3.78 Mrs Judith Lynne (Sunfish Queensland) said that during consultation processes, people were asked where they catch fish. She said that subsequently, the best fishing areas were closed, 'which created a history of mistrust.'⁸³ She added that closing areas of value to fishers had led to apathy for the health of oceans:

Once upon a time there were fish habitat areas and reserves and everybody in the community knew the value that they had and the reason they were there. They were very conscious of it and looked after them extremely well. We now have areas that appear to have just been painted on a map only to make percentages and they have lost their value. People are not as concerned about looking after them.⁸⁴

- 3.79 Professor Bob Kearney (private capacity) said that MPAs are merely 'lines on the water' based on 'terrestrial' management models.⁸⁵ He said:

80 Prof Colin Buxton, *Committee Hansard*, 12 July 2012, p.48.

81 Mr Dean Logan, *Committee Hansard*, 29 June 2012, p.16.

82 Mr Richard Stevens, *Committee Hansard*, 9 July 2012, p.8.

83 Mrs Judith Lynne, *Committee Hansard*, 31 July 2012, p.15.

84 Mrs Judith Lynne, *Committee Hansard*, 31 July 2012, p.16.

85 Prof Bob Kearney, *Committee Hansard*, 29 June 2012, p.23.

The concept of area management of that sort came from forestry, where you are dealing with sedentary, non-mobile stress in an area that you can draw a line around and control. ... But it has no relevance, really, to the marine environment.⁸⁶

- 3.80 However, Mr Stephen Oxley (SEWPaC) told the Committee that science has been central to the creation of MPAs:

That scientific foundation has its genesis in the 1990s and a national endeavour involving major research institutions such as the CSIRO, Geoscience Australia and a number of universities and museums around Australia to create, over several iterations, what has become known as the integrated marine and coastal bioregionalisation of Australia.⁸⁷

- 3.81 Professor Kingsford (James Cook University) gave evidence in support of the science behind marine reserves, in particular the 'spill over' effects they generated, stating that:

'there was is demonstrable proof which has been refereed by scientists in different parts of the world, so it is not, as was said, pretty much a bunch of hippies coming up with an eco-argument on this. It is based on really good science. It is quite clear that you can see that the blue zones are doing better as a result of having green zones nearby.'⁸⁸

- 3.82 However, Mr Oxley recognised that MPAs are not necessarily a 'panacea', with other fisheries management tools also being utilised to enhance conservation.

- 3.83 Mr Oxley also acknowledged that MPAs have 'impacts on people, communities, businesses and families', making the subject 'a highly contested space'. However, consultation has been extensive, he said, involving 245 meetings, 1,953 people and a large quantity of submissions over a three-year period.⁸⁹

- 3.84 He pointed out that not all MPAs will necessarily result in total closure:

They allow for a range of different activities. The extent to which those activities are allowed is determined firstly in terms of the risk they pose to the biodiversity values within them. We have

86 Prof Bob Kearney, *Committee Hansard*, 29 June 2012, p.23.

87 Mr Stephen Oxley, *Committee Hansard*, 19 September 2012, p.1.

88 Professor Kingsford, *Committee Hansard*, 31 July 2012, pp 24.

89 Mr Stephen Oxley, *Committee Hansard*, 19 September 2012, pp.4-5; SEWPaC, Submission 49.

done some risk assessment work in that regard, but there is also a socioeconomic consideration that is taken into account.⁹⁰

3.85 Mr Oxley added that management plans within MPAs are subject to a ten-year statutory lifespan and there would be a new opportunity to review arrangements.⁹¹ The Australian Government is also offering 'case-by-case decisions on adjustment assistance' to people affected by the creation of MPAs, an update of the same policy used in 2004 when the first tranche of MPAs were established in the south-east bioregion.⁹²

3.86 The Committee informed Mr Oxley that other witnesses had described MPAs as flawed for being akin to terrestrial approaches of management. Mr Oxley responded:

As for this transposition of terrestrial models into the marine environment, my observation is that the spatial management of the marine environment is something that demonstrably works.⁹³

3.87 Within the Great Barrier Reef Marine Park, he said, there has been a biomass increase, although he emphasised that benefits in other cases can vary depending on the circumstances. He commented that 'fisheries management extensively uses spatial management as a way of effectively managing fisheries'.⁹⁴

3.88 SEWPaC has advised the Committee that a national monitoring strategy is currently under development to evaluate marine ecosystem health and the marine reserves network. The monitoring strategy is being developed over several years from 2011 to 2014, and the following three outcomes are anticipated:

- A considered understanding of the data requirements for managing a network of Commonwealth Marine Reserves including how to mobilise national capacity to provide the required data;
- A considered understanding of the data requirements to evaluate and report on national marine ecosystem health including how to mobilise national capacity to provide the required data (especially with the Integrated Marine Observing System and National Plan for Environmental Information); and

90 Mr Stephen Oxley, *Committee Hansard*, 19 September 2012, p.5.

91 Mr Stephen Oxley, *Committee Hansard*, 19 September 2012, p.6.

92 Australian Government, 'Fisheries Adjustment Policy: Supporting the Creation of Commonwealth Marine Reserves' [undated], p.1 and p.3.

93 Mr Stephen Oxley, *Committee Hansard*, 19 September 2012, p.5.

94 Mr Stephen Oxley, *Committee Hansard*, 19 September 2012, p.5.

- Access to the relevant data analyses (within limits of existing data) to report on national-scale marine ecosystem health for input to the 2016 State of Environment report.⁹⁵

Committee comment

- 3.89 The Committee heard evidence that there has been a concerted effort in recent decades to improve fisheries science and management around Australia. Australia's fisheries science and management is now held in very high esteem around the world due to the efforts to move to more sustainable yields; development of a more sophisticated industry; and working towards ecosystems-based management. These changes have been significant, and not without controversy, but they have also improved the long term viability of our fisheries industry and the environment on which the industry depends.
- 3.90 Despite the relatively high standard of fisheries science and management in Australia, more still needs to be done.
- 3.91 This section provides the Committee's views in the areas of:
- The adequacy of measuring and reporting of fish stocks and environmental sustainability;
 - how uncertainty is managed and the precautionary principle applied; and
 - ensuring our marine park system contributes to world leading science.

Measuring and reporting of fish stocks and environmental sustainability

- 3.92 The Committee heard that good fish stock data is important for better fisheries management and better policy decisions. However, the first nationwide fish stock report will only be released later this year, and may still show a range of areas where data is lacking.
- 3.93 The Committee also heard that fish stock data is only part of the picture, and that assessing the environmental impacts of fishing and the sustainability of marine ecosystems is also necessary.
- 3.94 In the past, the fishing industry focused on financial returns and management of a resource; but today environmental objectives require management of ecosystems and habitats. Managing environmental impacts are integral to industry's financial returns both in terms of meeting regulatory requirements and satisfying consumers' demand for
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more information about the sources of their food, how it is harvested, and its overall sustainability.

- 3.95 The ecosystems based management approach has been a central part of Australian fisheries management for more than a decade, and is included in foundational documents such as the 1998 Oceans Policy.
- 3.96 However, the impetus to achieve higher levels of sustainability has placed increasing pressure upon fisheries managers and the industry. Substantial amounts of time and money are being invested in data collection and analysis to minimise impacts on surrounding ecosystems and to demonstrate sustainability.
- 3.97 During the inquiry witnesses commented on the additional data, analysis and reporting costs involved in collecting stock information and measuring sustainability. They also commented that the funding for this work is limited. The Committee heard that priorities need to be set and that pragmatism is needed to place limits on the desire to gain a 'perfect' understanding of the marine environment.
- 3.98 The Committee agrees that tough decisions need to be made on research priorities to fit within constrained budgets, but which also still support good decision making.
- 3.99 However, by taking a 'whole of system' approach to fisheries management this will ultimately support the ongoing viability of the industry and also improve sustainability outcomes and hopefully help to grow the future fishing industry.
- 3.100 The work towards a better understanding of the environment in which we fish will continue, and the Committee encourages all stakeholders to contribute.
- 3.101 However, a critical step is to gain a reliable consolidated national picture of fish stocks. The Committee therefore looks forward to the ABARES consolidated stock report expected later this year. This report needs to be made a regular publication, and supported with adequate funding to ensure it is comprehensive and can be relied upon by all stakeholders. It could then be expanded over time to include more detail on ecosystem sustainability and other issues as relevant.
- 3.102 Publication of a consolidated stock report for all Australian fisheries will complement existing publications and other publications recommended for production by the Committee in other chapters of this report. Together the reports will provide a full suite of national reporting on fisheries and aquaculture.

Recommendation 2

3.103 **The Committee recommends that the Australian Government continue to publish a consolidated stock report for all Australian fisheries on a regular basis, after the initial publication of such a report in 2012, in consultation with State and Territory governments.**

Uncertainty and the precautionary principle

3.104 During the inquiry, there was debate surrounding the costs and benefits of the precautionary principle and its effects on the fishing industry. Questions surrounding whether the appropriate level of precaution has been factored into management decisions have also been the subject of extensive public scrutiny and media attention.

3.105 Despite the fact that the precautionary principle (as defined in the 'Rio Declaration' agreed at the 1992 United Nations Conference on Environment and Development) has been enshrined in Australian fisheries management policy and legislation for some two decades, there has been no universal agreement as to its definition.

3.106 It has been used to decide how we manage uncertainty and risk. Yet when a risk or uncertainty becomes clearer and is no longer a risk or uncertainty, this principle becomes redundant.

3.107 In the Committee's view, the precautionary principle should not be interpreted as requiring zero impact, as some evidence has suggested is occurring. If this were the case, the precautionary principle would be excessive, prohibitive and unworkable.

3.108 The Committee feels that the precautionary principle should only be used as a guideline that can balance the interests of all stakeholders and recognise that decisions under its name are larger than just environmental decisions, but are also about jobs and communities.

3.109 The Committee therefore encourages the Australian Government to develop a guideline, rather than new principle, to assist with the development of a new national regional policy statement for fisheries, aquaculture and recreational fishing.

3.110 Once this guideline is developed the Australian Government should take action to ensure the community understands the new approach and explain how it is applied.

Recommendation 3

- 3.111 **The Committee believes that precaution is about managing risk; and therefore recommends that a new guideline on precaution be developed with agreement and support of stakeholders, for inclusion in a new national regional policy statement for fisheries, aquaculture and recreational fishing.**

The science of MPAs

- 3.112 The Committee heard a diverse range of arguments during the inquiry regarding MPAs.
- 3.113 Despite the fact that the establishment of a system of protected areas has been supported by successive governments since 1992, and several consultation processes have been run, some stakeholders remain unsatisfied about the rationale for MPAs. Particular questions and debate remain on the linkages between restricting activity, fisheries management and scientific research benefits.
- 3.114 The Committee heard that whilst there might be benefits of MPAs for fisheries management, they are primarily tools of conservation. MPAs may also contribute to scientific research and improving our understanding of the oceans, but only if good quality science is prioritised.
- 3.115 If Australia is going to create one of the world's largest systems of marine parks, we need to make the most of the scientific opportunity this offers. Extracting good data as to the effectiveness or otherwise of MPAs is crucial to justifying their establishment and also ensuring they are robustly evaluated. Furthermore, this data will inform the establishment of MPAs around the world.
- 3.116 The Committee recognises that getting the science right takes time, effort and money. The Committee was informed that there is a multi-year work plan in place under the National Environmental Research Program which will culminate in data being published in a 2016 State of Environment report⁹⁶.
- 3.117 However, given the years that have passed in the development of marine reserve networks in Australia, and the stakeholder concern heard during

96 SEWPaC, Supplementary submission 49.1.

the inquiry, the Committee feels that additional efforts are needed to finalise the monitoring and evaluation strategy as soon as possible.

- 3.118 The monitoring and evaluation strategy needs to ensure that the value of MPAs is critically assessed. Once the value or otherwise of MPAs has been determined, the Australian community can then be fully informed when making decisions about whether to establish additional MPAs or potentially whether some environmental controls should be relaxed.

Recommendation 4

- 3.119 **The Committee recommends that the Australian Government expedite the creation and implementation of the monitoring and evaluation strategy for the national Commonwealth marine reserves network – to ensure that they are well managed and thoroughly evaluated, before consideration of any new MPAs domestically and globally. A timeline should be announced to show:**

- when a complete monitoring strategy will be in place;
- when a full evaluation will be completed; and
- when the findings of the evaluation will be implemented.

Recreational fishing

- 3.120 Recreational fishing is a popular activity in Australia. Despite the significance of the sector, the level of policy attention given to recreational fishing issues is comparatively less than for commercial activities. Information relating to recreational fishing activity is limited. Facts and figures that are available tend to be out of date.

- 3.121 The CSIRO's submission stated that the recreational catch 'remains highly uncertain for many species, though in some cases it is known to be significant.'⁹⁷ Dr Andrew Rowland (RecFish West) explained that unlike the commercial fishing industry, recreational fishers 'are not bound by statute to record our catches'.⁹⁸

97 CSIRO, Submission 23, p.5; see also JCU, Submission 28, p.2.

98 Dr Andrew Rowland, *Committee Hansard*, 9 July 2012, pp.30-31.

- 3.122 The last major survey of recreational fishing, the 'National Recreational and Indigenous Fishing Survey', published in 2003, used a mixture of telephone surveys, face-to-face interviews and self-reporting through diaries to estimate effort, catch and expenditure.⁹⁹
- 3.123 The Survey also alluded to the fact that for some species, recreational fishers may match or exceed the impact of commercial fishing.¹⁰⁰ Many recreational fishers use boats with electronic aids, allowing them to range further out to sea and more effectively locate fish.¹⁰¹ Boat sizes and technology continue to advance and evolve.
- 3.124 Recreational fishing is primarily managed by the States and Territories, including where recreational fishing occurs in Commonwealth waters. The Australian Government has scope to intervene through general powers of the *EPBC Act* and s.17(6)(h) of the *FM Act* (relating to fisheries management plans), though in practice refrains from directly managing recreational fishing. Mr Ian Thompson (DAFF) said:

The data about how much fish are taken in recreational fishing is limited. It is from surveys of people coming in and those sorts of things, so it is a bit patchy from time to time. Recreational fishing is almost exclusively managed by the states, and there is not a consistent national picture of recreational fishing take.¹⁰²

- 3.125 Dr Rowland suggested that to compliment surveys, recreational fishers could keep diaries - 'where they might record the length of the fish, where it was caught, the day, the tide and all those sorts of things.'¹⁰³
- 3.126 Mrs Judith Lynne (Sunfish Queensland) said that licensing and reporting for the recreational sector should be enhanced through licensing and standardised data collection:

We rely heavily on the limited data collection that government provides. The issue nationally is that there are some state based licensing systems. They are not all the same. ... Some do it species-wise; some do it as total fish; some do not collect any data at all. To be honest, this is one case where we believe that the

99 TAFI/DAFF, 'National Recreational and Indigenous Fishing Survey', July 2003, FRDC Project 99/158.

100 TAFI/DAFF, 'National Recreational and Indigenous Fishing Survey', July 2003, FRDC Project 99/158, p.23.

101 TAFI/DAFF, 'National Recreational and Indigenous Fishing Survey', July 2003, FRDC Project 99/158, pp.52-53.

102 Mr Ian Thompson, *Committee Hansard*, 12 September 2012, p.9.

103 Dr Andrew Rowland, *Committee Hansard*, 9 July 2012, pp.30-31.

Commonwealth should have an overarching guideline that says we require data collection and therefore require the states to have some form of licensing system to provide that level of data collection. We know it is an issue. We cannot see any way around it other than some form of reporting.¹⁰⁴

- 3.127 A further advantage of licensing recreational fishers would be the ability to generate revenue to fund scientific research relevant to the recreational sector. Mrs Judith Lynne (Sunfish Queensland) said that DAFF, FRDC and Fisheries Queensland prioritise science for commercial fishing, leaving development of recreational fishing a challenge when 'the science dollar is being spent elsewhere.'¹⁰⁵
- 3.128 These themes have been recognised, discussed and reviewed prior to this inquiry. In 2002, recreational fishing stakeholders issued the 'Coolangatta Communique' on recreational fishing in Commonwealth waters. The Communique identified the following key issues:
- recreational fishing resource allocation;
 - agreement on resource management arrangements;
 - a cost recovery mechanism to fund improved management; and
 - the need for research to estimate the recreational catch.¹⁰⁶
- 3.129 In 2011, an advisory committee on recreational fishing (formed in 2008 by the then-Minister for Fisheries, Forestry and Agriculture) completed a review of national recreational fishing policy entitled *Recreational fishing in Australia – 2011 and beyond: a national industry development strategy*. It highlighted two key issues:
- The first and most critical is the need for a nationally-coordinated approach to the funding of recreational fisheries programs and of the representation of recreational fishers. The second is the need for strong leadership and an effective well-resourced national recreational fisher representation and advocacy body.¹⁰⁷

104 Mrs Judith Lynne, *Committee Hansard*, 31 July 2012, p.15.

105 Mrs Judith Lynne, *Committee Hansard*, 31 July 2012, pp.14-15.

106 'The Coolangatta Workshop Communique', October 2002, at <http://www.daff.gov.au/fisheries/domestic/resource-sharing/framework/coolangatta>

107 Recreational Fishing Advisory Committee, 'Recreational Fishing in Australia – 2011 and Beyond: A National Industry Development Strategy', June 2011, p. 25.

- 3.130 The review also observed that there is not a consistent national approach to licensing or funding for research and development.¹⁰⁸

Committee comment

- 3.131 Recreational fishing is a very popular pastime in Australia and is a significant economic activity, with potential impacts in terms of environmental outcomes.
- 3.132 The Committee learnt that recreational fishers were becoming increasingly sophisticated in their approach, using modern technology to locate fish and increase their vessel range. This poses a challenge for how recreational fishing is governed, but technology could also be an opportunity to gather additional information on recreational fishing impacts. For example, fishing groups could encourage individual members to report information using phone applications or website-based interfaces to capture data in 'real time'.
- 3.133 Recreational fishing is governed by a combination of State, Territory and national environmental legislation. The powers within the *FM Act* have not been used to actively manage recreational fishing in Commonwealth waters.
- 3.134 There are also different standards and rules for licensing and data collection arrangements between Australian jurisdictions. This creates resource management challenges when information relating to the numbers of fishers and their catch is limited or out-dated.
- 3.135 The Committee believes that recreational fishing impacts and catches should be better understood, and its contribution to the economy more accurately estimated. The last comprehensive national survey of recreational fishing was in the early 2000s. The Committee has therefore recommended regular reporting on recreational fishing statistics. This is one among a number of areas of national reporting the Committee believes should be addressed, with several related recommendations made throughout this report.
- 3.136 Separately, COAG should discuss standardising recreational fishing licensing and rules and agreeing to a framework for data collection on recreational fishing activity, to assist with national reporting.

108 Recreational Fishing Advisory Committee, 'Recreational Fishing in Australia – 2011 and Beyond: A National Industry Development Strategy', June 2011, p. 25.

- 3.137 In addition, the current review of Commonwealth fisheries management legislation should consider whether the *FM Act* needs to be revised to facilitate the Australian Government engaging more readily in regulation and data collection of recreational fishing in Commonwealth waters.

Recommendation 5

- 3.138 **The Committee recommends that the Minister for Agriculture, Fisheries and Forestry work with State and Territory counterparts to commission a regular estimate of recreational fishing activity and impacts in Australia, with data and results published in a yearly consolidated report, using a nationally agreed data collection model.**

Recommendation 6

- 3.139 **The Committee recommends that COAG seek to harmonise, where there is agreement, recreational fishing licensing, rules and data collection.**

Recommendation 7

- 3.140 **The Committee recommends that the current review of Commonwealth fisheries management consider whether revisions to the *Fisheries Management Act 1991* are necessary to allow the Australian Government to more readily manage recreational fishing activity in Commonwealth waters.**

Climate change

- 3.141 Climate change was recognised by a range of stakeholders during this inquiry as a known variable that will present a host of effects and challenges for the fishing industry. The appearance of tropical fish species as far south as Tasmania was given as a tangible example.¹⁰⁹ The Committee has sought, through this inquiry, to test the ability of science to provide answers and forecasts in relation to fisheries and aquaculture.

109 Mr Ian Thompson, *Committee Hansard*, 30 May 2012, p.6.

3.142 The CSIRO's submission made the observation that:

The majority of Australia's fishery species are considered sustainably managed but future climate change may impact industry profitability.¹¹⁰

3.143 This view was also shared by James Cook University, which in its submission described climate change as a 'one of the top emerging threats facing fisheries resources worldwide.'¹¹¹

3.144 The Department of Climate Change and Energy Efficiency (DCCEE)'s submission contained a bleak assessment:

Changes to ocean temperature, currents, winds, rainfall, extreme weather, ocean chemistry and nutrients supply are likely to have significant impacts on marine ecosystems. This will lead to changes in species dispersion and stock levels and impact on fishing communities. While climate change may present some opportunities, it is likely that overall, climate change will pose significant challenges to the fisheries and aquaculture sector.¹¹²

3.145 Mr Ian Thompson (DAFF) said:

...we expect direct impacts that could range from changes in fish populations, fish physiology, breeding habits, new diseases, changes in immunity and then indirect impacts like changes in algae and micro-organisms and the food chains.¹¹³

3.146 A recent CSIRO publication, entitled 'Marine Climate Change in Australia', reiterated that 'climate change is already happening' and outlined three general responses currently underway:

- designing adaptation strategies to 'reduce the vulnerability of marine species, systems and industries to climate change';
- observing key physical and biological variables in the ocean, which will be 'critical to evaluating effective adaptation strategies'; and
- preparing for climate change through 'changes in management or policy arrangements', a point also emphasised separately in the

110 CSIRO, Submission 23, p.7.

111 JCU, Submission 28, p.4.

112 DCCEE, Submission 36, p.1.

113 Mr Ian Thompson, *Committee Hansard*, 30 May 2012, p.2.

CSIRO's submission,¹¹⁴ particularly where these 'currently limit adaptation responses.'¹¹⁵

3.147 The WWF agreed that adaptation strategies will be required; however its submission anticipated:

Within already stretched budgets, it is difficult to see how these research needs can be met without compromising existing programs.¹¹⁶

3.148 However, notwithstanding the expected predictions surrounding climate change, according to DCCEE, 'there is little consolidated knowledge of the potential impacts of climate change' and 'much of the evidence... on marine fisheries has been inferred'.¹¹⁷

3.149 During this inquiry, there was noticeable diversity in opinions espoused by witnesses and submissions in terms of the specific impacts climate change might produce for fisheries or how other factors could be contributing to variability. Issues included:

- localised social and economic impacts if species move to new habitats. The Australian Marine Sciences Association (AMSA)'s submission stated:

In Australia, fisheries in some regions may benefit from climate change but other regions are likely to experience significant reduction of catches (particularly in southern temperate waters).¹¹⁸

Mr Brian Jeffriess (CFA) flagged the financial implication of climate change for the fishing industry:

Most importantly, it frightens the banks, and they are still the foundation, unfortunately, of the industry.¹¹⁹

He commented that there could be 'some positives' arising from climate change. 'Sardines in the Great Australian Bight, for example, will blossom to be better than they are now,' he said.¹²⁰

114 CSIRO, Submission 23, p.7.

115 CSIRO, 'Marine Climate Change in Australia: Impacts and Adaptation Responses: 2012 Report Card', p.1.

116 WWF, Submission 11, p.5.

117 DCCEE, Submission 36, p.2.

118 AMSA, Submission 14, p.4.

119 Mr Brian Jeffriess, *Committee Hansard*, 20 August 2012, p.20.

120 Mr Brian Jeffriess, *Committee Hansard*, 20 August 2012, p.20.

- whether other changes to the oceans, such as acidification, may deserve greater or equal status. According to Dr Anthony Smith (CSIRO):

In some ways, acidification is perhaps an even more important issue than temperature. We are still a long way from understanding what the consequences of those changes might be. That is right at the base of the ecosystem, so there is potentially a very large impact from that.¹²¹

Professor Michael Harte said that ‘cumulative impacts’ including sedimentation and agricultural run-off could greatly affect the state of the ocean.¹²²

- whether climate change should be regarded as part of broader environmental changes, which are ongoing rather than isolated events. Mr Neil Stump (TSIC) said:

...I would hope to see this fleeting focus on climate change turned into a longer-term view, and recognition that there is ongoing environmental change in the world’s oceans, estuaries and whatever, and that we do need to invest money to understand what those changes are and what the possible ramifications are.¹²³

- overcoming a shortage of knowledge about impacts on individual species of fish, which may vary. DCCEE submitted:

For most fisheries little is known about how climate change will affect:

- ⇒ population dynamics, for example, the timing of spawning or the tolerance to increased water temperatures;
- ⇒ composition and interaction within communities; [and]
- ⇒ structure and dynamics of communities, including changes to productivity due to physical changes in the environment such as wind-driven upwelling.¹²⁴

During a site visit to JCU, the Committee observed first-hand experiments underway in controlled conditions to test for the tolerance of individual species to temperature changes.

121 Dr Anthony Smith, *Committee Hansard*, 12 July 2012, p.15.

122 Prof Michael Harte, *Committee Hansard*, 29 June 2012, p.26.

123 Mr Neil Stump, *Committee Hansard*, 12 July 2012, p.57.

124 DCCEE, Submission 36, p.2.

3.150 The Committee notes that there has been active interest in answering the types of questions raised above. DCCEE cited three reports and strategies within its submission:

- ‘Implications of Climate Change for Australian Fisheries and Aquaculture: A Preliminary Assessment’, released in 2008;
- the ‘National Climate Change Adaptation Research Plan for Marine Biodiversity and Resources’, released in 2010; and
- ‘Australian Climate Change Science: A National Framework’, released in 2009.

3.151 Ms Jo Mummery (Assistant Secretary, Science and International Adaptation Branch, DCCEE) said:

At this stage, there is quite a lot that is not known. There is a level of confidence in the science community that many marine species operate within particular temperature ranges or have a preference to be within temperature ranges... it may lead to some unexpected predator-prey relationships that are not currently what we are managing around.¹²⁵

3.152 She continued:

It may lead to species moving further offshore or, in the case, for example, of species off the southern coastline of Australia, there may not be the nutrient support if the temperatures become too uncomfortable for their current distribution. There really is still too significant a gap in our understanding to fully respond to that question.¹²⁶

3.153 Nonetheless, Ms Mummery was confident that the necessary research priorities have been identified:

We have tried through our establishment and work through the adaptation research planning to make sure that there is a good engagement with other researchers and with stakeholders and industry in defining the research that is important. That has certainly been a core part of the way forward with the adaptation planning.

125 Ms Jo Mummery, *Committee Hansard*, 27 June 2012, p.2.

126 Ms Jo Mummery, *Committee Hansard*, 27 June 2012, p.2.

- 3.154 She also said that DCCEE is bringing together a coordination group for climate change science to enhance collaboration.¹²⁷

Committee Comment

- 3.155 Climate change was often raised as a significant source of concern and uncertainty by witnesses during the inquiry. Irrespective of the causes of climate change, change is occurring that will have large effects on the ocean environment and Australia's coastal communities.
- 3.156 The level of understanding surrounding climate change, oceans and fisheries is limited and the long-term outlook uncertain.
- 3.157 However, there was general consensus that further research is needed into how climate change may affect the oceans and how to best adapt to these changes.
- 3.158 The Committee supports the need for this additional research.
- 3.159 There is one central document prepared by the Department of Climate Change and Energy Efficiency - 'Implications of Climate Change for Australian Fisheries and Aquaculture' - that provides a foundation for further work. Whilst this is a short and specialised publication, it should be further developed into a comprehensive document that acts as a national reference document for the impacts of climate change on fisheries and aquaculture.

Recommendation 8

- 3.160 **The Committee recommends that the 2008 preliminary assessment of the 'Implications of Climate Change for Australian Fisheries and Aquaculture' be developed by the Department of Climate Change and Energy Efficiency into a more comprehensive study, to include broad strategic issues and localised impacts.**

Recommendation 9

- 3.161 **The Committee recommends that the Australian Government ensure there is a continued strong effort to monitor and analyse the effects of climate change on Australia's oceans and communities.**

¹²⁷ Ms Jo Mummery, *Committee Hansard*, 27 June 2012, p.3.

Research and public education

- 3.162 World leading science is critical to Australia's high standard of fisheries management. Continuously building on this science will support the future viability and competitiveness of Australian fisheries and will lead to even better environmental outcomes. Harnessing Australia's scientific skills will also allow Australia to play our global role in helping to provide food to surrounding developing nations.
- 3.163 In order to have good research outcomes we must foster our research capacity, including through skills development and targeted investment.
- 3.164 In order to use this research to achieve better fisheries management and environmental outcomes the research needs to be communicated to all stakeholders and the general public.
- 3.165 Breaking these issues down, there were four main themes raised during the inquiry, which are dealt with in turn within this chapter:
1. the demand for research generally;
 2. maximising research capacity, in terms of people, infrastructure and investment;
 3. setting research priorities and coordinating research efforts; and
 4. communicating fisheries research through public education.
- 3.166 The Committee recognises that there are many different terms used to describe scientific efforts and that there is also a spectrum from initial research to development, commercialisation and extension. For simplicity, the remainder of this chapter collectively refers to these issues as 'research'.

Demand for research

- 3.167 The 'National Fishing and Aquaculture RD&E Strategy 2010', commissioned by the Australian Primary Industries Ministerial Council, is a key source of information, facts, figures and discussion of fisheries research in Australia. It identified several 'strategic research themes' (separately, the FRDC has its own RD&E plan¹²⁸ based on these themes):
- biosecurity and aquaculture health;

128 FRDC, 'Investing for Tomorrow's Fish: The FRDC's Research, Development and Extension Plan 2010-2015', 2010.

- habitat and ecosystem protection;
- climate change;
- ecologically sustainable development;
- governance and regulatory systems;
- resource access and allocation;
- growth and profitability;
- maximising value from aquatic resources;
- consumers and markets;
- community support;
- community resilience and development;
- develop the capabilities of the people to whom the industry entrusts its future; and
- to create positive practice and attitudinal change through information transfer (addressing public perceptions).¹²⁹

3.168 Demand for fisheries research is growing. Consequently, having a plan for fisheries research priorities is essential. Dr James Findlay (AFMA) said:

The uncertainty about our marine stocks puts a lot of pressure on science. We are very science hungry organisation. We are making evidence-based decisions. It is highly contestable environment. Every decision we make about the level of catch, where people should fish or what method they should use or about managing things such as by-catch... is heavily contested. Because of that, we are heavily dependent on science and it is a large part of our investment.¹³⁰

3.169 As AMSA explained in its submission, less science would translate into 'overly conservative and risk-averse management decisions' or 'poorly informed management decisions'.¹³¹

3.170 Markets and the desires of consumers are key determinants of research investment. Dr Patrick Hone (FRDC) said:

129 Primary Industries Research Ministerial Council, 'National Fishing and Aquaculture RD&E Strategy 2010', April 2010, pp.31-36.

130 Dr James Findlay, Committee Hansard, 30 May 2012, p.10.

131 AMSA, Submission 14, p.8.

For the commercial sector, whether it is wild catch or aquaculture, it is about linking to markets. It is about getting market signals back into the research, back into the production base and to make sure that we have informed decisions about where they put their investment. If you build a fishing boat, that is a 15 to 20 year investment so you want to make sure if you are putting that sort of money in that you know what the market is going to do for white fish or what it is going to do for the sorts of products that you are producing.¹³²

- 3.171 Mr Brian Jeffriess (Commonwealth Fisheries Association) said that Australia's science is a source of competitive advantage, which would 'suffer' without an investment in training.¹³³

Maximising fisheries research capacity

- 3.172 The 'National Fishing and Aquaculture RD&E Strategy 2010' defined capacity as having three elements: 'human, infrastructure and investment.'

- 3.173 The RD&E Strategy estimated that there are '531 FTE research and extension professionals employed by major institutions', most in government agencies and the remainder in universities. The report estimated expenditure by research providers in 2008-09 to have been \$142million and capital investment in fisheries research infrastructure (for example, aquariums, laboratories and ships) was estimated to be around \$323million.¹³⁴

- 3.174 Fisheries research relies on mixed funding sources. The effort is partly funded by the fishing industry and funded partly from the government sector. Contributing stakeholders, therefore, expect spending to accord with their respective interests and contributions.

- 3.175 The Committee was informed that marine research has a relatively high cost and degree of difficulty. According to DAFF's submission:

Marine environments are generally far less accessible than their terrestrial equivalents and present a much more challenging environment in which to conduct research. As a result marine

132 Dr Patrick Hone, Committee Hansard, 20 June 2012, p.3.

133 Mr Brian Jeffriess, *Committee Hansard*, 20 August 2012, p.18.

134 Primary Industries Research Ministerial Council, 'National Fishing and Aquaculture RD&E Strategy 2010', April 2010, pp.23-27.

ecosystems are generally more difficult and expensive to study than terrestrial ecosystems.¹³⁵

- 3.176 Professor Neil Loneragan (Centre for Fish, Fisheries and Aquatic Ecosystem Research) said:

The size of the pie is being reduced in the wild harvest fisheries and more research is expected because of the requirements to demonstrate ecological sustainability and the requirements of ecosystem based fisheries management. There are two issues: how do we grow the funding pie and how do we do research more efficiently within the current model?¹³⁶

- 3.177 The CSIRO's submission mirrored this view, adding that public sector funding for research is 'flat', notwithstanding the 'ongoing needs for monitoring and research to reduce uncertainty about future resource dynamics... and demand for scientific proof to meet society's high environmental standards.'¹³⁷ JCU's submission warned that diminishing resources has 'meant management agencies can struggle to base decisions on high quality science.'¹³⁸ Another consequence of this situation may be that organisations have to devote a greater amount of time to bidding for funds in an environment of scarce funding.

- 3.178 However, Mr Richard Stevens (WAFIC) said cuts to research funding may be having the effect of driving cooperation and dismantling silos. 'I am seeing a greater amount of public cooperation now as the capacity to fund research declines. People are really starting to cooperate,' he said.¹³⁹ Mr Stevens added:

If you are looking at areas to fund, you should concentrate on those people who are working together rather than those people who are working apart. That would be a good strategy.¹⁴⁰

- 3.179 Associate Professor Robert Day (University of Melbourne Department of Zoology) said that funding for fisheries and aquaculture research has been concentrated into a few institutions only. A secondary issue arising, he said, is 'real or perceived conflicts of interest in allocating funds,' which he

135 DAFF, Submission 24, p.1; CSIRO, Submission, p.4.

136 Prof Neil Loneragan, *Committee Hansard*, 9 July 2012, p.42

137 CSIRO, Submission 23, p.4 and p.11.

138 JCU, Submission 28, p.3.

139 Mr Richard Stevens, *Committee Hansard*, 9 July 2012, p.8.

140 Mr Richard Stevens, *Committee Hansard*, 9 July 2012, p.10.

believed is reinforcing the concentration.¹⁴¹ He said this concentration is undesirable:

Expertise for projects depends on the project and it is very difficult to predict what kind of expertise you are going to need, so you need to be able to draw on expertise from institutions right across Australia when they are required for a particular project. It is very unlikely that the few institutions which are specifically targeted for fisheries and agriculture are going to have that sort of expertise in every case.¹⁴²

3.180 AMSA's submission described the intensive process from experts across a range of disciplines and fields to conduct stock assessments:

Obtaining such information (which may be fishery dependent or fishery independent) relies on fisheries biologists and mathematical modellers, regular sampling by fisheries observers, compilation and analysis of the catch data by scientists and computation of various scenarios with respect to yield.¹⁴³

3.181 Associate Professor Robert Day said that 'usually you need a combination of mathematics and biology and there are very few students anywhere who have those qualifications.'¹⁴⁴ Professor Neil Loneragan said that attracting enrolments was largely dependent on the research interests of individuals. The long-term direction of the university is something 'you cannot control', he said, adding: 'That depends on the success of the research area and the demand for teaching in the area.'¹⁴⁵ Mr Greg Jenkins (Challenger Institute) said that in his view there is 'a lot of competition' among universities, at least in his home State of Western Australia, and consequently 'the entry standards have lowered.'¹⁴⁶

3.182 Dr Michael Hughes (Office of the Chief Scientist) said that based on figures from the Department of Education, Employment and Workplace Relations, the numbers of students in specialised agricultural science or fisheries science degrees has 'steadily declined'. He said fisheries science has now become encompassed part of physical and natural sciences degrees, although this will expand the cohort of graduates.¹⁴⁷ He added

141 Assoc Prof Robert Day, *Committee Hansard*, 29 June 2012, p.5.

142 Assoc Prof Robert Day, *Committee Hansard*, 29 June 2012, pp.5-6.

143 AMSA, Submission 14, p.4.

144 Associate Professor Robert Day, *Committee Hansard*, 29 June 2012, p.6.

145 Prof Neil Loneragan, *Committee Hansard*, 9 July 2012, p.45.

146 Mr Greg Jenkins, *Committee Hansard*, 9 July 2012, p.39.

147 Dr Michael Hughes, *Committee Hansard*, 29 June 2012, p.1.

that cadetships and scholarships should be available to add ‘some attractiveness and career path that is laid out and clear in the fisheries and aquaculture sector.’¹⁴⁸ Dr Hughes (Office of the Chief Scientist) said that although he believed ‘potential’ existed through cooperative research centres (CRCs):

...to be quite frank, the way this situation is at the moment is not ideal. There is a disconnect between people at the coalface and recognition of the problems they are having and the science that they need to innovate and deal with those problems.¹⁴⁹

3.183 Dr Patrick Hone (FRDC) agreed that the number of fisheries science courses are ‘in decline’, though he said this has been offset by an enlarged pool of employable graduates:

It is fair to say, though, that in our industry the sorts of graduates that come in from science are multidisciplinary – they will come from information technology, computational science or nutrition backgrounds. There are plenty of good graduates still coming through the system in that regard.¹⁵⁰

3.184 He said that in some areas, however, there is a shortage of graduates:

The veterinary area is an area where we still have some gaps. We still struggle to get aquatic animal health vets coming through the system and we are trying to address that. We still do have some gaps around computational science – mathematical modellers – not because there are not mathematical modellers; it is just that the competition for those sorts of people is very intense, like in a lot of industries.¹⁵¹

3.185 Dr Hone added that regarding courses aimed at the technical and trade level, ‘there are definitely requirements to do more work in TAFE-type colleges’.¹⁵²

3.186 Associate Professor Robert Day (University of Melbourne Department of Zoology) said the FRDC should offer small grants to doctoral students to fund the operational costs of their projects, which should be framed to:

drive greater collaboration between industry, universities and state based fishery agencies and create a pathway to attract

148 Dr Michael Hughes, *Committee Hansard*, 29 June 2012, p.2.

149 Dr Michael Hughes, *Committee Hansard*, 29 June 2012, p.3.

150 Dr Patrick Hone, *Committee Hansard*, 20 June 2012, p.7.

151 Dr Patrick Hone, *Committee Hansard*, 20 June 2012, p.7.

152 Dr Patrick Hone, *Committee Hansard*, 20 June 2012, p.7.

students who are interested in this from anywhere in Australia and train them in the fisheries and aquaculture fields.¹⁵³

3.187 Dr Elizabeth Smith (private capacity) said:

The difficulty that I saw as a working scientist and which I still see in scientific research is that research tends to get narrower and narrower and narrower. It has to because only in that way can you fully understand a system, but there are fewer people who are doing the broad-range research and it tends not to be the younger people.¹⁵⁴

3.188 Dr Smith suggested there could be fellowships offered that are designed to provide students with broader views.¹⁵⁵

3.189 Dr Len Stephens (Seafood CRC) said that CRCs are obliged to fund graduate students and that the Seafood CRC is funding around 55 students.¹⁵⁶

Setting priorities and coordinating efforts

3.190 The *National Fishing and Aquaculture RD&E Strategy 2010* (RD&E Strategy), developed by the Primary Industries Ministerial Council, aims to establish:

‘the future direction to improve the focus, efficiency and effectiveness of RD&E to support Australia’s fishing and aquaculture industry’¹⁵⁷

3.191 The RD&E Strategy’s ‘research themes’ included ecosystems, climate change, governance, marine resources and social and economic issues.

3.192 Despite the aim of the RD&E Strategy, a number of witnesses claimed that the organisation of fisheries science in Australia is devolved, dispersed and not well coordinated.

3.193 The RD&E Strategy itself recognises that in 2010 there was ‘no common forum for stakeholders to work together on RD&E’ and characterised Australia’s fisheries research effort as being one of ‘confusion, competition, inefficient investment and suboptimal adoption rates.’ Once

153 Assoc Prof Robert Day, *Committee Hansard*, 29 June 2012, p.5.

154 Dr Elizabeth Smith, *Committee Hansard*, 12 July 2012, p.10.

155 Dr Elizabeth Smith, *Committee Hansard*, 12 July 2012, p.10.

156 Dr Len Stephens, *Proof Committee Hansard*, 22 August 2012, p.3.

157 FRDC, ‘National RD&E Framework’, at http://www.frdc.com.au/research/RDEPlanningandPriorities/Pages/nat_framework.aspx

implemented, it was claimed the RD&E Strategy would result in 'higher returns on the substantial resources invested by government and industry'.¹⁵⁸

3.194 A key issue for achieving coordination is that the range of fisheries research stakeholders is diverse, potentially emanating from the following types of organisations:

- state and Federal government departments with responsibility for the primary industries and environment portfolios;
- independent institutes, relying on a mixture of government and non-government funding, which deliver relevant projects in accordance with the wishes of their stakeholders and financiers (but unlike universities, most do not have teaching programs, though they may fund graduate studies) (e.g. CSIRO, AIMS, FRDC, CRCs);
- universities, with expertise in areas including marine resources, habitats, ecosystems, climatic studies, oceanography, oceans policy and aquaculture. Universities are also training the future generations of fisheries scientists;
- technical skills institutes, which concentrate on practical aspects of harvesting fish, workforce training and improving production; and
- museums and aquariums, which collect and catalogue taxonomic information about fish species.

3.195 According to the WWF's submission, coordination is still generally lacking:

There are significant differences across the jurisdictions' arrangements for delivery of scientific advice, engagement of stakeholders, the identification of research priorities and the conduct of peer review and evaluation of scientific research.¹⁵⁹

3.196 The WWF submitted that although some research programs been developed to address issues at a national or regional level, many institutions continue to operate in 'silos' based around jurisdictions or sectors, 'and this restricts their access to funding and prevents them achieving the "critical mass" required to address and increasingly complex set of questions.' The tight and uncertain funding situation

158 Primary Industries Research Ministerial Council, 'National Fishing and Aquaculture RD&E Strategy 2010', April 2010, pp.1-2.

159 WWF, Submission 11, p.4.

(except for the CSIRO, which has core funding), according to WWF, 'does not engender good strategic planning of either research or expertise.'¹⁶⁰

3.197 Professor Michael Kingsford (James Cook University) said:

Essentially, you have a limited number of scientists and managers in Australia. You want to maximise the interaction between them and maximise the opportunities for collaborative research.¹⁶¹

3.198 Mr Jon Bryan (TCT) said there is 'no coordinating body' and 'there tends to be silos'.¹⁶² Mr Bryan also that the FRDC was essentially 'an industry research group' with 'fairly narrow, industry-directed research goals which look at industry problems in the short-term'.¹⁶³

3.199 Dr Elizabeth Smith (private capacity) said:

I do believe that publicly funded science should be for the benefit of the public and the environment, not so much for the benefit of private companies or publicly listed companies.¹⁶⁴

3.200 The NSW Department of Primary Industries submitted that there are a number of structures and processes in place which are designed to ensure collaboration and minimise duplication of effort.¹⁶⁵ NSW DPI suggested:

To build upon this success and formalise these processes, NSW recommends the development of a national centralised database or notification register for fisheries and aquaculture-related projects.¹⁶⁶

3.201 Professor Steve Kennelly (Director Fisheries Research, NSW DPI) said that a web-based format would be preferable; he commented that past attempts had led to incomprehensible 'reams of paper' being produced.

3.202 The Committee heard a variety of views regarding priority accorded to research fields or sectors, with witnesses concerned that important areas are not being accorded appropriate priority.

3.203 Associate Professor Tim Day and Dr Rob Dempster submitted that 'almost all' funding for fisheries and aquaculture research is 'focused on tactical research for management' and 'strategic research with obvious direct

160 WWF, Submission 11, p.2.

161 Prof Michael Kingsford, *Committee Hansard*, 31 July 2012, p.20.

162 Mr Jon Bryan, *Committee Hansard*, 12 July 2012, p.32.

163 Mr Jon Bryan, *Committee Hansard*, 12 July 2012, p.31.

164 Dr Elizabeth Smith, *Committee Hansard*, 12 July 2012, p.6.

165 NSW DPI, Submission 32, p.2.

166 NSW DPI, Submission 32, p.2.

benefit for the industries.’¹⁶⁷ However, Mr Warwick Nash (Queensland DAFF) explained that research involving information-gathering, such as for ongoing stock assessments, is not of particular interest to universities because it is not publishable. He said:

Universities to a large extent get funded by the quality of the research that they do and the number of papers they have in those high-level journals. So, to some extent, the type of research that is needed for the states to be able to have their fisheries going into the future is not the sort of work that is attractive to universities.¹⁶⁸

3.204 Mr Richard Stevens (WAFIC) said that most science is about counting fish and oceanography and felt that contrary to claims of other witnesses, industry is ‘neglected’.¹⁶⁹

3.205 Mr Gregory Jenkins (Challenger Institute of Technology) said:

We only use the science when we have a problem that prevents our industry partner getting to a particular goal. Scientists love their science, they love their areas. Quite often perhaps... some of their science may not be completely necessary for the industry to move forward but it may be important for their career progression. Our career progression depends on us having an industry result. It has certainly got nothing to do with a number of papers we publish.¹⁷⁰

3.206 The recreational fishing sector also expressed concerns about having its interests perceived as being unimportant. Mrs Judith Lynne (Sunfish Queensland) said that the sector cannot make its case when ‘it is the commercial sector that receives all the interest’ and ‘the science dollar is being spent elsewhere.’¹⁷¹

3.207 The Australian Marine Science Association expressed a similar view, noting that whilst historically commercial interests have set priorities, there has been a realisation of the need to include recreational fishers, indigenous fishers and other community groups.¹⁷²

3.208 DAFF assured the Committee that while some duplication may exist, coordination is being achieved. Mr Ian Thompson (DAFF) said that

167 Day and Dempster, Submission 17, p.3.

168 Mr Warwick Nash, *Committee Hansard*, 20 August 2012, p.5.

169 Mr Richard Stevens, *Committee Hansard*, 9 July 2012, p.12.

170 Mr Greg Jenkins, *Committee Hansard*, 9 July 2012, p.38.

171 Mrs Judith Lynne, *Committee Hansard*, 31 July 2012, pp.14-15.

172 AMSA, Submission 14, p.8.

generally, research providers 'tend to specialise in different areas' and coordinate their work through the National Fishing and Aquaculture RD&E Strategy 2010 and forums to minimise duplication and overlap. However, he said:

The risk of it happening with so many providers is probably quite high but, with budget pressures and the existence of a coordination strategy, I am in no position to say how much overlap still exists or whether it ever did exist.¹⁷³

3.209 He said the potential for 'inefficiency and duplication' is addressed through the National Fishing and Aquaculture RD&E Strategy 2010:

It is brought to life through the cooperation between Commonwealth and states in the Australian Fisheries Management Forum, which is Commonwealth and state fisheries managers, and the FRDC plays a major role in coordination implementation. Under that strategy there tends to be some specialisation between states and the Commonwealth and institutes in what they should do so everyone does not need to be an expert in everything.¹⁷⁴

3.210 Mr Gordon Neil (DAFF) added that there is 'a big effort to avoid duplication' through the research and development strategy and forums convened by the FRDC.¹⁷⁵

Communicating fisheries research through public education

3.211 A number of witnesses expressed a degree of concern that at times, the standards of fisheries management and sustainability of species is subject to unfair or factually questionable public commentary, based upon mistaken perceptions and incomplete information.

3.212 Dr Anthony Smith (CSIRO Wealth from Oceans National Flagship) said that although Australian fisheries are 'well-managed', with few exceptions:

The difficulty is that globally there is quite a lot of mismanagement in fisheries and there is quite a lot of overfishing. I think the media tends to play up those issues, and that is a lot of what influences public perception. ...there is not a lot of

173 Mr Ian Thompson, *Committee Hansard*, 30 May 2012, p.9.

174 Mr Ian Thompson, *Committee Hansard*, 30 May 2012, p.2.

175 Mr Gordon Neil, *Committee Hansard*, 30 May 2012, p.9.

differentiation in the public's mind between the global situation and the situation in Australia.¹⁷⁶

- 3.213 Dr Smith said the CSIRO is considering ways to improve the public perception, 'or at least get it based on more realistic information and science.'¹⁷⁷ Professor Neil Loneragan (Murdoch University) commented that science is being used for 'political arguments' and has become 'lost'.¹⁷⁸ Mr Neil Stump (TSIC) said that there are people who are 'hell-bent on ignoring the science'.¹⁷⁹ Mr Robert Gott (DPIPWE) said:

There are some sections of the community that want a zero-risk approach. The amount of science that would need to be invested to get to that point would be significant and we will probably never achieve that outcome.¹⁸⁰

- 3.214 Dr Adam Main (TSGA) said:

I see that there is a tremendous amount of science being done for our industry by some very qualified and independent researchers. It is my role, our role – that of the company – to try and get the science translated across so it is understood, not just by the community but also by government. Failure to do that means that there could be a perception that we are not utilising science when we make decisions or plan.¹⁸¹

- 3.215 Dr Andrew Rowland (RecFish West) explained the need to adequately communicate decisions:

The essential role of science in underpinning the management is one thing, but it is actually the understanding of the science in the community which is needed, given the political nature of the way management decisions are made, particularly given the large size of the recreational fishing community.

- 3.216 He continued:

If the science is solid and it is communicated well and the rationale and reasons behind any management reforms are put forward in that manner, then generally we have found that the recreational fishing community will be accepting of any changes and, indeed,

176 Dr Anthony Smith, *Committee Hansard*, 12 July 2012, p.12.

177 Dr Anthony Smith, *Committee Hansard*, 12 July 2012, p.12.

178 Prof Neil Loneragan, *Committee Hansard*, 9 July 2012, p.44.

179 Mr Neil Stump, *Committee Hansard*, 12 July 2012, p.55.

180 Mr Robert Gott, *Committee Hansard*, 12 July 2012, p.50.

181 Dr Adam Main, *Committee Hansard*, 12 July 2012, p.59.

as I said earlier, will drive those changes because they care deeply about the resource.¹⁸²

- 3.217 Dr Len Stephens (Seafood CRC) emphasised the need for customer outreach to feature in production research and ‘marketing science’. He explained:

The CRC is doing a lot of work in the area of the three major activities... technical research in the whole area of seafood product, packaging and retailing; consumer research – consumers’ attitudes to seafood and seafood marketing and retailing; and provision of technical advice on issues such as trade negotiations...¹⁸³

- 3.218 Dr Stephens commented that he believed that ‘post-harvest research into seafood... is an area where Australia’s capability is quite deficient.’¹⁸⁴ However, he said there have been efforts to communicate the health benefits of seafood through schools, health professionals, industry and retailers.¹⁸⁵

- 3.219 Professor Colin Simpfendorfer (JCU) said that managing fish is about managing the people who catch fish, which means taking account of the social aspects of fishing within the research agenda, in particular attitudes and behaviours.¹⁸⁶

Committee Comment

- 3.220 Fisheries research makes a significant contribution to the fishing industry, communities and the environment. Fisheries science contributes to:
- maintaining the industry’s comparative advantages;
 - guaranteeing that marine resources will be available for future generations;
 - ensuring the health of ecosystems and the environment; and
 - informing and reassuring consumers and markets that Australian products are harvested sustainably from fisheries managed under best-practice conditions.

182 Dr Andrew Rowland, *Committee Hansard*, 9 July 2012, p.30.

183 Dr Len Stephens, *Committee Hansard*, 22 August 2012, p.2.

184 Dr Len Stephens, *Committee Hansard*, 22 August 2012, p.3.

185 Dr Len Stephens, *Committee Hansard*, 22 August 2012, p.3.

186 Prof Simpfendorfer, *Committee Hansard*, 31 July 2012, p.25.

- 3.221 The Committee found that Australian fisheries science is world leading, and that our fisheries are well managed - especially in comparison to international standards. However, the Committee also heard of the challenges of prioritising limited research funding in order to find the right balance between diverse stakeholder agendas and also between short and long term interests.
- 3.222 Despite the increasing demand for high quality research the Committee heard of the challenges in getting the right people with the right skills into the industry. In particular, the area of veterinary science for fisheries and aquaculture was highlighted to the Committee, and this area is discussed in more detail in Chapter 5.
- 3.223 While the aims of better coordination within the National Fishing and Aquaculture RD&E Strategy 2010 are commendable, the Committee nevertheless found that issues of poor coordination and disagreement surrounding research priorities still appear widespread. Industry, recreational fishers, environment groups and academics expressed concern that one aspect or another of fisheries science is not given high enough priority or attention. The Committee is not in a position to judge whether certain aspects of fisheries research are being neglected nor to specifically identify a source of coordination or leadership failure. However, unless these issues can be addressed there is a risk that the RD&E Strategy could become marginalised. The Strategy itself identifies a number of pre-existing shortcomings, to which the Strategy in part was expected to respond.
- 3.224 The Committee recognises that the RD&E Strategy is at the early stages of implementation, however, it also believes that a review should be undertaken to assess how the RD&E Strategy is improving coordination outcomes. As part of this review - and update of the strategy if necessary - there should be consideration of new coordination mechanisms, such as a regular national fisheries RD&E forum and registry of research projects.
- 3.225 In addition to the appropriate research being undertaken and published, there is a need to ensure that it is also communicated amongst the industry, and to the community at large. It is essential that scientists themselves be active in this communication effort. Numerous witnesses commented on the high esteem in which Australian fisheries management and aquaculture development is held around the world. However, it was also evident throughout the inquiry that this does not always find reflection in Australian community attitudes towards fisheries management and aquaculture. Problems with other countries fisheries management of environmental outcomes are too often falsely claimed to

also be occurring in Australia. Ongoing efforts by scientists, industry stakeholders, fisheries managers, and governments will be fundamental to overcoming these misconceptions; and achieving greater public awareness and acceptance of the strong management and environmental sustainability credentials of our fisheries.

- 3.226 The importance of seafood for health has been addressed during the inquiry, and the Committee believes that further work by the FRDC and Seafood CRC (amongst others) can ensure that this message is widely understood.

Recommendation 10

- 3.227 **The Committee recommends that the Australian Primary Industries Ministerial Council commission a review of the 'National Fishing and Aquaculture RD&E Strategy 2010', to assess progress in achieving the Strategy's aims, in particular in regard to the co-ordination of Australia's scientific effort. The review should consider whether additional mechanisms are necessary to complement the strategy, such as a regular national fisheries research, development and extension forum or registry of research projects.**

