Chapter 6

Marine, freshwater and island environmental biosecurity issues

6.1 This chapter considers some specific environmental biosecurity issues that were raised during the committee's inquiry relating to marine and freshwater aquatic biosecurity, and the biosecurity of islands.

6.2 This chapter also considers proposed alterations to the governance of marine biosecurity contained in the Biosecurity Bill 2014.

Marine biosecurity

6.3 The recent CSIRO report, *Australia's Biosecurity Future*, outlined the current marine biosecurity environment:

> The invasion of marine ecosystems by non-indigenous species continues to increase and the control and eradication of invasive marine species is both technically and financially difficult. Each year, more than 11,000 vessels from 600 overseas ports visit Australia's 65 major ports. Globally, it is estimated that more than 3,000 organisms are transported in ballast water every day. Of these, 494 species are known to be established in Australian waters, including 156 that are native, 129 that are non-native and 209 that are of unknown origin. However, it is likely that as few as five to eight of these pests are of real concern.[1]

6.4 The Department of Agriculture stated that Australia has over 250 introduced marine species and that, although most of these species have little impact, 'some, including several crabs, mussels, seastars and seaweeds, have become aggressive pests in some locations.'[2]

6.5 Several submitters and witnesses identified biosecurity in the marine environment as an issue of concern.[3] The Invasive Species Council cited information from the Department of Agriculture:

> Invasive species are major threats to Australia's marine biodiversity. Australian waters already have an estimated 250 introduced species, another 230 cryptogenic species (whose origins are uncertain but are considered likely to be exotic) and 6 native species dispersed beyond their

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1 CSIRO, *Australia's Biosecurity Future: preparing for future biological challenges*, 2014, p. 65, (accessed 12 January 2015) http://www.csiro.au/Organisation-Structure/Flagships/Biosecurity-Flagship/Biosecurity-Futures-Report.aspx

2 Department of Agriculture, 'Marine Pests', (accessed 12 January 2015), http://www.agriculture.gov.au/natural-resources/invasive/invasive_marine_species

3 See, for example, Dr Judy Fisher, Theme Leader, Ecosystems and Invasive Species, IUCN Commission on Ecosystem Management, *Committee Hansard*, 8 October 2014, pp 6, 7; Ports Australia, *Submission 42*; Invasive Species Council, *Submission 74*, pp 73–75.

> native range. It is estimated that an additional average 3 to 4 species establish in Australian waters each year.[4]

6.6 CSIRO submitted that it undertook a prioritisation of marine pests in 2005 and the resultant invasion database included:

> 1582 marine and estuarine species that have been transported by human-mediated activities or have human-mediated invasion histories around the world. 207 of these species do not have a known invasion history but have been reported in either ballast water (128), hull fouling (50) samples, or on another vector (29). 494 of the species are known to be established in Australian waters of which: 156 are native; 129 are non-native; and 209 are cryptogenic. Almost 300 of the species in the database are known to be absent from Australian waters, whereas the establishment status in Australia of the remaining 789 species is uncertain.[5]

6.7 Submitters pointed out that, with increases in shipping, the risk of marine invasions also rises.[6]

6.8 Mr Michael McMullan, Acting Director-General of the Western Australian Department of Fisheries, told the committee that containment of aquatic pests and diseases is 'highly problematic' as they are often found in open systems and that:

> To have any chance of preventing establishment, aquatic pest or disease incursions must be dealt with at the earliest stages of arrival. Indeed, to date, there has been no successful eradication of an established marine pest anywhere in the world.[7]

Coordination and consultation in relation to marine biosecurity

6.9 In 2005, the Australian, state and Northern Territory Governments agreed to develop, implement and maintain a National System for the Prevention and Management of Marine Pest Incursions (National Marine Pest System). The Marine Pest Sectoral Committee (MPSC) is responsible for the development, implementation and review of the National System.[8] The Committee's membership is as follows:

> …two representatives from the Australian Government and one government representative from each state and the Northern Territory. Members come

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4 Invasive Species Council, *Submission 74*, p. 73.

5 CSIRO, *Submission 48*, p. 8.

6 See, for example, Invasive Species Council, *Submission 74*, p. 73; Dr Judy Fisher, Theme Leader, Ecosystems and Invasive Species, IUCN Commission on Ecosystem Management, *Committee Hansard*, 8 October 2014, p. 6.

7 Mr Michael McMullan, Acting Director-General, Department of Fisheries, Western Australia, *Committee Hansard*, 8 October 2014, p. 26; see also Department of Fisheries, Western Australia, *Background information*, provided 8 October 2014.

8 Australian Government, *National System for the Prevention and Management of Marine Pest Incursions* , www.marinepests.gov.au (accessed 22 October 2014); see also Shipping Australia, *Submission 9*, p. 2; Ms Victoria Aitken, Biosecurity Section Leader, Department of Fisheries, Western Australia, *Committee Hansard*, 8 October 2014, p. 31.

> from the agency with responsibility for marine pest issues within each jurisdiction but bring a whole of government position to MPSC discussions.
>
> The committee has three observers based on technical/scientific expertise. New Zealand is a standing observer on MPSC.[9]

6.10 Prevention measures under the National Marine Pest System are focused on managing risks in three distinct areas: ballast water; biofouling; and the aquarium trade.

6.11 With regard to the National Marine Pest System, Ports Australia submitted that engagement with both industry and environment groups is limited:

> Notwithstanding the policies and guidelines put in place for marine pests by the Commonwealth, engagement with the shipping and ports industries is somewhat perfunctory. The Marine Pest Sectoral Committee (MPSC) is the body responsible for the national system and is comprised of representatives from the Australian Government, each state government and the Northern Territory. Industry and environment groups have been sidelined into an "industry consultation group".[10]

6.12 Ports Australia also noted that marine pest incursions are managed under the NEBRA, which it submitted has 'fairly weak wording', has not been legislated and 'therefore has no teeth' and is 'fairly easy to circumvent'.[11]

6.13 The committee also received evidence arguing that, despite the existence of the National Marine Pest System, there is still considerable inconsistency across Australian jurisdictions in the approach to marine pests. For example, Shipping Australia expressed concern about the differences in marine biosecurity regulation, policy and procedures between jurisdictions around Australia. Shipping Australia submitted that:

> These differences complicate effective and efficient marine biosecurity management, particularly in association with commercial shipping activities. Biosecurity legislation must be synchronized across Australia to ensure consistency of approach, it is unreasonable for a Master of an international vessel calling in a number of States to be au fait with the variances in regulations and reporting requirements for each port. Shipping is international and Australia must follow international conventions. Duplicate and overlapping State and Federal legislation which adds costs and dissuades commercial shipping is detrimental to Australia and must be avoided.[12]

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9 Department of Agriculture, 'Marine Pest Sectoral Committee', http://www.agriculture.gov.au/animal-plant-health/pests-diseases-weeds/marine-pests/mp-sect-committee (accessed 12 January 2015).

10 Ports Australia, *Submission 42*, p. 1.

11 Ports Australia, *Submission 42*, p. 2.

12 Shipping Australia, *Submission 9*, p. 3.

6.14 Ms Victoria Aitken, from the WA Department of Fisheries, told the committee that there is 'great inconsistency between the states on how much they do', citing port monitoring (which is discussed further below) as a key example of this inconsistency.[13]

6.15 In addition to concerns about a lack of consistency between the states, the committee also received evidence expressing concern about the management of marine biosecurity within some states. For example, the Victorian National Parks Association described the coordination between environment and primary industry agencies in relation to marine biosecurity as 'poor'.[14] The Victorian Auditor-General conducted an audit of Victoria's 30 marine protected areas in 2011 and found significant shortcomings, a finding that echoed the results of an earlier audit of the management of invasive plants and animals in Victoria's Parks. The Auditor-General stated:

> Parks Victoria cannot show that marine biodiversity is being protected or that the related management obligations of applying resources as intended are being discharged. Little environmental management activity is evident across its [marine protected areas].
>
> In common with our 2010 performance audit, *Control of Invasive Plants and Animals in Victoria's Parks*, this audit points to systemic weaknesses with planning, program management and resource allocation that should be addressed.[15]

Priority Marine Pests

6.16 The departments of agriculture and the environment advised that the Marine Pest Sectoral Committee is 'currently developing criteria for the Australian Priority Marine Pests List which will include species assessed as having a nationally significant impact if they were to become established in the Australian marine environment'. The departments noted that this assessment will:

> …consider the outcomes of a review of the Consultative Committee on Introduced Marine Pests' Environmental Biosecurity Trigger List against the national significance criteria set out in the National Environmental Biosecurity Response Agreement, which was commissioned by the department and undertaken by CSIRO.[16]

6.17 As discussed in the previous chapter, the Australian Museum expressed concern about the quality of the marine priority species list contained in the *Species*

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13 Ms Victoria Aitken, Biosecurity Section Leader, Department of Fisheries, Western Australia, *Committee Hansard*, 8 October 2014, p. 28.

14 VNPA, *Submission 66*, p. 3.

15 Victorian Auditor-General, *Environmental Management of Marine Protected Areas*, March 2011, p. vii, http://www.audit.vic.gov.au/publications/2010-11/20110302-Marine.pdf (accessed 12 January 2015).

16 See, for example, Departments of Agriculture and the Environment, *Submission 59*, pp 27–28.

biofouling risk assessment report, which in its view contained some non-invasive species and did not contain several highly invasive species.[17]

6.18 The Great Barrier Reef Marine Park Authority identified the Asian green mussel (*Perna viridis*) as an issue of concern for marine biodiversity in the Great Barrier Reef region, and noted that it has been detected four times in the region since 2002.[18]

6.19 Other high-priority marine pests and diseases not yet established in Australia that were identified in evidence to the committee included Asian green mussels; White colonial ascidian *Didemnum perlucidum;*[19] and the island apple snail[20].

6.20 The Tasmanian Salmonid Growers Association emphasised that, in the case of aquaculture, the health of the environment is essential to the success of the industry. Environmental and industry biosecurity are therefore, in their view, very closely related concerns. The association identified the introduction via ballast water of toxic dinoflagellates as a significant threat both to the environment and to aquaculture in coastal marine waters and estuaries.[21]

Key pathways

6.21 The committee received evidence that two of the key pathways for exotic marine species are from the accumulation of pests attached to vessel hulls ('biofouling') or through water carried in vessels to maintain their stability (ballast water).[22] Other pathways identified included the ornamental fish trade, aquaculture, the food trade and recreational fishing.[23]

6.22 Ballast water and biofouling are discussed further below. The ornamental fish trade is discussed further in the section on freshwater biosecurity below.

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17 Australian Museum, Submission 36, pp. 3–4; Also see discussion of the island apple snail by Dr Donald Colgan, Principal Research Scientist, Group Head Malacology, Australian Museum, *Committee Hansard*, 11 November 2014, p. 40.

18 Great Barrier Reef Marine Park Authority, *Submission 19*, p. 2.

19 Mr Michael McMullan, Acting Director-General, Department of Fisheries, Western Australia, *Committee Hansard*, 8 October 2014, p. 26; see also GBRMPA, *Submission 19*, p. 2.

20 Dr Donald Colgan, Principal Research Scientist, Group Head Malacology, Australian Museum *Committee Hansard*, 11 November 2014, p. 40.

21 Tasmanian Salmonid Growers Association, *Submission 21*, p. 2.

22 See, for example, CSIRO, *Submission* 48, p. 7; Departments of Agriculture and the Environment, *Submission 59*, p. 27; Mr Michael McMullan, Acting Director-General, Department of Fisheries, Western Australia, *Committee Hansard*, 8 October 2014, p. 26; Invasive Species Council, *Submission 74*, pp 73–74.

23 Mr Michael McMullan, Acting Director-General, Department of Fisheries, Western Australia, *Committee Hansard*, 8 October 2014, p. 26; see also Department of Fisheries, Western Australia, *Background information*, provided 8 October 2014, p. 2.

Ballast water

6.23 As noted above, 'ballast water' is water taken up and used to stabilise ships. The Australian Maritime Safety Authority explained that:

> The discharge of ballast water from ships is recognised as a significant biosecurity risk and has resulted in the spread of invasive marine species and pathogens around the world.[24]

6.24 The Australian Government introduced mandatory Australian Ballast Water Requirements in 2001 to 'reduce the risk of introducing harmful aquatic organisms into Australia's marine environment through ballast water from international vessels.' These requirements are implemented under the Quarantine Act and administered by the Department of Agriculture. They require vessels to exchange ballast water at sea prior to entering Australian waters.[25]

6.25 Australia signed the *International Convention for the Control and Management of Ships' Ballast Water and Sediments* (Ballast Water Convention) in 2005. AMSA submitted that the Ballast Water Convention 'aims to minimise the biosecurity risk associated with ballast water by providing uniform international control and management arrangements for the shipping industry'.[26] The *Australian Ballast Water Requirements* discussed above are consistent with the Ballast Water Convention.[27]

6.26 At the time of writing, the Convention had not yet entered into force, but AMSA suggested that it is likely to be ratified in 2015 and 'implemented globally during 2016'. AMSA explained that:

> Ratification and implementation of the Ballast Water Convention will significantly strengthen Australia's arrangements to prevent the entry and establishment of invasive marine species and pathogens. While there have been mandatory arrangements in place in Australia since 2001, the Ballast Water Convention will require ships to treat ballast water using methods that are considerably more effective at reducing biosecurity risk than the methods that are currently accepted by the Australian Government.[28]

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24 AMSA, *Submission 37*, p. 1.

25 Department of Agriculture, *Australian Ballast Water Requirements*, Version 5, 5 September 2013, p. 3, http://www.agriculture.gov.au/SiteCollectionDocuments/aqis/airvesselmilitary/vessels/ballast/ballast-water-mgmt-requirements-v5.pdf (accessed 12 January 2015).

26 AMSA, *Submission 37*, p. 1. See further IMO, *BWM Convention*, http://www.imo.org/OurWork/Environment/BallastWaterManagement/Pages/BWMConvention.aspx (accessed 29 October 2014).

27 Department of Agriculture, *Australian Ballast Water Requirements*, Version 5, 5 September 2013, p. 3, http://www.agriculture.gov.au/SiteCollectionDocuments/aqis/airvesselmilitary/vessels/ballast/ballast-water-mgmt-requirements-v5.pdf (accessed 12 January 2015).

28 AMSA, *Submission 37*, pp 1–2.

6.27 Shipping Australia submitted that 'the increased controls on ballast water and hull fouling being introduced by the International Maritime Organisation (IMO) will further enhance the protection of marine environments'.[29]

6.28 Victoria currently also has a ballast water regime governing ships entering Victorian ports from other Australian ports. These ships are required to comply with the following Victorian legislation: Waste Management Policy (Ships' Ballast Water) and Environment Protection (Ships' Ballast Water) Regulations 2006.[30]

6.29 The committee notes that the Beale review recommended that the Commonwealth 'extend its legislative reach to cover the field with respect to international and domestic ballast water regulation'.[31] Some submitters and witnesses noted that, in response to the Beale review, the Biosecurity Bill 2012 contained a chapter regulating ballast water management.[32] The Invasive Species Council endorsed this approach, but noted that many details of the proposed regime were to be contained in regulations or decisions of the Director of Biosecurity.[33]

6.30 Chapter 5 of the Biosecurity Bill 2014 addresses the regulation of ballast water and sediment of vessels. The chapter creates a single, Australia-wide ballast water and sediment management regime to cover both international and domestic vessels. The explanatory memorandum to the bill states that this will 'allow Australia to manage risks associated with ballast water and work towards ratification of the Ballast Water Convention.'[34]

6.31 This chapter of the bill is intended to cover the field with regard to ballast water biosecurity, which means that it, if enacted, it will 'operate to exclude any state or territory law that purports to deal with ballast water or sediment'. However, state and territory laws covering the treatment or disposal of ballast water or sediment after it has been removed from a vessel may operate concurrently with this proposed legislation.[35]

6.32 The chapter creates an offence of discharging ballast water in Australian seas, which carries a penalty of up to 2000 penalty units, or $340,000.[36] There are a number of exceptions to this offence detailed in the bill, including:

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29 Shipping Australia, *Submission 9*, p. 5.

30 Environment Protection Authority Victoria, 'Ballast Water', http://www.epa.vic.gov.au/your-environment/water/ballast-water (accessed 12 January 2015).

31 Beale, Roger et al, *One Biosecurity: a working partnership*, September 2008, p. xxxi, recommendation 4 and see also pp 21–22.

32 See, for example, Shipping Australia, *Submission 9*, p. 4; Invasive Species Council, *Submission 74*, p. 73.

33 Invasive Species Council, *Submission 74*, p. 73.

34 Explanatory Memorandum, Biosecurity Bill 2014, p. 12.

35 Explanatory Memorandum, Biosecurity Bill 2014, p. 198; Biosecurity Bill 2014, clause 265.

36 Biosecurity Bill 2014, clause 270; note that, under section 4AA of the *Crimes Act 1914* (Cth), one penalty unit is equal to $170.

- the ballast water has been managed for discharge in accordance with an approved method of ballast water management;
- the discharge of ballast water is part of an acceptable ballast water exchange;
- there has been an approved discharge to a ballast water reception facility;
- the discharge has been covered by an exemption granted by the Director of Biosecurity;
- the ballast water that was discharged was taken from the same place; and
- the discharge of ballast water has been necessary for safety of the vessel or persons at sea, the discharge was accidental, or if the discharge was for the purpose of avoiding or minimising pollution from the vessel.[37]

Biofouling

6.33 As noted above, marine pests can attach themselves to vessels and their associated equipment. This process is known as 'hull fouling' or 'biofouling', which is the accumulation of aquatic microorganisms, algae, plants and animals on vessel hulls and submerged surfaces. Levels of biofouling increase the longer a vessel or structure remains submerged in seawater.[38]

6.34 The Invasive Species Council submitted that biofouling 'is likely to be the dominant cause of marine invasions, potentially responsible for more than two-thirds of marine introductions world-wide'.[39] Indeed, the Department of Agriculture's website states that up to 75 per cent of the marine species introduced into Australian waters by vessels are likely to have arrived as biofouling organisms attached to vessels.[40] Ms Aitken from WA Fisheries described biofouling as 'by far the biggest risk for marine biosecurity'.[41]

6.35 However, many submitters expressed concern that Australia's approach to biofouling is inadequate. For example, the Invasive Species Council expressed concern that currently, 'fewer than 1% of arriving vessels are inspected for biofouling' and one in four of these inspected vessels have high priority pest species present in biofouling.[42]

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37 See Biosecurity Bill 2014, clauses 271, 276, 277, 279, 282 and 283.

38 Australian Government, *National System for the Prevention and Management of Marine Pest Incursions*, 'What is marine biofouling'. http://www.marinepests.gov.au/marine_pests/Pages/Biofouling-and-marine-pests.aspx (accessed 22 October 2014).

39 Invasive Species Council, *Submission 74*, p. 74.

40 Department of Agriculture, *Biofouling – the threat to Australia*, http://www.agriculture.gov.au/animal-plant-health/pests-diseases-weeds/marine-pests/biofouling/biofouling-threat (accessed 22 October 2014).

41 Ms Victoria Aitken, Biosecurity Section Leader, Department of Fisheries, Western Australia, *Committee Hansard*, 8 October 2014, p. 28.

42 Invasive Species Council, *Submission 74*, p. 74.

6.36 The Australian Museum similarly pointed to the inadequacy of biofouling regulation and submitted that:

> Despite the biosecurity threats posed by vessel biofouling, Australia is yet to develop empirically based fouling standards, contrasting strongly with New Zealand, for which mature Import Health Standards have existed for many years. Moreover, guidelines for Australian domestic shipping exist only as voluntary recommendations. Enforceable biofouling standards are required…[43]

6.37 Ports Australia noted that 'shipping operators have a heightened awareness of ballast water management procedure'.[44] By contrast, Ports Australia also submitted that shipping operators 'remain largely unaware of the issues associated with the impacts arising from hull fouling and the potential for incursions of marine pests at new locations'.[45]

6.38 Submitters and witnesses highlighted the need for a consistent national approach to the issue of hull fouling. For example, Ports Australia submitted that there is a 'lack of consistent and binding approach to biofouling risk management', and that 'differences and duplication of management practices within and between jurisdictions causes increased costs, time delays, uncertainties and misunderstandings'.[46] Ports Australia pointed out that:

> …in a number of jurisdictions there has been a distinct lack of engagement around hull fouling for a range of vessels operating from international locations. Some of the jurisdictions have put in place fragmented legislation and regulation which are potentially ineffective. We need consistency in policy and guidelines between the jurisdictions. Marine pests know no boundaries. It is all too easy for translocations to take place from jurisdiction to jurisdiction.[47]

6.39 The Invasive Species Council submitted that 'current federal, state and territory approaches to biofouling are deficient (mostly non-existent) and inconsistent'.[48] The Invasive Species Council noted that Western Australia has the most stringent requirements, and suggested a national approach should exceed those WA standards and 'apply them comprehensively to all vessel types, depending on individual and cumulative risks'.[49]

6.40 Indeed, the committee received evidence from the WA Department of Fisheries of their impressive work in this sphere, including stakeholder engagement

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43 Australian Museum, *Submission 36*, pp 4–5.

44 Ports Australia, *Submission 42*, p. 3.

45 Ports Australia, *Submission 42*, p. 3.

46 Ports Australia, *Submission 42*, p. 2.

47 Ports Australia, *Submission 42*, p. 2.

48 Invasive Species Council, *Submission 74*, p. 74.

49 Invasive Species Council, *Submission 74*, p. 74.

and a biofouling policy. Ms Aitken advised the committee that they provide clear guidance to all their stakeholders as to 'how they can lower the risk of their vessel bringing a pest into WA or moving one within WA'. The Western Australian department conducted a series of workshops, implemented in-water cleaning guidelines and developed a successful app for the public to report potential marine pests and diseases, which has resulted in 'thousands of pairs of eyes out there instead of just our team'. WA has also developed a vessel risk assessment tool called 'Vessel Check'.[50]

6.41 Several witnesses and submitters noted that the IMO has endorsed *Guidelines for control and management of biofouling to minimise the transfer of invasive aquatic species*.[51] The Department of Agriculture advised that these guidelines are being implemented in Australia, but did not provide any information as to how this is occurring.[52]

6.42 In Australia, on 26 June 2013, the COAG Standing Council on Primary Industries endorsed the 'Anti-fouling and in-water cleaning guidelines'. These guidelines apply to vessels and moveable structures such as oil and other exploration rigs, floating dry docks, pontoons, aquaculture installations and navigational structures.[53] There are also six national biofouling management guidance documents for different vessel categories (for example, for recreational vessels, commercial fishing vessels and the aquaculture industry).[54]

6.43 Under the National Marine Pest System, voluntary biofouling management guidelines have also been developed for a range of sectors, providing practical maintenance recommendations to help vessel operators manage biofouling.[55] In

50 Ms Victoria Aitken, Biosecurity Section Leader, Department of Fisheries, Western Australia, *Committee Hansard*, 8 October 2014, p. 30.

51 AMSA, *Submission 37*, p. 2; Invasive Species Council, *Submission 74*, p. 73; Shipping Australia, *Submission 9*, p. 4.

52 Department of Agriculture, *Answer to question on notice No. 3* (received 18 November 2014).

53 Department of Agriculture, *Anti-fouling and in-water cleaning guidelines*, http://www.agriculture.gov.au/animal-plant-health/pests-diseases-weeds/marine-pests/anti-fouling-and-inwater-cleaning-guidelines (accessed 22 October 2014); see also Shipping Australia, *Submission 9*, p. 3.

54 Australian Government, *National System for the Prevention and Management of Marine Pest Incursions*, 'Publications', http://www.marinepests.gov.au/marine_pests/publications/pages/default.aspx (accessed 22 October 2014).

55 Australian Government, 'Marine Pests – Publications', http://www.marinepests.gov.au/marine_pests/publications/pages/default.aspx (accessed 12 January 2015).

addition to these national guidelines, Western Australia and the Northern Territory also have their own biofouling management arrangements.[56]

6.44 However, submitters noted that these are just voluntary guidelines.[57] It was suggested that a mandatory regulatory regime may be required. For example, the Invasive Species Council recommended that the IMO guidelines be adopted in Australia, along with a national regulatory approach to biofouling to cover international and domestic traffic for all Australian waters.[58] The Invasive Species Council submitted that:

> All vessels should be required by law to undertake the risk-minimising measures specified in the biofouling guidelines specific to different types of vessels rather than leave it to voluntary compliance.[59]

6.45 The Invasive Species Council noted that the previous Biosecurity Bill 2012 did not propose a regulatory regime for biofouling, and suggested that this is a 'major gap' in biosecurity and environmental law.[60]

6.46 Ms Aitken from WA Fisheries similarly identified the lack of biofouling legislation as a big issue in marine biosecurity.[61]

6.47 The Invasive Species Council recommended a mandatory regulatory regime for anti-fouling and submitted that:

> This is justified on environmental and economic grounds due to the high likelihood of invasions by this pathway and the serious to catastrophic consequences that can result. A voluntary regime will not be sufficient to address the risk.[62]

> A consistent national approach…will be of benefit to business in reducing complexity arising from different state standards.[63]

6.48 Dr Main, Chief Executive Officer, Tasmanian Salmonid Growers Association Limited, and Mr Jungalwalla, Independent Executive Chair, National Aquaculture Council, provided the committee with information on biosecurity threats facing the aquaculture industry in general, and salmon farming in Tasmania in particular. The introduction of pathogens and diseases via imported fish products appears to be the

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56 Australian Government, 'Preventing new pests arriving in Australia', http://www.marinepests.gov.au/national-system/how-it-works/Pages/Prevention.aspx (accessed 12 January 2015).

57 See, for example, Ports Australia, *Submission 42*, p. 2.

58 Invasive Species Council, *Submission 74*, p. 75.

59 Invasive Species Council, *Submission 74*, p. 74.

60 Invasive Species Council, *Submission 74*, p. 73.

61 Mr Victoria Aitken, Biosecurity Section Leader, Department of Fisheries, Western Australia, *Committee Hansard*, 8 October 2014, p. 28.

62 Invasive Species Council, *Submission 74*, p. 73.

63 Invasive Species Council, *Submission 74*, p. 73.

most significant threat. However, the movement of pests and diseases on equipment and ships, both within Australian and from overseas, is also now a pathway of significant concern.[64]

6.49 Dr Main commented on the increasing threat posed to Tasmanian aquaculture by the movement of contaminated ships and equipment:

> That has changed from a minor issue to a major pathway issue. If it is barges, the boat may be at a safe distance, but there is still a risk with ships coming into that region, the south-east, which is one of the largest growing regions for salmonids. That is something that is now raising its head and increasing its profile in terms of a pathway. We have a benefit in being geographically isolated and that has served us well in terms of keeping the industry safe from pests and diseases. But moving forward, as Tasmania grows and opportunities are taken in other primary industries, we are going to be looking more intently at those pathways and coming up with strategies to minimise the risk.[65]

6.50 The committee notes that, in relation to biofouling, the Beale review recommended that the Commonwealth's legislative reach should be 'restricted to international vessels arriving in Australia, with the states and territories responsible for domestic biofouling requirements'. The Beale review further recommended that the Commonwealth should promote the development of an international convention covering biofouling through the International Maritime Organization.[66]

6.51 The committee also notes that the Biosecurity Bill 2014 does not address biofouling, in contrast to the situation with ballast water regulation described in previous section. This bill will therefore not address the concerns outlined above regarding the lack of a nationally consistent and enforceable management regime for biofouling in Australian waters.

6.52 Finally, the committee notes that the Department of Agriculture is currently conducting a review of national marine pest policy, which is due to report by 30 June 2015. The issues paper developed for this review states:

> For some time the department has been considering new biofouling management options for vessels arriving in Australian waters. This work will continue while the review is being conducted and will take into

64 Dr Adam Main, Chief Executive Officer, Tasmanian Salmonid Growers Association Limited and Mr Jungalwalla, Independent Executive Chair, National Aquaculture Council, *Committee Hansard*, 10 November 2014, p. 38.

65 Dr Adam Main, Chief Executive Officer, Tasmanian Salmonid Growers Association Limited, *Committee Hansard*, 10 November 2014, p. 38.

66 Beale, Roger et al, *One Biosecurity: a working partnership*, September 2008, recommendation 5, p. xxxi.

> consideration the input on biofouling management that is received from stakeholders during the review.[67]

Monitoring, compliance and enforcement relating to marine pests

6.53 As noted elsewhere in this report, submitters and witnesses raised concerns about biosecurity monitoring and surveillance. Several submissions and witnesses expressed particular concern about the adequacy of surveillance in relation to marine pests.

6.54 For example, the Australian Museum submitted that marine surveillance is inadequate and 'creates significant vulnerabilities'. The Australian Museum suggested that 'although surveillance is generally a state responsibility, a nationally co-ordinated approach is needed'. At the same time, they noted that responses to some recent marine incursions, such as the 2007 Green mussel (*Perna viridis*) incursion in Cairns and the New Zealand mussel in South Australia in 2008, 'appear to have been prompt, decisive and effective'.[68]

6.55 The Invasive Species Council lamented that 'there is little information about recent marine incursions due to a lack of marine surveillance and monitoring'. The Invasive Species Council suggested that there should be mandatory port marine pest surveys every five years, along with public reporting and disclosure of marine pest surveys.[69] The Invasive Species Council also emphasised the need for robust enforcement regimes and penalties 'to motivate compliance'.[70]

6.56 Ms Aitken of the WA Department of Fisheries told the committee that there are gaps in monitoring. She noted that Commonwealth officers inspect 'the top side of vessels' and ballast water, but 'there is no underneath inspection' for bioufouling.[71]

6.57 CSIRO similarly submitted that 'there are too many high priority risks given Australia's current capacity to respond' and provided the example of marine monitoring:

> ….a few years ago the Marine Pest Sectoral Committee initiated a marine monitoring network for invasive marine species across approximately 20 sites around Australia, yet some states have not completed any of this monitoring. Often high cost is raised as the issue preventing progress. Similarly there is currently little monitoring of ship biofouling (i.e. inspection of ship hulls arriving into Australia for their potential to be carrying invasive marine species) underway. Effectively this means that not

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67 Department of Agriculture, *National Marine Pest Biosecurity Review: Issues Paper*, 2014, p. 1, http://www.agriculture.gov.au/animal-plant-health/pests-diseases-weeds/marine-pests/review-national-marine-pest-biosecurity (accessed 12 January 2015).

68 Australian Museum, *Submission 36*, p. 4.

69 Invasive Species Council, *Submission 74*, pp 74–75.

70 Invasive Species Council, *Submission 74*, p. 74.

71 Ms Victoria Aitken, Biosecurity Section Leader, Department of Fisheries, Western Australia, *Committee Hansard*, 8 October 2014, p. 29 and see also p. 31.

> only do we not know what is coming in, we also don't know in most situations what is here already until the impacts are obvious.[72]

6.58 Shipping Australia expressed a related concern that 'it appears that certain state jurisdictions have not yet allocated the appropriate resources to undertake such marine pest monitoring, possibly due to funding limitations',[73] while Ports Australia submitted that:

> More focus needs to be placed on supporting ongoing surveillance of the marine setting, particularly at entry points of high risk, and these programs require national support.[74]

6.59 GBRMPA identified a need for 'stronger coordination of environmental monitoring, reporting and research and evaluation within and between ports'.[75] The authority also suggested that monitoring programs need to be established or enhanced to enable early detection of invasive marine and terrestrial species.[76] The authority submitted that, while there is a response plan for introduced pests in the Great Barrier Reef region, there is little or no planning for surveillance, management and prevention.[77]

6.60 The departments of agriculture and the environment submitted that a Marine Pest National Monitoring Strategy has been established under the National System for the Prevention and Management of Marine Pest Incursions. This Strategy provides for:

> …an ongoing national programme of targeted monitoring for marine pests to agreed minimum principles and standards. These principles and standards are set out in the Australian marine pest monitoring guidelines and the Australian marine pest monitoring manual to ensure the data is collected using rigorous, consistent methods and is of a suitable quality for scientifically-sound decision-making. This monitoring programme provides early detection of exotic marine pests and is used to routinely update assessments of the risk status of vectors to prevent marine pest introductions into and within Australia.[78]

6.61 Under the strategy, biennial monitoring will be undertaken at 18 high risk ports around Australia. However, the departments advised that 'there is uneven implementation of the programme across all jurisdictions'.[79] With regard to the

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72 CSIRO, *Submission 48*, p. 12.

73 Shipping Australia, *Submission 9*, p. 2.

74 Ports Australia, *Submission 42*, p. 3.

75 Great Barrier Reef Marine Park Authority, *Submission 19*, p. 3.

76 Great Barrier Reef Marine Park Authority, *Submission 19*, p. 3.

77 Great Barrier Reef Marine Park Authority, *Submission 19*, p. 2.

78 See, for example, Departments of Agriculture and the Environment, *Submission 59*, p. 31; see also Shipping Australia, *Submission 9*, pp 2 and 3.

79 See, for example, Departments of Agriculture and the Environment, *Submission 59*, p. 31.

implementation of marine monitoring by the states, Ms Mellor, Commonwealth Department of Agriculture, stated:

> The intention is and has been that states and territories ought to be monitoring marine pest imports. Certainly some years ago the Commonwealth provided seed funding to the states and territories to do that. Not all of them did. There has been some good results and not so good results. But it is the responsibility of the states and territories to understand what the pests are in their waters. From that perspective the expectation is that they will do that. It is difficult if they don't, because I cannot make them; they have to make their own decisions about the deployment of their resources. But certainly there have been a few issues with pests and diseases in the marine space and they are pretty attuned to it now.[80]

6.62 The Department of Agriculture also noted that, as part of the review of national marine pest policy, mentioned above, ABARES is reviewing the existing national monitoring strategy for marine pests with the aim of identifying 'the characteristics of the existing National Monitoring Strategy considered impediments and identify improvements or new characteristics that jurisdictions would accept and be willing to implement.'[81]

6.63 The Department of Agriculture also stated that the results of marine pest monitoring are published, once available, via the National Introduced Marine Pest Information System (NIMPIS).[82]

6.64 The Western Australian Department of Fisheries told the committee that the national system has identified 18 high-risk ports that require monitoring for marine pests and the department has identified 'an additional seven high-risk areas' in Western Australia that it also monitors at regular intervals.[83]

6.65 There is, however, inconsistency between states in terms of how much monitoring they undertake. While Western Australia monitors all of its high-risk ports, Ms Aitken stated that very few other states do. She also informed the committee that the resources applied to marine biosecurity vary greatly between states and that this affects national biosecurity:

> There are also great differences between the responses of the jurisdictions—how many staff are assigned, resourcing and those sorts of things. For instance, we regularly now find, because we are looking, significant high-risk pests on vessels that come into WA and we manage those. But there are knock-on effects if those vessels are going to other states, and we had one last week in that situation. We are quite good now at

80 Ms Rona Mellor, Deputy Secretary, Department of Agriculture, *Committee Hansard*, 31 October 2014, p. 22; see also p. 35.

81 Department of Agriculture, *Answer to question on notice No 5* (received 18 November 2014).

82 Department of Agriculture, *Answer to question on notice No 4* (received 18 November 2014).

83 Mr Michael McMullan, Acting Director-General, Department of Fisheries, Western Australia, *Committee Hansard*, 8 October 2014, p. 27.

> managing those situations, but other states do not necessarily have the processes in place to deal with them…[84]

Freshwater biosecurity

6.66 The committee received evidence raising concerns about the regulation of freshwater biosecurity in Australia. The biosecurity threat posed by the ornamental fish trade was a particular focus of submissions. A 2010 Bureau of Rural Sciences report states:

> The ornamental aquarium fish trade in Australia is estimated to be worth approximately $350 million annually. This ornamental fish industry encompasses commercial fish breeding facilities, wholesale traders and importers, retail outlets and the hobby sector.
>
> While a valuable industry, the introduction of exotic (non-native) species can present a significant risk to freshwater ecosystems in Australia and has the potential to alter or degrade natural systems. Exotic fish species have been implicated in the decline of 42 per cent of Australian native fish and several frog species.[85]

Regulation of the ornamental fish trade

6.67 The importation of ornamental fish is currently governed by both the EPBC Act and the Quarantine Act. A number of fish species are contained on the live import list made under section 303EB of the EPBC Act, both as species that can be imported without a permit from the Department of the Environment and as species that do require such a permit before being imported. Species permitted for import under the EPBC Act also require an import permit issued by the Department of Agriculture under the Quarantine Act.[86]

6.68 The committee notes that the Biosecurity Bill 2014 does not alter requirements under the EPBC Act. Chapter 3 of the bill does however propose arrangements for the importation of 'goods' into Australia, with goods being broadly defined to include plants and animals. Clauses 171 to 181 of this chapter provide that the Director of Biosecurity and the Director of Human Biosecurity can jointly determine that certain goods are 'prohibited' or 'conditionally non-prohibited'.[87]

6.69 Under this proposed legislation a good will be declared prohibited, which means it cannot be brought into Australia, only if each director is satisfied it poses an unacceptable level of biosecurity risk which cannot be reduced to an acceptable level.

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84 Ms Victoria Aitken, Biosecurity Section Leader, Department of Fisheries, Western Australia, *Committee Hansard*, 8 October 2014, p. 28.

85 A Moore, N Marton and A McNee, *A strategic approach to the management of ornamental fish in Australia: communication strategy and grey list review – a report to OFMIG*, Bureau of Rural Sciences, March 2010, p. iv.

86 See discussion EPBC Act and live imports in chapter 2.

87 Biosecurity Bill 2014, clauses 171 to 181.

If a good is determined to be 'conditionally non-prohibited' it may be imported provided specified conditions are met.[88]

6.70 The committee notes that no explicit role is given to the Department of the Environment in the determination of what goods are determined to be prohibited or conditionally non-prohibited under the proposed legislation.

6.71 A national strategy for the management of ornamental fish was approved by the then Natural Resource Management Ministerial Council of COAG. The strategy contains a list of noxious ornamental aquarium fish species that the states and territories have agreed to control through legislation and also a 'grey list' of species which require further assessment. Implementation of the national strategy is overseen by the national Freshwater Fish Working Group that reports to the Vertebrate Pest Committee.[89]

6.72 However, the 2010 Bureau of Rural Sciences report notes that ornamental fish imports are not well regulated under either the EPBC Act or the Quarantine Act:

> It is estimated that there are around 2000 species in the ornamental fish trade nationally, most of which are exotic to Australia. Many fish species in the ornamental fish trade are not on the current national permitted species lists established under Part 13A of the Environment Protection and Biodiversity Conservation Act 1999 or covered by quarantine regulations. It may be that such species have been permitted under previous statutory arrangements, but they are no longer on any national permitted lists and have not been assessed for potential risk to the Australian environment.[90]

Issues related to importation of ornamental fish

6.73 Some submitters and witnesses expressed specific concern about the ornamental fish trade and its implications for aquatic environments. For example, the Invasive Species Council submitted that:

> Live ornamental fish are a high risk group for introduced aquatic animal diseases into Australia, because they are vectors of numerous diseases, and are traded widely around the world, are imported in large numbers into Australia (>10 million a year) and are frequently released into waterways by aquarium owners.[91]

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88 Biosecurity Bill 2014, clauses 173 and 174.

89 Department of the Environment, 'Exotic Fish Trade', http://www.environment.gov.au/biodiversity/wildlife-trade/exotics/exotic-fish-trade (accessed 13 January 2015). For noxious and grey lists see Department of Agriculture, Fisheries and Forestry, *A strategic approach to the management of ornamental fish in Australia*, November 2006, p. 27.

90 A Moore, N Marton and A McNee, *A strategic approach to the management of ornamental fish in Australia: communication strategy and grey list review – a report to OFMIG*, Bureau of Rural Sciences, March 2010, p. iv.

91 Invasive Species Council, *Submission 74*, Attachment 1, p. 57.

6.74 The Invasive Species Council noted that more than 450 fish species are permitted for import into Australia. The Invasive Species Council noted that of 40 exotic fish species known to have established in Australian waterways, up to 30 were imported as aquarium fish, most of which were likely to have been illegally released into waterways.[92]

6.75 In addition, the Invasive Species Council noted that there is 'reportedly widespread illegal smuggling, breeding and trading of banned species of aquarium fish in Australia', and that prohibited species make up around 10% of the fish imported in Australia.[93]

6.76 The 2010 Bureau of Rural Sciences report provides similar figures on the number of ornamental fish species that have established in Australia's waterways:

> To date 30 ornamental fish species have found their way into Australian native aquatic ecosystems and have been shown to have a significant impact on these systems. Of the 30 ornamental species established in Australia, 10 (33 per cent) of these species are currently on the permitted imports list, demonstrating how aquarium species can find there way into freshwater systems. Future escapes of ornamental fish have the potential to compound current impacts on native faunal and floral assemblages.[94]

6.77 The potential adverse impact on the environment of the release of fish was detailed in evidence. The Condamine Alliance, for example, highlighted the threat posed to the Murray-Darling Basin by introduced invasive freshwater species, in particular the danger posed by tilapia, a group of freshwater fish in the Cichlidae family. The alliance stated that tilapia are thought to have entered Australia's waterways via the aquarium trade and have been present in waterways in Queensland and Western Australia since the 1970s. However, the Condamine Alliance expressed concern about their potential to invade the Murray-Darling Basin:

> An investigation by Hutchison et al. (2011) indicates that if tilapia were to enter the Northern Basin, there is potential that they could spread to approximately 50 per cent of the basin, as far as the Lower Lakes and lower Murray in South Australia. Predicted temperature rise of 1 to 2 degrees associated with climate change may mean that tilapia could disperse throughout the entire [Murray-Darling Basin] (Hutchison et al. 2011) as their thermal tolerance range extends and sexual activities increase with the predicted warmer climate (Greiner & Gregg 2008).

92 Invasive Species Council, *Submission 74*, p. 9 and see also Table 2, pp 13–14 and pp 24, 27.

93 Invasive Species Council, *Submission 74*, p. 53.

94 A Moore, N Marton and A McNee, *A strategic approach to the management of ornamental fish in Australia: communication strategy and grey list review – a report to OFMIG*, Bureau of Rural Sciences, March 2010, p. iv.

> The effective management of pest fish is a growing concern in Queensland. Once they have colonized a waterway it is almost impossible to eradicate them with current methods.[95]

6.78 Dr John Harris, a fisheries scientist and freshwater ecologist, provided a submission highlighting the impact of common carp in Australia's river systems. Although carp have been present in Australia for over 150 years, and are present in every jurisdiction except the Northern Territory, they continue to spread to new areas.[96]

6.79 Dr Harris stated that genetic research indicates that these invading populations are 'entirely or largely based on koi parentage. Representatives include those in east-coast rivers, Tasmania, the ACT and other parts of the [Murray-Darling Basin]'. This indicates that the source of these carp populations is koi breeding establishments.[97]

6.80 Dr Harris stated that lax regulation of koi carp industry in New South Wales means that 'that large numbers of the State's coastal-drainage rivers, together with their highly vulnerable wetlands, are threatened by incursions of carp', and that 'regulatory efforts in neighbouring States are made less effective by the ease of cross-border access to koi carp'.[98]

6.81 The Department of Fisheries in Western Australia noted that 'biosecurity management of freshwater pest fish is not so well established at the national level as it is for marine':

> Responses to new detections of freshwater pest fish are not nationally prioritised or coordinated and are unlikely to be adequate, under current arrangements. National monitoring or data sharing is needed, as are national mechanisms to capture and analyse data on freshwater fish incursions. The non-existence of a Consultative Committee to report to and discuss new freshwater fish incursions is a significant gap.[99]

6.82 Ms Aitken of the WA Department of Fisheries told the committee that the process for identifying high-risk freshwater species has been 'very slow':

> There are many thousands of ornamental freshwater species, and almost 70 per cent of pest fish in freshwater rivers and waterways come from aquarium related species…[100]

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95 Condamine Alliance, *Submission 40,* p. 3. The Invasive Species Council also provided information on the invasive potential of Jack Dempsey cichlids, a member of the Chichlidae family. See case study at Invasive Species Council, *Submission 74*, Attachment 1, p. 50.

96 Dr John Harris, *Submission 20*, p. 1.

97 Dr John Harris, *Submission 20*, p. 2.

98 Dr John Harris, *Submission 20*, p. 2.

99 Department of Fisheries, Western Australia, *Background information,* provided 8 October 2014, p. 5.

100 Ms Victoria Aitken, Biosecurity Section Leader, Department of Fisheries, Western Australia, *Committee Hansard*, 8 October 2014, p. 28.

6.83 Ms Aitken also noted that there are sometimes gaps in the process in relation to aquatic biosecurity at the Commonwealth level:

> Thousands of ornamental fish come in via the airport, but until recently there were no checks done on that. For instance, you might check whether there is any weed in the bag or if there are any snails, but you might not check that the species of fish is what it says it is.[101]

6.84 She observed that the WA Department of Fisheries compliance team has started to undertake airport visits to check imported fish.[102]

6.85 The Invasive Species Council expressed further concern that 'current quarantine practices are known by biosecurity authorities to be ineffective in stopping the entry of diseased fish into Australia', and that 'very little is known about specific disease risks of the hundreds of species permitted entry into Australia'.[103] The Invasive Species Council noted reports indicating that 'risk assessments for the importation of aquarium fish are based on overseas information, which can be of limited value in predicting the likelihood of environmental impacts in Australian waters'.[104]

6.86 The committee also notes that the Department of Agriculture's Annual Report 2013–14 states that the Department:

> …continued to focus on managing the biosecurity risks associated with ornamental fish imports by placing greater emphasis on managing the biosecurity risks offshore and introducing an on-arrival fish health monitoring programme.[105]

6.87 The report states that trials of the fish health monitoring programme commenced in 2013. The Department of Agriculture and the Department of Environment also submitted that there is an Aquatic Consultative Committee on Emergency Animal Disease which coordinates the national technical response to aquatic animal disease incursions.[106]

Island biosecurity

6.88 Several submitters and witnesses emphasised the importance of biosecurity on Australia's islands. For example, Dr Andrew Burbidge AO submitted that:

> Australia's continental and oceanic islands protect an amazing number and variety of plants and animals. Some of these are endemic or are extinct on

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101 Ms Victoria Aitken, Biosecurity Section Leader, Department of Fisheries, Western Australia, *Committee Hansard*, 8 October 2014, p. 31.

102 Ms Victoria Aitken, Biosecurity Section Leader, Department of Fisheries, Western Australia, *Committee Hansard*, 8 October 2014, p. 31.

103 Invasive Species Council, *Submission 74*, p. 27; see also Attachment 1, p. 57.

104 Invasive Species Council, *Submission 74*, p. 34.

105 Department of Agriculture, *Annual Report 2013–14*, p. 94.

106 Department of Agriculture and Department of the Environment, *Submission 59*, p. 34.

> the Australian mainland…non-indigenous species are the major threat to island biodiversity…Some species have already been lost from Australia's islands because of invasive species. Despite this Australia does not have a comprehensive, national plan for island biosecurity.[107]

6.89 As noted in Chapter 2, this committee recommended in its recent report on threatened species and ecological communities that the Department of the Environment develop biosecurity strategies to protect island sanctuaries.[108] The government response agreed but noted that while Norfolk Island, Christmas Island and Pulu Keeling National Parks are managed by the Australian Government, the responsibility for development biosecurity strategies to protect other island sanctuaries 'lies with the states and territories'.[109]

6.90 Dr Burbidge acknowledged that biosecurity for islands is largely a state responsibility, but suggested that as such there is currently a very 'ad hoc system'.[110] Dr Burbidge called for a 'comprehensive national plan for island biosecurity'.[111]

6.91 The Invasive Species Council echoed this call, highlighting that 'islands are very important environmental assets in Australia' which harbour many endemic species and subspecies, provide breeding and roosting grounds for seabirds, mammals and reptiles, and function as refugia for species threatened by invasive species on the mainland. For these reasons, the Invasive Species Council suggested that 'rigorous biosecurity for islands should be a high environmental priority', yet is often neglected.[112]

6.92 The Invasive Species Council proposed a 'National Island Biosecurity Initiative' to establish biosecurity priorities for all islands based on their ecological values and risk assessment. It suggested that biosecurity management systems be developed for all islands, and that the proposed new biosecurity legislation should allow for the declaration of 'conservation biosecurity zones' to facilitate biosecurity management measures for high conservation value areas such as islands.[113]

6.93 Support for focusing on protecting the biosecurity of Australia's islands was also expressed by the South Australian Government, which cited the relatively pest-free status of Kangaroo Island as an example of islands providing biosecurity refuges:

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107 Dr Andrew Burbidge AO, *Submission 13*, p. 1.

108 Senate Environment and Communications References Committee, *Effectiveness of threatened species and ecological communities' protection in Australia*, August 2013, recommendation 15.

109 Australian Government, Government response to Australian Government response to the Senate Environment and Communications References Committee report: *Effectiveness of threatened species and ecological communities' protection in Australia*, August 2014, p. 13.

110 Dr Andrew Burbidge, *Committee Hansard*, 8 October 2014, p. 10.

111 Dr Andrew Burbidge, *Committee Hansard*, 8 October 2014, p. 9; see also Andrew Burbidge AO, *Submission 13*, p. 1, and *Submission 13*, Attachment 1.

112 Invasive Species Council, *Submission 74*, p. 70.

113 Invasive Species Council, *Submission 74*, pp 70–72.

> All significant islands around Australia should be considered in terms of havens for native animals, plants and marine life and should have environmental biosecurity protection where possible. An example is Kangaroo Island in South Australia, which is free of many pests present on the mainland. This should be considered as part of any future policy arrangements as there is a strategic advantage in preserving these refuges for the future benefit of the mainland environment.[114]

Christmas Island

6.94 Dr Burbidge and Professor Woinarski described the 'historic and recent biosecurity performance in relation to Christmas Island ' as 'shockingly inadequate'.[115] Dr Burbidge explained that there has been a serious decline in biodiversity on Christmas Island, 'due almost entirely to the establishment of non-indigenous species'. An expert working group, of which Dr Burbidge was a member, recommended in 2010 that biosecurity on Christmas Island be improved. Dr Burbidge told the committee that there has been 'no adequate response' to the group's recommendations relating to biosecurity and that:

> The Department of Agriculture has insufficient resources on the island to effectively manage biosecurity, especially noting that one of their major duties is to minimise the threat of invasive species on Christmas Island getting to mainland Australia.[116]

6.95 Dr Burbidge and Professor Woinarski pointed to the poor resource levels provided to undertake biosecurity screening:

> The Australian Department of Agriculture currently has a single biosecurity staff person on the island plus casuals…there is often only one person available to screen arriving people and goods. The amount of goods, including food and plants, arriving on Christmas Island, much of it from Asia, is large, given the size of the population on the island, including people and staff associated with the Immigration Detention Centre.[117]

6.96 Dr Burbidge stated that the most pressing threat to Christmas Island's biodiversity is the yellow crazy ant, which has had a devastating effect on the island's ecosystem. He commented:

> The major threat to Christmas Island biodiversity at the moment is the yellow crazy ant, which has gone into supercolony development, and that is because there has also been a species of scale insects introduced to Christmas Island, and the interaction between the ants and the scales is

114 Government of South Australia, *Submission 86*, p. 9.

115 Dr Andrew Burbidge and Professor John Woinarski, *Submission 60*, p. 1.

116 Dr Andrew Burbidge, *Committee Hansard*, 8 October 2014, p. 9 and see also p. 17.

117 Dr Andrew Burbidge and Professor John Woinarski, *Submission 60*, p. 1.

> actually driving an ecological cascade which is impacting a whole lot of other species on the island.[118]

6.97 Dr Burbidge further explained that previous attempts to control the yellow crazy ant population had employed a 'highly toxic pesticide', but that work was now concentrating on using biological controls to reduce the scale insect population and thereby control the yellow crazy ant population.[119]

6.98 The committee received a detailed submission on the yellow crazy ant from the Christmas Island Crazy Ant Scientific Advisory Committee (CASAP), which 'provides scientific and technical advice to Parks Australia to inform pest ant management on Christmas Island and Pulu Keeling National Parks, with a particular focus on the implementation of the ten-year Crazy Ant Management Strategy for Christmas Island.'[120]

6.99 CASAP reported that the baiting program conducted on the island since 2002 is considered an 'outstanding success' in that it considerably reduced ant populations when applied. However, this program is problematic in that the island's land crabs are also susceptible to the bait, much of the island is inaccessible and that yellow crazy ant super colonies frequently re-form after baiting has occurred. These factors, and the high recurrent cost of the program, make it 'difficult if not impossible to sustain in perpetuity in such a remote location.'[121]

6.100 CASAP explained that, in light of these weaknesses with using baits to control the yellow crazy ant (YCA) population, a biological control method, as mentioned above, is being trialled:

> An ambitious biological control program, funded by the Department of the Environment, is under development to suppress high YCA densities on Christmas Island by targeting their major food supply—carbohydrates supplied by honeydew-producing scale insects feeding on their host trees. YCA depend heavily on this honeydew resource and in its absence YCA populations decline rapidly (Green et al. 2013). This effort involves the introduction to the island of a host-specific natural enemy—a tiny microwasp—that targets only the introduced yellow lac scale, the main supplier of honeydew to the YCA. Rigorous tests have demonstrated that this microwasp attacks only the yellow lac scale. If this specific microwasp establishes on the island, prospects are very good that it will reduce the

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118 Dr Andrew Burbidge, *Committee Hansard*, 8 October 2014, p. 12; the committee also discussed the impact of yellow crazy ants on Christmas Island with Dr Lori Lach, see *Committee Hansard*, 11 November 2014, pp 61–62.

119 Dr Andrew Burbidge, *Committee Hansard*, 8 October 2014, p. 12. The biological control methods being employed on Christmas Island may also be relevant to controlling yellow crazy ant populations in other locations, for example, in the Wet Tropics World Heritage Area. See discussion with Mr Andrew Maclean, Executive Director, Wet Tropics Management Authority, *Committee Hansard*, 31 October 2014, p. 20.

120 Christmas Island Crazy Ant Scientific Advisory Committee, *Submission 78*, p. 3.

121 Christmas Island Crazy Ant Scientific Advisory Committee, *Submission 78*, pp 8–9.

> honeydew supply to the YCA and result in a safe, self-sustainable means of managing the YCA and its impacts on biodiversity on the island.[122]

Barrow Island

6.101 On the other hand, several witnesses pointed to the example of biosecurity management of Barrow Island in Western Australia as exemplary. For example, Dr Burbidge told the committee that the biosecurity work done by Chevron on Barrow Island in recent years has been 'extremely effective':

> They have shown what you can do with commitment and some resources directed towards a problem like this…there is a case where government can probably learn from industry as to the way things might be improved.[123]

6.102 The Barrow Island Quarantine Management System was described as the 'world's largest non-government biosecurity initiative' and has been recognised for its excellence.[124]

6.103 Mr Richard Stoklosa stated that the approach taken to the implementation of biosecurity on Barrow Island could be used as an instructive example for developing biosecurity strategies more generally. He emphasised the following key features of the Barrow Island approach:

- defining a clear objective for the project and what outcomes would constitute a success;
- prioritising prevention rather than eradication;
- putting in place good leadership and clear lines of responsibility;
- engaging expertise; and
- engaging non-experts in surveillance and detection.[125]

6.104 As discussed in chapter 4, Mr Stoklosa emphasised the importance of starting with a clear goal, and constructing a strategy on that basis. He stated that the ALOP description of the level of biosecurity protection Australia intends to maintain, 'a very low level but not zero', is not precise enough:

> In the world that I came from, with the Barrow Island biosecurity program, the system was a zero-tolerance approach—absolutely zero tolerance. That meant doing the most comprehensive invertebrate survey of any island in the world on Barrow Island to figure out what was there, because you could not decide what was coming if you did not know what was there. We spent a lot of time on that sort of effort.

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122 Christmas Island Crazy Ant Scientific Advisory Committee, *Submission 78*, p. 9.

123 Dr Andrew Burbidge, *Committee Hansard*, 8 October 2014, p. 15.

124 Mr Richard Stoklosa, *Submission 53*, p. 1. See also discussion of best practice pathway analysis at Dr Lori Lach, *Supplementary Submission 76.1*, pp 5–6.

125 Mr Richard Stoklosa, *Committee Hansard*, 10 November 2014, pp 15–16.

> It is that sort of objective and policy statement that triggers what you must do. I am not saying that zero tolerance is appropriate for environmental biosecurity. I think it probably cannot ever be…but you need to decide, and perhaps the other submissions that talk about specific pests inform this sort of debate and this decision about what the policy is. Once you have that set, you can then understand what you must do.[126]

Great Barrier Reef World Heritage Area islands

6.105 The GBRMPA submitted that, in terms of islands in the Great Barrier Reef World Heritage Area, 'work is progressing on developing' an overarching World Heritage Area Island Biosecurity Strategy, which will integrate individual Biosecurity Management Plans for high conservation value island groups.[127]

6.106 GBRMPA reported that:

> The maintenance of island biodiversity and ecosystem health of the Great Barrier Reef Region relies on arrangements to prevent entry and establishment of invasive species. Where invasive species have become established, field management resources have been and are currently deployed to maximise ecosystem resilience to climate change and other stressors by enhancing natural vegetation communities, minimising introduced flora and fauna, and maximising breeding opportunities for important coastal birds, marine turtle[s] and other species.[128]

6.107 As noted in chapter 4, GBRMPA has recently responded to a variety of invasive species detections on islands that it manages, including ants, goats, rats, deer, grasses and vines.[129]

Macquarie Island

6.108 The committee discussed with representatives of Biosecurity Tasmania progress on developing a biosecurity plan for Macquarie Island. The committee was informed that a Macquarie Island biosecurity plan, to be adopted jointly by the Tasmanian Parks and Wildlife Service (PWS) and the Australian Antarctic Division (AAD) of the Commonwealth Department of the Environment, has been under development for some time and that its finalisation is now imminent. A final draft of the plan is currently being reviewed by the Australian Antarctic Division with a view to finalisation before the schedule resupply voyage to Macquarie Island in April 2015.[130]

6.109 Although the plan is not yet finalised, a number of biosecurity measures have been in place since 2011, including:

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126 Mr Richard Stoklosa, *Committee Hansard*, 10 November 2014, p. 18.

127 Great Barrier Reef Marine Park Authority, *Submission 19*, p. 3.

128 Great Barrier Reef Marine Park Authority, *Submission 19*, p. 2.

129 Great Barrier Reef Marine Park Authority, *Submission 19*, p. 2.

130 Biosecurity Tasmania, *Answer to question on notice*, p. 1; see also discussion at *Committee Hansard*, 10 November 2014, pp 49-50.

- PWS and AAD have been using rodent detector dogs to screen cargo, ships and passenger personal effects departing for Macquarie for several years. A new rodent detector dog is currently being trained and arrangements are being developed for it to screen all ships departing for Macquarie Island from Hobart and for the dog and handler to travel to Macquarie Island on-board the AAD chartered ship undertaking future resupply voyages.
- Individual inspections of expeditioner personal effects have been undertaken on all AAD voyages to Macquarie since late 2011.
- A three tiered inspection regime (along with the use of rodent proof and invertebrate resistant cargo containers) has been implemented to inspect all Macquarie Bound cargo.
- The AAD now sends all cargo through a purpose built Cargo and Biosecurity Centre which has been designed to be rodent proof. The Cargo and Biosecurity Centre is regularly baited for rodents and sprayed for invertebrates.
- The scientific station area is monitored for any pest species introductions (and also baited for rodents) over the course of each shipping season.[131]

6.110 A number of biosecurity measures are also in place to address risks posed by tourist vessels visiting the island.[132]

Conclusion

6.111 Evidence presented to the committee suggests that Australia's marine biosecurity system performs very unevenly. There appear to be widely varying levels of surveillance and monitoring undertaken by state and Northern Territory governments. The two major pathways for marine invasive species, ballast water and biofouling, have not been well regulated. Although the Biosecurity Bill 2014 includes provisions for the national regulation of ballast water, it does not address the issue of biofouling, which presents the greater risk in terms of marine biosecurity.

6.112 The ornamental fish trade also appears to present a significant threat to the health of Australia's freshwater environments. A significant proportion of exotic fish that have established in Australia's waterways are related to aquarium fish. The committee received evidence that inspection regimes for freshwater fish at Australia's borders are lax in that fish are not inspected to determine their species or their disease status. There also appears to be many species in the ornamental fish trade that do not appear on permitted species lists under the EPBC Act and the Quarantine Act.

6.113 Australia's record regarding island biosecurity is also uneven. Christmas Island and Barrow Island provide contrasting examples of failure and success in this area. There is currently no national strategy for managing the biosecurity of Australia's islands, despite their importance as biodiversity refuges.

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131 Biosecurity Tasmania, *Answer to question taken on notice*, p. 1.

132 Biosecurity Tasmania, *Answer to question taken on notice*, pp 1–2.