



Australian Government
Inspector-General of Biosecurity

Environmental biosecurity risk management in Australia

REVIEW REPORT NO. 2018–19/04



Asian black-spined toad



Huanglongbing (citrus greening)



Tramp ants



Xylella on grapevine



Dutch elm disease

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Review process

Purpose

The purpose of this review was to examine:

- how the Department of Agriculture and Water Resources (Agriculture) participates in the broader biosecurity system to address environmental biosecurity concerns
- processes to identify gaps in pathway and risk analyses and to improve environmental biosecurity information gathering and sharing between jurisdictions.

Scope

This review covered activities conducted by the Australian Government (particularly Agriculture) to help manage environmental biosecurity risks. These included:

- governance and collaborative arrangements between Agriculture and state and territory governments
- how the Australian Government (particularly Agriculture)
 - responded to previous reviews on environmental biosecurity
 - implemented the recommendations from these reviews
 - managed environmental biosecurity incursions
- how Agriculture helps manage environmental biosecurity risks by
 - identifying gaps in pathway and risk analyses, and
 - dealing with past incursions with major environmental impacts.

Out of scope

This review did not examine in detail:

- policies or activities that are the prime responsibility of the Department of the Environment and Energy (Environment)
- environmental biosecurity issues already covered in other Inspector-General of Biosecurity (IGB) review reports, including the hitchhikers and contaminants review (IGB 2018).

Potential risks

Potential risks considered as part of this review included:

- inadequacy and incorrect use of Agriculture's methods to detect, identify and treat threats to Australia's environmental biosecurity
- non-provision of appropriate and/or timely information to Agriculture by stakeholders to allow it to carry out its responsibilities
- non-provision of appropriate and/or timely information from Agriculture to stakeholders to allow them to carry out their responsibilities
- inadequacy of capacity and/or expertise to meet demands for environmental biosecurity activities.

Review methodology

The IGB:

- reviewed relevant scientific literature, reports and departmental policies and procedures
- met with key stakeholders from agricultural and environmental sectors
- circulated a discussion paper for public consultation
- reviewed submissions from interested stakeholders
- provided a draft report to Agriculture for response
- published the report after consultation with the minister.

Review team

Glenn McMellon, Dr Naveen Bhatia and Clare Hamilton assisted the Inspector-General in this review.

Summary

1 Background

Australia has well-developed systems for managing biosecurity risks that threaten agriculture and human health. To protect our environment and ecosystems from ever-increasing risks of pests and diseases entering and establishing in Australia, we need improved institutional and funding arrangements and more targeted programs with greater research and innovation.

Pests and diseases already introduced to Australia threaten the existence of some of our unique flora and fauna and have contributed to Australia's unenviable rate of species extinction. Many introduced invasive animals, weeds and pathogens (such as chytrid fungus of frogs and myrtle rust of many plant species) have proliferated and spread slowly but inexorably into many parts of the country, destroying or threatening native species and ecosystems. The challenges of preventing further incursions and establishment will only increase with greater trade and travel.

Biosecurity is increasingly recognised as a shared responsibility between agricultural industries and government. This has led to agricultural industries having greater involvement in managing and co-funding biosecurity for their industries. However, similar arrangements to protect the environment from major biosecurity risks have lagged because of greater complexity in prioritising potential threats and quantifying the public good in funding responses to incursions.

In 2015 the report of a Senate Inquiry into Environmental Biosecurity made 26 recommendations to address shortfalls in Australia's environmental biosecurity arrangements. An Australian Greens minority report made a further eight recommendations. In 2017 a review of the Intergovernmental Agreement on Biosecurity (IGAB) made further recommendations on environmental biosecurity and a review of the National Environmental Biosecurity Response Agreement (NEBRA) was also carried out.

2 Regulation of environmental biosecurity

Internationally, the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) of the World Trade Organization accepts that a country may set an acceptable level of sanitary and phytosanitary protection (ALOP) by applying biosecurity risk management measures while minimising negative trade impacts. The United Nations (UN) Convention on Biological Diversity requires its 150 signatory countries (including Australia) to 'as far as possible and as appropriate, prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species'.

The Australian Government Department of Agriculture and Water Resources (Agriculture) has primary responsibility for implementing pre-border and border biosecurity measures. Agriculture works with state and territory governments through the National Biosecurity Committee (NBC) on post-border measures and programs. Industry peak bodies, such as Animal Health Australia and Plant Health Australia, and their levy funds share formal management and costs of key national agricultural, fisheries and forestry biosecurity programs. Animal Health Australia is the custodian of the Emergency Animal Disease Response Agreement (EADRA) and AUSVETPLAN. Plant Health Australia is the custodian of the Emergency Plant Pest Response Deed (EPPRD) and PLANTPLAN. These plans outline responses to agreed priority disease and pest incursions.

The Australian Government Department of the Environment and Energy (Environment) works with state and territory governments on environmental protection and biodiversity conservation. Environment has specific biosecurity responsibilities for regulating the import of live animals and plants after considering their potential environmental impact. However, there are no equivalent 'environmental industry' peak bodies with access to levy funds, so management and cost-sharing of national environmental biosecurity programs are largely arranged through governments. NEBRA provides for responses to nationally significant environmental incidents where a combined response provides mainly public benefits.

In 2018 a national environmental biosecurity stocktake found that governments invested almost \$1 billion in 2016–17 in activities with direct and indirect environmental biosecurity impacts.

3 Evolving institutional arrangements

The 2015 Senate inquiry report made several recommendations about a greater role for Environment in managing environmental biosecurity. However, the *Biosecurity Act 2015* (Cth) and the Australian Government response to the Senate inquiry clearly established Agriculture as the agency with primary responsibility for most aspects of federal biosecurity risk management. Many of the measures implemented by Agriculture protect Australia against environmental as well as agricultural pests and diseases. It is not practical or desirable to duplicate responsibilities.

In February 2018 the NBC replaced its Invasive Plants and Animals Committee with an Environment and Invasives Committee, with representatives from all government agricultural and environment agencies. The committee provides national policy leadership and technical and scientific advice on identifying, preventing and managing invasive species.

In late 2018 Agriculture appointed a Chief Environmental Biosecurity Officer (CEBO) to negotiate and implement federal environmental biosecurity programs and communicate with Environment and the community.

Agriculture has committed to developing a memorandum of understanding with Environment outlining their respective roles and responsibilities in delivering environmental biosecurity. This should reduce the potential for gaps or duplication of services and improve stakeholder bodies' understanding of each department's role.

4 Responding to environmental pest and disease incursions

Since 2013 responses to environmental pest and disease incursions have been managed according to the NEBRA. Most of the successful responses have been to exotic invasive tramp ant incursions. However, the most serious incursion of red imported fire ant (RIFA), which entered south-east Queensland about 20 years ago, is still not vanquished and is now under a 10-year eradication plan. Australian governments have spent or committed more than \$800 million to fighting tramp ant incursions since 2001.

After detection, incursions are evaluated and many are found to be unfeasible or uneconomic to eradicate. In these cases they transition to management. The 2010 incursion of myrtle rust, a fungus that affects hundreds of native species such as eucalypts, was rapidly transitioned to management and has since spread from the NSW central coast across eastern Australia and to the Tiwi Islands, Norfolk Island and New Zealand. Some rare native *Myrtaceae* species are threatened with extinction. Seed collection and seedling rearing programs are being undertaken to avert this if possible.

5 Prioritising environmental biosecurity threats

The complexity of potential environmental biosecurity threats can seem overwhelming. Local and overseas experience can help us understand the potential impacts of new invasive animals and plants on native terrestrial and aquatic ecosystems, and impacts of new diseases and pests on vulnerable native fauna and flora and on social amenity of different communities. Pathway and risk analyses are needed to prioritise and effectively combat such threats.

Agriculture is leading development of a national environmental pest and disease priority list, which will help to focus future preparedness activities. An extensive stakeholder consultation process will be followed by expert analysis to develop the first such list by the end of 2019. The list will then need to be updated periodically.

6 Surveillance and wider scientific and community engagement

Regular border biosecurity risk management activities prevent entry of a huge range of pests and diseases, but some inevitably get through and could establish if not found promptly.

Since 2016 Agriculture has implemented a national border surveillance program at first points of entry and approved arrangements. This program targets known hitchhiker pest and contaminant risks, many of which threaten the environment. From 2017 to 2018 the program detected 42 exotic pests and diseases of environmental concern.

The Northern Australian Quarantine Strategy (NAQS) also conducts surveillance across a wide zone of northern Australia and offshore in neighbouring countries. NAQS has a strong Indigenous ranger program using traditional knowledge to find threats to native ecosystems.

Post-border surveillance requires innovative approaches, high community awareness and engagement of all levels of government, as well as environmental non-government organisations and other groups. Ongoing research is also needed. Former Cooperative Research Centres for Invasive Animals and Australian Weeds Management were succeeded by a Centre for Invasive Species Solutions (CISS). CISS was funded for five years from 2017 to 2022 to research, develop and implement collaborative portfolios to improve knowledge and innovation in invasive species management. CISS' environmental biosecurity projects include:

- environmental DNA freshwater vertebrate research
- a national incursions management framework
- upgrading of PestSmart and FeralScan digital platforms
- new tools for surveillance and eradication
- invasive species gene drive technology.

7 Conclusion

Australia's framework for managing environmental biosecurity challenges has improved considerably since the Senate inquiry was published in 2015. The respective roles of Agriculture and Environment in implementing pre-border and border biosecurity risk management measures are clearer. A memorandum of understanding between the two departments should further clarify this. Agriculture has appointed a Chief Environmental Biosecurity Officer and now holds regular environmental biosecurity stakeholder forums for two-way communication about key issues and mechanisms to resolve them. The vast array of potential exotic pests, diseases, weeds and invasive animals that could damage Australia's unique environment should be prioritised to ensure that the highest risks are targeted.

Agriculture and Environment will need to engage with agricultural and environmental agencies in all jurisdictions, non-government organisations and communities to develop a greater acceptance of the shared responsibility for better biosecurity outcomes. The government should source a high level of scientific expertise and innovation, both nationally and internationally, to ensure that novel and more efficient solutions to new biosecurity threats can be rapidly developed and applied as needed.

Recommendations and departmental responses

The full departmental response to the recommendations is at [Appendix A](#).

Recommendation 1

The department should include, in its forthcoming Memorandum of Understanding with the Department of the Environment and Energy, roles and processes for the two departments, to agree on desired environmental biosecurity outcomes at the Australian Government level, including performance reporting over time.

Department's response: Agreed.

Recommendation 2

The department, working with the Department of the Environment and Energy and through the National Biosecurity Committee, should promote the development of Memoranda of Understanding on environmental biosecurity in all Australian jurisdictions.

Department's response: Agreed.

Recommendation 3

The Chief Environmental Biosecurity Officer, through the Environment and Invasives Committee, should work with jurisdictions and environmental groups to prepare an environmental biosecurity emergency preparedness plan (strategy), incorporating the exotic environmental pest and disease list once it has been determined.

Department's response: Agreed.

Recommendation 4

The department should work with relevant environmental groups and agencies to develop and conduct environmental biosecurity emergency preparedness exercises.

Department's response: Agreed.

Recommendation 5

The department should establish a dynamic and transparent environmental pest and disease risk prioritisation process, informed by new scientific knowledge, to allow emerging environmental pests and diseases to be added to the priority list as they arise. This list of priority environmental biosecurity pests and diseases, with the basis for their inclusion, should be published on the department's website and continuously reviewed.

Department's response: Agreed.

Recommendation 6

The department should ensure the Northern Australia Quarantine Strategy program, and other surveillance programs, are coordinated with state and territory biosecurity surveillance activities and environmental biosecurity projects (as appropriate) to encourage collaborative resourcing and avoid possible duplication.

Department's response: Agreed.

Recommendation 7

The department should work with relevant stakeholders to contribute to the development of environmental biosecurity plans targeting specific pests or diseases aimed at environmental sectors of concern, and include the community as much as possible.

Department's response: Agreed.



Dr Helen Scott-Orr

Inspector-General of Biosecurity

12 April 2019

Chapter 1

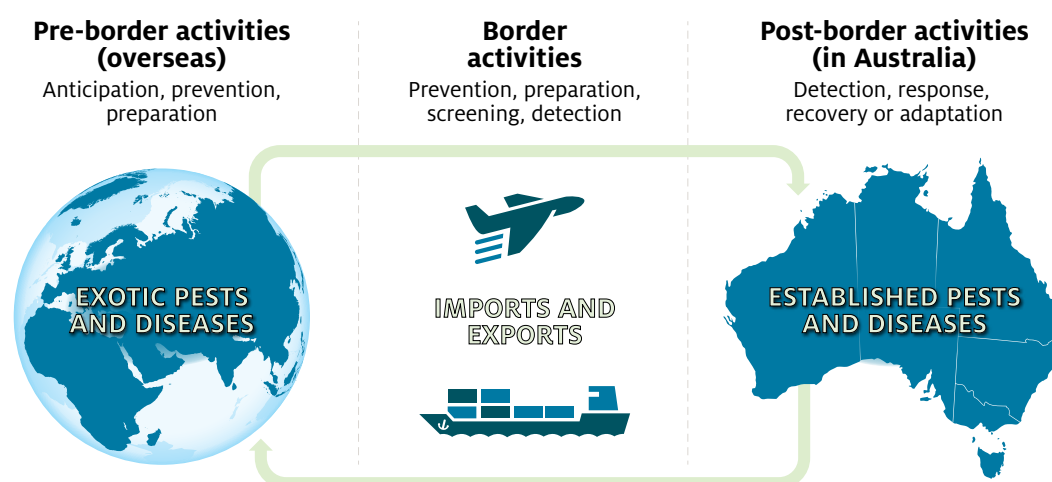
Background

1.1 Defining environmental biosecurity

Environmental biosecurity is the protection of the environment and/or social amenity from the risks and negative effects of pests and diseases entering, emerging, establishing or spreading in Australia. Pests include invasive vertebrate and invertebrate animals and invasive plants (weeds).

The environment includes Australia's natural terrestrial, inland water and marine ecosystems, their unique flora and fauna, and Australia's natural and physical resources. Social amenity includes the social, economic and cultural aspects of the environment, including tourism, human infrastructure, cultural assets and national image. Environmental biosecurity targets pests and diseases that threaten native plants, animals or ecosystems, or the social amenity of Australia's diverse communities.

Agricultural biosecurity focuses on pests and diseases that may cause economic impacts on Australia's agricultural, fisheries and forestry industries. The impacts can be from direct production losses, reduced market access and from the length of time and cost to recover. Exotic disease impacts are well documented from overseas outbreaks, such as foot-and-mouth disease in the United Kingdom in 2001 (Scudamore & Harris 2002) and *Xylella fastidiosa* in Europe from 2013 (Strona, Carstens & Beck 2017). Potential entry pathways for priority agricultural pests and diseases are relatively well known and targeted by the Australian Government Department of Agriculture and Water Resources (Agriculture) across the biosecurity continuum according to risk (Figure 1). In contrast, quantifying the potential impacts of pest and disease incursions on the environment is difficult. This makes developing preparedness and response plans more difficult.

FIGURE 1 The biosecurity continuum

The environment is considered to be owned by all Australians with no environmental industries equivalent to agricultural industries. Most environmental organisations are not-for-profit or voluntary. Relevant research organisations largely depend on government or community group funding. Indigenous and other community groups have special relationships with the environments in which they live and move through. Engagement with these groups can be complex.

A review of threats to Australia's imperilled species (Kearney et al. 2018) found that:

Since European occupation of Australia, human activities have caused the dramatic decline and sometimes extinction of many of the continent's unique species. Here we provide a comprehensive review of threats to species listed as threatened under Australia's *Environment Protection and Biodiversity Conservation Act 1999*. Following accepted global categories of threat, we find that invasive species affect the largest number of listed species (1257 species, or 82% of all threatened species); ecosystem modifications (e.g. fire) (74% of listed species) and agricultural activity (57%) are also important.

Little information is available on the potential impact of many exotic pests and diseases on Australia's native biota and natural ecosystems. The range and complexity of pests and diseases that may affect the environment far exceeds those of agricultural, fisheries and forestry industries. Quantifying the economic impacts of these pests and diseases, and the (mostly public) benefits of better environmental biosecurity outcomes can be difficult. However, Australia is aware of the continuing environmental impacts of past invasive pests and diseases, such as cane toads, carp, alligator weed and *Phytophthora* spp.

Management of environmental and agricultural biosecurity risks overlaps significantly, despite major differences in knowledge, impacts and economics. An 'all-hazards' approach—managing generic rather than specific biosecurity risks—is an appropriate risk management strategy.

1.2 Environmental biosecurity reviews

Senate inquiry into environmental biosecurity

In 2015 the Senate Environment and Communications References Committee published *Environmental biosecurity—an inquiry into the adequacy of arrangements to prevent the entry and establishment of invasive species likely to harm Australia’s natural environment* (Senate Environment and Communication References Committee 2017). This was Australia’s first review dedicated to environmental biosecurity.

The Senate inquiry investigated the concept of environmental biosecurity, its treatment and performance within Australia’s current biosecurity system, and various proposals to strengthen environmental biosecurity in Australia. The inquiry included recommendations from previous reviews (Beale et al. 2008; Hawke 2009), the National Biosecurity Committee (NBC) and communications between the Australian Government and state and territory governments.

The inquiry concluded that employing a risk-based approach to prioritising incursion pathways was important, given the limited resources available to government agencies. The inquiry listed mail, cargo, the horticulture industry and the live animal trade as pathways and industries that posed significant threats to Australia’s environmental biosecurity.

The inquiry made 26 recommendations to address shortfalls in Australia’s environmental biosecurity. The Senate Committee report included the Australian Greens Minority Report as an annexure, making eight additional recommendations.

In June 2017 the Australian Government tabled its response to the Senate inquiry. The response supported (fully or in principle) 19 Senate recommendations and one Australian Greens recommendation, noted five recommendations, and did not support two Senate and seven Australian Greens recommendations. Agriculture considers that it has committed to all necessary recommendations and that any ‘not supported’ or ‘noted’ recommendations or recommendations directed at another agency do not require further action. [Appendix B](#) details the Australian Government’s response and Agriculture’s actions up to March 2019 against all of the Senate inquiry recommendations.

Intergovernmental Agreement on Biosecurity Review

The Intergovernmental Agreement on Biosecurity (IGAB) is an agreement between the Australian Government and state and territory governments that came into effect in January 2012. Its purpose is to enhance Australia’s biosecurity system and strengthen the collaborative approach between the Australian Government and state and territory governments.

In 2017 an independent panel completed a review of the capacity of Australia’s biosecurity system and the IGAB. The review, *Priorities for Australia’s Biosecurity System (IGAB review)* made 42 recommendations, of which 10 directly or indirectly covered aspects of environmental biosecurity (Craik, Palmer & Sheldrake 2017).

The IGAB review found that, along with protection of Australia’s trade in tourism and agriculture, biosecurity helps to maintain Australia’s natural environments—valued by the Australian Bureau of Statistics in 2017 at over \$6 trillion (Craik, Palmer & Sheldrake 2017). It highlighted that environmental biosecurity should be addressed to ensure Australia can minimise the risk of impact of pest animals, pest plants and diseases on the Australian environment, human health and the economy.

The review also found that biosecurity stakeholders wanted a greater say in decision-making about biosecurity issues and stronger arrangements for environmental biosecurity. Community and environmental biosecurity was a focus during the course of the review, finding that incursions of exotic organisms were regular occurrences, but that pest and disease risks were yet to be established. The review recommended that environment agencies must be central to the development of biosecurity policy and response arrangements.

In November 2018 Australian agricultural ministers accepted all 42 recommendations from the IGAB review. Several recommendations that directly and indirectly relate to environmental biosecurity were already in the process of being implemented. Agriculture's progress in implementing these recommendations is set out in [Appendix C](#).

Chapter 2

Regulation of environmental biosecurity

2.1 International agreements

Australia's response to biosecurity issues is based on the requirements of the World Trade Organization Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement). The SPS Agreement defines the concept of an 'appropriate level of sanitary and phytosanitary protection' (ALOP) while minimising negative trade effects. Australia's ALOP, agreed in 2002 with state and territory governments, is expressed as 'providing a high level of sanitary and phytosanitary protection aimed at reducing risk to a very low level, but not zero' (Agriculture and Environment 2014). Under the SPS agreement, management of trade to reduce risks of plant, animal and marine pests and diseases is guided by the International Plant Protection Convention (IPPC), the World Animal Health Organisation (OIE) and the International Maritime Organisation (IMO).

The United Nations Convention on Biological Diversity (Biodiversity Convention) requires that the parties shall 'as far as possible and as appropriate, prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species'.

The International Union for Conservation of Nature (IUCN) is the global authority on the status of the natural world and the measures needed to safeguard it. The IUCN Red List of Threatened Species™ is the world's most comprehensive inventory of the global conservation status of plant and animal species. It uses a set of criteria to evaluate the extinction risk of thousands of species and subspecies. These criteria are relevant to all species and all regions of the world. With its strong scientific base, the IUCN Red List is recognised as the most authoritative guide to the status of biological diversity.

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival.

2.2 Australian legal framework

Management of Australia's environmental biosecurity risks is legislated at the Commonwealth level under the *Biosecurity Act 2015* (the Biosecurity Act) and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Similar division of legal responsibility occurs at state and territory level. States and territories have primary responsibility under the Australian Constitution for managing matters within their boundaries. A list of policy and legal frameworks for environmental biosecurity in Australia is at [Appendix D](#).

The Biosecurity Act 2015 (Cth)

The Biosecurity Act explains how we manage biosecurity threats to plant, animal and human health in Australia and its external territories. The Act outlines how to determine the likelihood of a disease or pest entering or establishing itself in Australia and the potential for the disease or pest to cause harm to human, animal or plant health, or the environment, as well as the possible economic consequences. It is administered by the Department of Agriculture and Water Resources (Agriculture).

Sections 185 and 186 of the Biosecurity Act state 'that a person commits an offence if the person imports a regulated live specimen'. What constitutes a regulated live specimen is determined under Section 303EB, which states that 'the Environment Minister must establish a Live Import List. This must include two lists, one of unregulated species, and one of allowable regulated species'.

Under Section 443 of the Biosecurity Act, power is given to the Governor-General to declare a biosecurity emergency if the Agriculture Minister is satisfied that a disease or pest is threatening or causing nationally significant harm to the environment (among other criteria). However, 'nationally significant' is not defined.

The Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act aims to promote protection of the environment, sustainable use of natural resources, the conservation of biodiversity, and assist in implementing Australia's international environmental responsibilities. It is administered by the Department of the Environment and Energy (Environment).

The EPBC Act provides for identification of key processes that threaten the survival, abundance or evolutionary development of a native species or ecological community, and the development of threat abatement and recovery plans. Since the commencement of the EPBC Act, 21 key threatening processes have been listed, including 14 caused by invasive pest and pathogen species. This led to the approval of 14 threat abatement plans (or threat abatement advices) to identify research management and other actions needed to reduce the impacts of the key threatening processes.

2.3 Roles of Agriculture and Environment in delivering environmental biosecurity

Agriculture implements measures and undertakes activities that minimise the threat of pests and diseases along the biosecurity continuum—offshore, at the border and onshore (within Australia) (Figure 2). Agriculture has primary responsibility for implementing pre-border and border biosecurity measures. For post-border measure and programs, Agriculture works with state and territory governments via the National Biosecurity Committee (NBC), and with industry and community bodies.

FIGURE 2 Agriculture’s activities conducted across the biosecurity continuum

Department of Agriculture and Water Resources activities		
Offshore	At the border	Onshore
<ul style="list-style-type: none"> • Import risk assessments • Offshore verifications • Inspections • Audits • Collaboration with international partners • Building regional capacity • Intelligence and surveillance to assess potential biosecurity risks 	<ul style="list-style-type: none"> • Import permit decisions • Screening and inspection of vessels, passengers, cargo and mail • Managing risks of live plant and animal imports • Audits and post-entry quarantine • Raising biosecurity awareness of travellers, importers and industry operators 	<ul style="list-style-type: none"> • Policy and program development • Coordinating surveillance and diagnostic capability • Preparing for and responding to incursions • Research contributions • Assisting landholders to manage established pests and diseases

To ensure effective and appropriate management of Australia’s environmental biosecurity risk, Agriculture:

- works collaboratively with Environment to develop and implement policies and programs that protect and conserve the environment
- conducts risks analyses, including import risk analyses, to ensure that goods and people arriving in Australia do not pose an unacceptable biosecurity risk, including to Australia’s environment
- provides inspection and certification services to facilitate the safe movement of people, goods and conveyances in and out of Australia
- partners with state and territory governments, industry and communities to manage pest and disease outbreaks that threaten Australia’s environment.

Agriculture considers it difficult and undesirable to manage biosecurity risk to the environment separately to managing biosecurity risk to animal, plant and human health. This view is shared by Plant Health Australia and the National Farmers’ Federation (NFF).

Environmental biosecurity is not entirely distinct from agricultural biosecurity as there is significant overlap in pests that affect plants grown for agricultural purposes and those found in the natural environment or have social amenity in urban spaces. An example is *Xylella fastidiosa* and its vector the glassy-winged sharpshooter (Plant Health Australia submission).

The NFF is of the view that environmental biosecurity should not be considered in isolation but rather be seen in the context of the broader biosecurity framework (National Farmers’ Federation submission).

Despite the Senate inquiry recommending that Environment have a lead role in environmental biosecurity, the Australian Government response made it clear that Agriculture would be the lead agency as set out in the *Biosecurity Act 2015*.

Environment has specific responsibilities for regulating the import of live animals and plants, and works with states and territories to protect the environment and conserve biodiversity. Environment supports an integrated environmental biosecurity system led by Agriculture and supported by Environment's expertise, responsibilities and legislative framework.

The import of live specimens such as animals and plants, seeds and biological control agents requires agreement between Agriculture and Environment. Only animals on the Live Import List are allowed; species not listed are prohibited. Each animal species is subject to a risk assessment by Environment of its potential environmental impacts. The Live Import List includes any live plant not included on the CITES list or a list of taxa prohibited due to their national invasive potential.

All new plant species, seeds, tissue culture or any other material for propagation are potential weeds. Agriculture uses the Australian Weed Risk Assessment (WRA) tool to assess applications for import of new plant and plant material. The WRA considers whether plant species have a high or low weed risk. However, the WRA allows the import of plants that are established weeds and are not on the Weeds of National significance list or under national control. This appears to contradict the definition of environmental biosecurity to reduce the risk of a pest spreading once established.

Biological control agents—organisms such as insects or pathogens that are used to control specific pests—are assessed by both departments. Only agents that are demonstrated to be target host-specific and where the potential consequences of off-target effects are assessed as meeting Australia's acceptable level of protection, may be approved. Biological control agents are only deemed to be acceptably host specific if they do not successfully reproduce on any species other than the target. Risk analyses of weed biocontrol agents are released by the Plant Health Committee for inclusion of biocontrol agents on the Live Import List. A process for approving animal biological control targets and agents is being developed and should be followed once made available. The acceptance of biological control agents can take many years of research before approval is granted. Making a wrong decision can have very negative consequences for the environment, as was seen with cane toads (*Bufo marinus*).

2.4 National Biosecurity Committee

The Australian Government works with governments of all states and territories as well as with importers, producers and the community to manage biosecurity in a number of ways ([Appendix E](#) and [Appendix F](#)).

Most post-border government biosecurity work is progressed through the National Biosecurity Committee (NBC) and its various subcommittees and working groups. Established in July 2008 under the IGAB, NBC membership comprises senior officials from the Australian Government, and from state and territory primary industry and environment departments.

The NBC is responsible for managing a national, strategic approach to all biosecurity threats—terrestrial and aquatic plant and animal pests and diseases, and their impacts on agriculture, the environment, community wellbeing and social amenity—and implements the IGAB. It is supported by four sectoral committees with secretariats from Agriculture that provide policy, technical and scientific advice on matters affecting their sector:

- Animal Health Committee
- Plant Health Committee
- Marine Pest Sectoral Committee
- Environment and Invasives Committee.

The NBC recognises that some roles and responsibilities rest solely within a single jurisdiction and will be implemented when required, following relevant consultation.

2.5 National environmental biosecurity stocktake

In February 2017 the NBC agreed to undertake a stocktake on the environmental biosecurity activities currently being undertaken by the Australian and state and territory governments.

The stocktake was undertaken to:

- develop a more comprehensive understanding of environmental biosecurity activities
- identify gaps in management of environmental biosecurity
- identify and prioritise future activities to improve management of environmental biosecurity and better align and integrate it with the national biosecurity system.

Twenty-four Australian Government, state and territory government agencies contributed data to the stocktake. This included agencies with responsibility for primary industries such as agriculture and fisheries, the environment and biodiversity conservation, parks, heritage, water, natural resources, and planning and development.

The stocktake identified a complex array of committees, forums and groups that support management of environmental biosecurity ([Appendix G](#)).

The stocktake found that government agencies undertook 296 environmental biosecurity activities in 2016–17. A conservative estimate of government investment in these activities was approximately \$954 million. Of this, about 19 per cent (\$179 million) was for activities with a direct (identifiable and quantifiable) environmental biosecurity benefit. The remaining \$775 million was for activities with a supporting benefit (not easily identifiable and quantifiable) for environmental biosecurity.

Chapter 3

Evolving institutional arrangements

3.1 Strengthening Australian Government arrangements

3.1.1 Chief Environmental Biosecurity Officer

The IGAB review recommended ‘The Australian Government should establish the senior, expert position of Chief Community and Environmental Biosecurity Officer within the environment department. A far less preferred alternative is to house the position in the agriculture department’ (Craig, Palmer & Sheldrake 2017).

In October 2018 Agriculture appointed Dr Ian Thompson as Australia’s inaugural Chief Environmental Biosecurity Officer (CEBO). The CEBO is the primary representative and advisor to the Australian Government on Australia’s environmental biosecurity risks. He oversees the delivery of an \$825,000 per year project fund to drive investment in building environmental biosecurity capability and capacity.

The key objectives of the CEBO are to:

- enhance understanding and oversight of environmental biosecurity risks
- perform a national policy, engagement and leadership role
- ensure that Australia’s environmental and community biosecurity risks are better defined and prioritised
- improve the maturity of Australia’s environmental biosecurity preparedness, surveillance and response capacity.

The appointment of the CEBO was well received by stakeholders submitting to this review.

The appointment of a Chief Environmental Biosecurity Officer, albeit in the Agriculture portfolio, is a step forward. We urge the maximum possible leadership and support from the Commonwealth for a similar process at State and Territory level (Australian Network for Plant Conservation Inc. submission).

PHA acknowledges recent advancements in the management of environmental biosecurity including the appointment of the inaugural Chief Environmental Biosecurity Officer, Ian Thompson within the Department of Agriculture and Water Resources, with a strong policy link to Environment Department, and whom PHA looks forward to working closely with (Plant Health Australia submission).

The CEBO will develop a mission statement for future environmental biosecurity to provide a 'vision for success', as well as a State of Environmental Biosecurity Statement, which will assess the condition of environmental biosecurity. Agriculture, through the CEBO, should work with the Environment and Invasives Committee to develop a strategic plan for environmental biosecurity, analogous to those for weeds, invasive animals and marine pests.

3.1.2 Threatened Species Commissioner

Environment's Threatened Species Commissioner, established in 2014, provides a national focus to conservation efforts, especially of Australian native flora and fauna facing extinction. The commissioner works collaboratively with the national Threatened Species Scientific Committee, established under the EPBC Act, the community (including the non-profit sector), industry, scientists and all levels of government to find solutions to avoid the extinction of Australia's native species. The Commissioner explicitly raises awareness of, and support for, threatened species in the community. The role includes building on, and instigating, initiatives and strategic approaches to threatened species conservation.

The Threatened Species Commissioner is responsible for the Threatened Species Strategy. The five-year strategy from 2015 to 2020 includes an action plan, setting out areas for the Australian Government to focus its efforts to help conserve threatened species.

The commissioner has a well-established social media presence, including on Facebook and Twitter, and regular direct engagement with the conservation community. The commissioner has offered to use these networks to assist the NBC, sectoral committees and the CEBO, and to promote education and awareness of environmental biosecurity issues.

3.1.3 Memorandum of understanding between Agriculture and Environment

Agriculture manages certain responsibilities under the Biosecurity Act through collaboration with other government agencies. In most cases this is through a formal arrangement such as a memorandum of understanding (MoU). The MoU sets out the representation, working relationship, expectations, responsibilities and duties of both departments at strategic, policy and operational levels. Agriculture has biosecurity MoUs with the Department of Defence, Department of Health and the Department of Home Affairs (Border Force).

The Senate inquiry, the IGAB and the NEBRA reviews all recognised that environmental biosecurity is as important as human health and agricultural biosecurity. Agriculture's CEBO is developing an MoU with Environment about environmental biosecurity. This MoU should outline processes for the two departments to jointly agree on desired environmental biosecurity outcomes at the Australian Government level and report regularly on their performance effectiveness.

Outcome-focused measures could include indicators for prevention (for example, potential invasive species detected and stopped at the border or post-border) and eradication or control of key environmental pest incursions.

Recommendation 1

The department should include, in its forthcoming Memorandum of Understanding with the Department of the Environment and Energy, roles and processes for the two departments, to agree on desired environmental biosecurity outcomes at the Australian Government level, including performance reporting over time.

Department's response: The department has been meeting regularly with officials from the Department of the Environment and Energy (DoEE) to discuss the development of a formalised arrangement on environmental biosecurity. The meetings to date have been productive and the department will continue to work with DoEE on developing shared biosecurity outcomes and further opportunities for collaboration including on improved data sharing, stakeholder engagement and environmental biosecurity preparedness.

To provide opportunities to improve environmental biosecurity communication and participation, the NSW Office of Environment and Heritage considers that the Australian Government should provide national coordination to help establish cross-jurisdictional and inter-jurisdictional communication platforms/mechanisms related to environmental biosecurity. This could be achieved by promoting the development of similar MoUs on environmental biosecurity between primary industries and environmental agencies in each state and territory.

Recommendation 2

The department, working with the Department of the Environment and Energy and through the National Biosecurity Committee, should promote the development of Memoranda of Understanding on environmental biosecurity in all Australian jurisdictions.

Department's response: Department's response: The department will promote the development of Memoranda of Understanding on environmental biosecurity through the National Biosecurity Committee, with input from the Department of the Environment and Energy, and relevant State and Territory representatives.

3.2 Strengthening inter-governmental arrangements under NBC

3.2.1 Past management of invasive animals and plants

Longstanding arrangements were in place under the NBC to manage pest animals through the Vertebrate Pest Committee and weeds through the Australian Weeds Committee, focussing on the impact of established invasive pests on agriculture and the environment. In 2014 the committees were combined into the Invasive Plants and Animals Committee (IPAC), which developed an Australian Pest Animal Strategy and an Australian Weeds Strategy, both from 2017–2027. However, there was growing awareness of the need for better management of other environmental pests and diseases that can affect native plants, wildlife and ecosystems.

3.2.2 Environment and Invasives Committee

In February 2018 the NBC replaced IPAC with the Environment and Invasives Committee (EIC). The EIC allows Agriculture to work with Environment and state and territory governments on environmental biosecurity issues. It provides national policy leadership and technical and scientific advice on the identification, prevention and management of invasive plant, freshwater, vertebrate and invertebrate species that adversely impact the environment, economy and community, unless they are within the scope of another NBC subcommittee.

Voting members comprises representatives from primary industry and environment departments of all governments, with observers from CSIRO, the Australian Bureau of Agricultural and Resource Economics and Sciences, the Centre for Invasive Species Solutions, Plant Health Australia, Animal Health Australia and Wildlife Health Australia. Stakeholders' submissions to this review suggest that the membership of the EIC could be further extended.

The composition of the EIC, as currently constituted, lacks a perspective for harnessing Australian (and regional) environmental expertise and providing a wider window of access and communication to the scientific part of the environmental sector. There are no New Zealand or regional observers or representation by key scientific professional organisations such as the Ecological Society of Australia (ESA), Australian Mammal, Entomological, and Mycological Societies and Birds Australia, Council of Heads of Australian Faunal Collections (CHAFC), and the Council of Heads of Australasian Herbaria (CHAH). ESA nominates one member of the NSW Threatened Species Scientific Committee for extinction-risk listings (Australian Network for Plant Conservation submission).

OEHS suggests that NBC (or other appropriate body/agency) continue to encourage jurisdictional representatives to liaise with their environmental agencies regarding the opportunities and benefits to providing environmental representation on EIC, such that EIC will include all jurisdictional environment agencies (even if only as corresponding members for information sharing purposes). Communication between primary industry and environment agencies in some jurisdictions is often limited. Direct communication and information sharing for environmental departments via representation on the EIC would assist in strengthening biosecurity communication (NSW Office of Environment and Heritage submission).

The EIC has formed a subgroup called the Environmental Biosecurity Advisory Group to provide advice to the EIC on national policy and effective stakeholder engagement in environmental biosecurity. The advisory group will be chaired by the Chief Environmental Biosecurity Officer and consist of 11 non-government members with a national and strategic environmental and/or community outlook.

The NBC has referred its *Environmental biosecurity stocktake* to the EIC for consideration of next steps. This report is not publicly available.

Recommendation 3

The Chief Environmental Biosecurity Officer, through the Environment and Invasives Committee, should work with jurisdictions and environmental groups to prepare an environmental biosecurity emergency preparedness plan (strategy), incorporating the exotic environmental pest and disease list once it has been determined.

Department's response: The Chief Environmental Biosecurity Officer will work with the Environment and Invasives Committee, Environmental Biosecurity Advisory Group and other relevant stakeholders to further develop and refine environmental biosecurity preparedness arrangements, including where appropriate, individual biosecurity plans for species or ecological communities. Work is currently underway to develop a biosecurity plan for acacia species and will be used as a pilot to develop future plans, informed by priorities identified in the National Priority List of Exotic Environmental Pests and Diseases.

3.2.3 Marine Pest Sectoral Committee

From the 1990s Australia progressively strengthened its management of the risks of international shipping bringing marine pests into new ports and waters by ballast water or by biofouling. In 2011 the NBC formed a Marine Pest Sectoral Committee (MPSC) to develop and coordinate implementation of harmonised, national arrangements to identify, minimise and address the pest risk to Australia's marine environment and associated industries. The committee plays an advocacy role within government to highlight the impact of marine pests on Australia's marine environment and associated industries. The MPSC comprises two representatives from the Australian Government and one government representative from each state and the Northern Territory. Members are from the agency with responsibility for marine pest issues within each jurisdiction, but bring a whole-of-government position to MPSC discussions. New Zealand is a standing observer and another three observers are representatives based on technical/scientific expertise.

The MPSC developed MarinePestPlan 2018–2023, the national strategic plan for managing Australia's marine pest biosecurity. Agriculture has worked with the MPSC to:

- develop and use new technologies and methods for surveillance for marine invasive species and diseases
- apply evidence-based and data-based decision-making for risk assessments
- focus on prevention and international consistency and application of requirements
- contribute to international efforts to inform requirements under the Ballast Water Management Convention
- participate in meetings of the International Maritime Organization (IMO) to influence and develop international standards, and
- use innovation and broad stakeholder involvement to solve complex marine biosecurity problems.

Chapter 4

Responding to environmental pest and disease incursions

4.1 Planning and preparedness

Emergency response preparedness and management plans and strategies are in place for priority pests of most agricultural industries. Formal management and cost-sharing of key national emergency response programs involve agricultural industry peak bodies and their levy funds via Animal Health Australia (AHA) and Plant Health Australia (PHA). AHA is the custodian of the Emergency Animal Disease Response Agreement (EADRA) between 23 signatories, and AUSVETPLAN, which covers 66 animal diseases and pests. PHA is the custodian of the Emergency Plant Pest Response Deed (EPPRD) between 47 signatories, and PLANTPLAN, which covers 82 plant pests and diseases. Many of the priority plant pests managed by PHA are pests of both agriculture and the environment, as are a number of avian and aquatic animal diseases managed through AHA.

There is provision under the EPPRD to manage pests which, if not eradicated, may result in major environmental damage to natural ecosystems, potentially affect human health or cause a nuisance to humans, or cause significant damage to amenity flora. For example, the response to the myrtle rust incursion into New South Wales in 2010 was managed through the EPPRD, until it was determined it was not technically feasible to eradicate the disease.

AHA and PHA support Australia's preparedness for pest and disease incursions through biosecurity training and running live biosecurity emergency response simulation exercises. This helps stakeholders to actively analyse the risks posed by high priority pests and implement practices and procedures to rapidly detect and respond to an incursion, minimising potential impacts.

Agriculture prepares for its role in these exercises and other incident responses by:

- developing internal response plans and arrangements
- establishing resources and logistics
- conducting training and education activities
- designing, conducting and evaluating exercises
- evaluating activities.

Exercises are usually specific to high priority agricultural diseases such as foot-and-mouth disease. AHA and PHA could include environmental biosecurity as part of the development of these biosecurity emergency response scenarios.

Recommendation 4

The department should work with relevant environmental groups and agencies to develop and conduct environmental biosecurity emergency preparedness exercises.

Department's response: Work has begun on the development of a simulation exercise to test Australia's capability to respond to the detection of an exotic disease in a non-production animal using the National Environmental Biosecurity Response Agreement (NEBRA). This work will be funded by the Environmental Biosecurity Project Fund and will test and identify potential gaps in our environmental biosecurity preparedness.

In October 2018 a National Biosecurity Emergency Preparedness Expert Group completed a *Review of preparedness and response capability for environmental biosecurity incidents*, finding that:

- planning and plans for managing the response to environmental biosecurity incidents are less mature than for the animal health and plant health sectors
- many environmental emergency response plans rely on existing animal and plant plans
- adequate resources for training, preparation exercises, technical expertise and operational response are not available
- the range of environmental threats has not been fully identified
- threat-specific plans have not been extensively developed within the environmental biosecurity sector.

4.2 National Environmental Biosecurity Response Agreement

Unlike agricultural industries, the 'environmental industry' has no equivalent peak bodies with access to levy funds, so management of cost-shared national environmental biosecurity programs is arranged solely through governments. In 2012 the National Environmental Biosecurity Response Agreement (NEBRA) was set up under the Intergovernmental Agreement on Biosecurity. It provides for responses to nationally significant environmental biosecurity incidents impacting the environment and/or social amenity, such as weeds, tramp ants and marine pests, where a combined response provides mainly public benefits. Half the cost is funded by the Australian Government with the other half shared among states and territories.

The NEBRA has officially been used for five cost-shared eradication responses, including three separate red imported fire ant (RIFA) incursions in Port Botany, Yarwun, and Brisbane airport; browsing ant in Darwin; and Macao paper wasps on the Cocos (Keeling) Islands (Table 1).

TABLE 1 Emergency responses conducted under NEBRA

Species	Location	Year	Status	Cost
RIFA (<i>Solenopsis invicta</i>)	Queensland, Yarwun	2013–2017	Eradicated 2017	\$2,636,628
RIFA (<i>Solenopsis invicta</i>)	New South Wales, Port Botany	2014–2017	Eradicated 2017	\$998,751
Browsing ant (<i>Lepisiota frauenfeldi</i>)	Northern Territory, Darwin port	2015–16 to 2017–18	Lapsed response phase	\$1,100,000
Browsing ant (<i>Lepisiota frauenfeldi</i>)	Northern Territory, Darwin	2017–18 to 2021–22	Response phase	\$5,400,000
RIFA (<i>Solenopsis invicta</i>)	Queensland, Brisbane Airport	2015–2018	NBMG to consider proof of freedom	\$343,002
Macao paper wasp (<i>Polistes olivaceus</i>)	Cocos (Keeling) Islands	2016–2018	Transition to management	\$193,000

RIFA Red imported fire ant. **NBMG** National Biosecurity Management Group.

Fire ants were detected and eradicated twice at Yarwun (near Gladstone) Queensland—first between 2006 and 2010, and then again between 2013 and 2017, following successful surveillance, baiting and direct nest injection techniques. The second Yarwun incursion was the first eradication response to be managed under the NEBRA.

In November 2014 fire ants were detected at Port Botany in Sydney (just outside a stacked container area). An immediate 2 km surveillance zone was established over 366 hectares containing over 2,000 residential homes, businesses, other port facilities and playgrounds. Traps and odour detector dogs were used for surveillance and eradication declared in 2017.

In July 2015 browsing ants (*Lepisiota frauenfeldi*) were detected at Darwin seaport. In 2017 the NBMCC agreed that it was technically feasible and cost beneficial to eradicate browsing ants from Australia, through a coordinated baiting and spraying program. The first response plan (2015–16 to 2017–18) did not achieve eradication. The NT Government put forward a second plan from 2017–18 to 2021–22. In January 2018 the National Biosecurity Management Group (NBMG) committed \$5.4 million to eradicate browsing ants from the Northern Territory by mid 2021 under the NEBRA. This agreement superseded the original response plan because browsing ants were detected on more properties in Darwin than initially budgeted for.

In September 2015 RIFA were detected at Brisbane Airport by a member of the public. The nest was destroyed and an emergency response initiated under the NEBRA. The NBMG hopes to be able to declare proof of freedom for this site in 2019.

In April 2015 the Macao paper wasp (*Polistes olivaceus*) was first detected on the Cocos (Keeling) Islands. In 2016 a two-year eradication program conducted under the NEBRA began but encountered difficulties. The wasp could breed rapidly and colonise dense forest, becoming difficult to effectively locate, delimit, treat and contain, because many islands in the group are densely forested and challenging to access. In September 2018 the NBMG determined that the Macao paper wasp was no longer technically feasible to eradicate from Cocos (Keeling) Islands under the NEBRA. The WA Government conducted wind-down activities until the end of 2018. Ongoing management of the wasp will be led by the Australian Government Department of Infrastructure, Regional Development and Cities, which administers the islands.

In 2017 an independent review of the NEBRA, after five years of operation, made 16 recommendations ([Appendix H](#)) across five themes:

- the need for greater involvement of environmental agencies and system participants in the NEBRA activities
- the need for an enhanced custodian role to allow for greater transparency around the NEBRA activities
- revising the approach to assess the national significance and cost benefit of eradication
- cost-sharing emergency containment activities under the NEBRA or another mechanism
- restructuring the NEBRA in line with the four phases of an emergency plant pest response, detailed in the Emergency Plant Pest Response Deed.

By February 2019 implementation of several recommendations was already completed or in progress ([Appendix H](#)). The Australian Government is working with other NEBRA signatories to respond to the review through the National Biosecurity Committee.

4.3 Incursion response case studies

4.3.1 Exotic invasive ants—responses mostly successful

Exotic invasive ants, also called tramp ants, are some of the world's most invasive pests because of their devastating environmental, economic and social impacts. Since 2001 20 serious tramp ant incursions have occurred, including 16 incursions of RIFA (Table 2).

Between 2001 and 2017 Australian and state and territory governments, in a cost-shared response, spent more than \$366 million to contain a RIFA incursion south-west of Brisbane. The fire ants may have entered in the 1990s and were widely established. In July 2017 Australian and state and territory agriculture ministers together committed a further \$411.4 million over 10 years to the National Red Imported Fire Ant Eradication Program. When the \$10.5 million for the NEBRA responses to ant incursions is added, Australia has spent or allocated more than \$800 million for exotic invasive ant control since 2001.

The yellow crazy ant (*Anoplolepis gracilipes*) is listed as one of the top 100 worst invasive species by the International Union for Conservation of Nature and the Global Invasive Species Database. First discovered in Cairns in 2001, the ants have been found at more than 20 sites in Queensland and in a large, scattered population in Arnhem Land in the Northern Territory. On Christmas Island, yellow crazy ants have killed millions of red land crabs and robber crabs, both of which play an important role in Christmas Island's forest floor ecology.

TABLE 2 Emergency responses to exotic invasive ants, 2001 to 2018

Year	Location	Pest	Detection type	Result
2001 to 2026–27	South-east Queensland	RIFA	Incursion	Response phase
2001	Port of Brisbane	RIFA	Incursion	Eradicated 2012
2001	Cairns	Yellow crazy ant	Incursion	Response phase
2004	Port of Brisbane	RIFA	Border breach	Eradicated 2004
2006	Cairns	Electric ant	Incursion	Transition to management
2006	Yarwun, Queensland	RIFA	Incursion	Eradicated 2010
2006	Melbourne	RIFA	Interception	Eradicated 2006
2007	Darwin	RIFA	Interception	Eradicated 2007
2009	Lytton, Queensland	RIFA	Border breach	Eradicated 2009
2009	Port of Brisbane	RIFA	Interception	Eradicated 2009
2009	South Australia	RIFA	Interception	Eradicated 2009
2013	Yarwun, Queensland	RIFA	Incursion	Eradicated 2017
2011	Roma, Queensland	RIFA	Border breach	Eradicated 2011
2011	Western Australia	RIFA	Interception	Eradicated 2011
2014	Port of Brisbane	RIFA	Interception	Eradicated 2014
2014	Port Botany, New South Wales	RIFA	Incursion	Eradicated 2017
2015	Melbourne	RIFA	Interception	Eradicated 2015
2015	Darwin Port	Browsing ant	Incursion	Response phase
2016–2018	Brisbane Airport	RIFA	Incursion	Response phase
2018	Lismore, New South Wales	Yellow crazy ant	Incursion	Response phase

RIFA Red imported fire ant.

In May 2018 a yellow crazy ant infestation was found in Lismore, New South Wales. A month later an additional infestation was discovered 30 km north of Lismore, at Terania Creek. Extensive community-based surveillance and eradication efforts led by the NSW Department of Primary Industries (NSW DPI) are ongoing.

The NBC is developing the National Invasive Ant Biosecurity Plan 2018–2028. The plan, yet to be endorsed, provides a nationally agreed approach to enhance Australia's capacity to manage the ongoing threat of invasive ants establishing in Australia, and the impacts caused by those species already established.

4.3.2 Myrtle rust—too widespread to eradicate

Myrtle rust, caused by the fungus *Austropuccinia psidii*, is a highly infectious disease that affects plants in the *Myrtaceae* species, such as eucalypts, willow myrtle, turpentine, bottlebrush, paperbark, tea tree and lilly pilly.

Myrtle rust was detected in April 2010 on the Central Coast of New South Wales. The sample was initially diagnosed as *Uredo rangelii* by the NSW DPI, which initiated an emergency response on 23 April 2010. The response was conducted under the EPPRD because the NEBRA did not come into effect until 2012.

On 27 April 2010 the Consultative Committee on Emergency Plant Pests (CCEPP) decided that more surveillance was needed to determine the extent of the spread of the rust. The CCEPP had representatives from Agriculture, state and territory primary industries' agencies and representatives from affected parties. Notably, the forest industry was not a signatory of the EPPRD and not deemed to be an affected industry. The CCEPP also had no senior representatives from the environmental sector.

On 30 April 2010, one week after the emergency response began, the CCEPP determined that *A. psidii* was not technically feasible to eradicate and ceased the emergency response. NSW government agencies continued surveillance and containment activities with much reduced resources. This revealed good control on infected properties and limited spread from them.

On 2 July 2010 the CCEPP restarted the emergency response under the EPPRD, following pressure from Plant Health Australia, the Nursery and Garden Industry Australia and the Australasian Plant Pathology Society. This resulted in a substantial increase in resources directed to surveillance, tracing, quarantine and treatment.

On 28 October 2010 *A. psidii* was found in native vegetation, and following optimum environmental conditions, the spread of *myrtle rust* escalated. Surveillance increased to over 1,600 inspections on more than 1,300 properties. On 2 December 2010 the CCEPP determined that eradication was no longer feasible and stopped the emergency response. The recoverable cost of the EPPRD response was \$3.5 million.

From 2011 to 2013 the Australian Government funded a \$1.5 million transition to a management program. Myrtle rust has now spread into Queensland, Tasmania, Victoria, the Tiwi Islands (Northern Territory), Norfolk Island, New Caledonia and New Zealand. Myrtle rust is not able to be directly managed other than by exclusion from unaffected areas.

Several criticisms of the myrtle rust emergency response (Carnegie & Pegg 2018) included:

- the haste at which the original response was stopped
- confusion around the correct taxonomy, which led to slow responses
- poor use of published resources on response procedures
- environmental threats not given sufficient weight in decision-making
- inadequate resourcing.

Myrtle rust does not impact human or animal health, although loss of affected plant species will impact some animal species or ecosystem integrity. Some severely affected areas in south-east Queensland have lost their bird life—a devastating outcome.

A draft action plan was developed by the Plant Biosecurity Cooperative Research Centre for a coordinated response to myrtle rust research and on-ground actions (Makinson 2018) but had not been funded at the time this report was prepared.

Since the 2010 incursion one ‘pandemic’ strain of *A. psidii* has naturalised in Australia. Three-hundred-and-fifty-eight susceptible Australian native plant species in the *Myrtaceae* family have been identified, four species of which are approaching extinction as a result of myrtle rust disease. Botanical gardens are attempting to grow specimens of some of these threatened species. *Lenwebbia* sp, a small tree growing in high altitude rainforest in south-east Queensland and northern New South Wales, is likely to become the first myrtle rust-mediated extinction in Australia. Further strains in South America, Central America and South Africa could severely impact eucalypt species.

This myrtle rust incursion demonstrates the extreme difficulty in dealing with a pathogen of such a wide range of native species.

Chapter 5

Prioritising environmental biosecurity threats

5.1 Environmental pest and disease priority list

The complexity of potential environmental biosecurity threats can seem overwhelming. Local and overseas experience can help us understand the potential impacts of new invasive animals and plants on native terrestrial and aquatic ecosystems, the impacts of new diseases and pests on vulnerable native fauna and flora, and the impacts on social amenity of different communities. Some pests may attack immediately vulnerable biota but also potentially cause cascading ecological effects. Extended pathway and risk analyses are needed to prioritise and effectively combat such threats.

Prioritising biosecurity threats is important to ensure that contingency arrangements for the highest risks can be put in place. A longstanding national Emergency Animal Disease list, a more recently developed National Priority Plant Pest list and a draft Australian Priority Marine Pest List allow disease-specific and pest-specific contingency plans, enabling prompt and appropriate risk management.

In 2011 the Vertebrate Pest Committee and the Australian Weeds Committee collaborated to produce a National Categorisation System for Invasive Species, which was endorsed by the NBC. This defined criteria for different categories of invasive species:

- **Category 1—National surveillance**—the taxon is not known to be in Australia and poses a potential ‘significant national threat’ to the environment and ecosystems; to people, including human infrastructure and social amenity; or to business activity.
- **Category 2—National eradication**—the taxon is currently a nationally agreed, cost-shared target or has satisfied the NEBRA criteria for eradication.
- **Category 3—Established invasive species of national significance**—the taxon is already an established pest or weed of national significance or has potential to become one, is already present, deemed ineradicable and requires nationally coordinated management.
- **Category 4—National restriction on keeping, sale and trade**—the taxon is nationally agreed as requiring these restrictions in every state and territory and has consistent national border restrictions for international recognition of its official control.

In July 2017 Agriculture, through the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES), began developing a national priority list of exotic environmental pests. The EIC agreed to sponsor the list, which includes:

- weeds and freshwater algae
- vertebrate pests
- marine pests
- aquatic animal disease
- animal disease
- plant pathogens
- terrestrial invertebrates
- freshwater invertebrates.

The list is intended to help with:

- identifying pests, weeds and diseases that are likely to cause nationally important negative impacts on Australia's environment and social amenity
- informing more efficient and effective targeting of activities and resources towards these environmental pests, weeds and diseases, which may include developing preparedness and response plans and guiding surveillance and detection activities
- raising government, industry and community awareness of, and engagement with, these environmental pests, weeds and diseases.

To begin developing the priority list, Agriculture hosted two stakeholder workshops. The first, in March 2018, was attended by Environment, all Australian jurisdictions, the NZ Ministry for Primary Industries, CSIRO, the Centre for Invasive Species Solutions (CISS), the Centre of Excellence for Biosecurity Risk Analysis (CEBRA), Wildlife Health Australia and Animal Health Australia (AHA). At the workshop, participants agreed to the vision and purpose of the list and the methodology to be used—a modified semi-quantitative delphi approach.

The second workshop was held in June 2018. This was attended by representatives from the first workshop as well as Wildlife Disease Association Australia, Plant Health Australia, researchers from universities and museums throughout Australia, and environmental consultants from private organisations. They tested the methodology for use in an expert elicitation process.

Using this agreed process, experts will assess candidate species for the priority list until March 2019. In April 2019 a targeted consultation process with NBC sectoral committees will begin. The CEBO will coordinate an open public consultation in mid 2019, and aims to publish the final list on Agriculture's website by the end of 2019, following endorsement by the EIC and the NBC.

We strongly support ABARES but are unclear what level of consultation will be applied. Agriculture should set a response period for public consultation to account for acute staff shortages in many environmental organisations (including many of the agencies as well as NGOs). A longer rather than shorter consultation period is advised (Australian Network for Plant Conservation submission).

ABARES should provide the data that have been used to assess the priority list during the public consultation phase. Sharing these data will assist the deliberations of many small environmental and community groups who may wish to have input into the process.

The IGAB review recommended that the national priority lists be reviewed every five years (Craik, Palmer & Sheldrake 2017). However, once established, developing a dynamic priority risk process to allow emerging environmental pests and diseases to be added will be more important. The Environmental Pest and Disease Priority list should also be subject to regular review, with opportunity for input from scientists and environmental and community groups.

Setting of national priority lists can have inadvertent perverse outcomes, for example the Weeds of National Significance (WONS) list had desirable effects in concentrating investment in control, but arguably led to under-investment in more localised environmental problem species which have since grown such as Ox-eye Daisy. (Australian Network for Plant Conservation submission)

Recommendation 5

The department should establish a dynamic and transparent environmental pest and disease risk prioritisation process, informed by new scientific knowledge, to allow emerging environmental pests and diseases to be added to the priority list as they arise. This list of priority environmental biosecurity pests and diseases, with the basis for their inclusion, should be published on the department's website and continuously reviewed.

Department's response: The department is working with ABARES to prepare and finalise the National Priority List of Exotic Environmental Pests and Diseases. Once the process is complete and each of the sectoral committees (Environment and Invasives Committee, Animal Health Committee, Marine Pests Sectoral Committee, Plant Health Committee) have been consulted on the list, the department will engage stakeholders and ensure thorough consultation on the draft list. Following consultation, the list and final report will go to the Environment and Invasives Committee and the National Biosecurity Committee for endorsement.

The priority list, along with the basis for pest & disease inclusion, will be published on the department's website. The Environmental Biosecurity Office and Chief Environmental Biosecurity Officer will play a key role in using the data from the list to develop policies that guide priority areas of work in environmental biosecurity. The list will be routinely reviewed every five years, with the first review to occur in three years. The review will include revision of the purpose, use, criteria and methodology. Provision will also be made for ad-hoc amendments to the list, which will allow for the timely addition or removal of a species to ensure that the list remains up-to-date. This process will be coordinated through the Environment and Invasives Committee, in consultation with the relevant sectoral committees.

5.2 Gaps in pathway and risk analysis

A great deal of effort has gone into conducting comprehensive pathway and risk analyses for agricultural pests and diseases in an attempt to underpin import conditions and pre-border, border and post-border controls to manage their risks. However, significant knowledge gaps for non-commodity risks and pathways of environmental threats remain. The pathways for different classes of environmental pests should be considered.

5.2.1 Hitchhiker pests

A recent review of hitchhiker pest and contaminant biosecurity risk management in Australia (IGB 2018) revealed how Agriculture is managing the risks of external and internal contamination of vessels and aircraft, sea and air containers and other cargo. The review highlighted environmental and agricultural hitchhiker pests such as exotic invasive ants, exotic bees and bee mites such as *Varroa destructor*, pests of many plant species such as brown marmorated stink bugs and giant African snails, and forestry pests such as Asian gypsy moth and burnt pine longicorn beetles.

The review found that challenges posed to Australia by hitchhiker pests and contaminants are increasing, due to greater global trade and movement of people, pests, and diseases around the world. Other countries may not prioritise preventative measures as much as Australia and New Zealand, since certain pests may be endemic there or not pose the same level of risk.

It concluded that, although Agriculture's efforts to manage the risks of hitchhiker and contaminant entry by many pathways, notably ships, aircraft and air cargo, are impressive, the more difficult and complex tasks of preventing hitchhikers and contaminants from entering on or in sea cargo are not easy to manage. The greatest and least mitigated risk is from external and internal contamination of sea containers.

Finding external contamination with soil, insects, snails and seeds depends largely on onerous and under-resourced manual inspection processes that need innovative automation to become more efficient. Risks are likely to increase with the greater emphasis on rail shipment of containers out of ports to intermodal hubs and beyond. Disturbed verges of rail tracks provide ideal habitat for red imported fire ants and other tramp ants and exotic pests that can fall off the base of containers with soil. The review recommended automatic washing facilities for sea containers be built into port rail entry points. However, little progress has been made on this recommendation, so external sea container biosecurity risks remain unmitigated.

5.2.2 Invasive animals

The environmental and agricultural damage done by established invasive animals such as rabbits, foxes, rats and mice, wild dogs, feral cats and feral pigs is well known and requires ongoing control. Other large animals such as camels, deer, goats and brumbies are also emerging or periodic environmental pests, but control of these can be more emotive. Preventing new, potentially invasive animals entering is a high priority. Pathways include legal or illegal importation of unusual pets, imports of ornamental fish with invasive potential, and illegal smuggling of exotic reptiles and birds (either as adults or eggs).

Illegal smuggling of live animals is often detected by standard border protection methods. On 13 December 2018 biosecurity officers detected two live squirrels being smuggled on a flight from Bali, Indonesia (Agriculture 2018). However, not all illegal imports are detected at the border. In July 2018 biosecurity and environment officers raided a house in Canberra and seized hundreds of exotic ant species (Brown 2017). Officials were alerted by several concerned members of the public after the owner had attempted to sell them online.

Environment's classification of animals for the Live Import List is a key means of preventing new invasive animal species entering and establishing, provided their invasive potential is recognised (Box 1).

Box 1 The Live Import List was used to ban Savannah cat imports

A Savannah cat is a cross between a domestic cat and a serval—a medium-sized, large-eared wild African cat. This unusual cross became popular among US cat breeders at the end of the 1990s, and in 2001 was accepted as a new registered breed. Savannahs are larger than domestic cats and can leap up to 2.5 m high from a standing position. By 2008 pet dealers were applying to import Savannah cats into Australia. Australian wildlife scientists and the Invasive Animals Cooperative Research Centre realised their potential to escape from captivity and breed with feral cats, creating a 'supercat' that could exterminate even more native marsupials. Australia did not need a more efficient feral cat. In August 2008 the Environment Minister changed the definition of 'domestic cat' on the Live Import List to rule out cats with serval genes.

Exotic hybrid pets, including wolf-dogs and other hybrid cat breeds, continue to be developed and Environment is considering how best to address the risk that hybrid animals may pose to Australia's environment.

5.2.3 Wildlife and plant diseases

Animal and plant diseases may be carried into Australia by the import of animals or plants carrying them or on the clothing and footwear of people who have been in contact overseas with host species for the various pathogens. Recognition of specialised pathways is essential to target community advice to potential risk creators.

For example, the risk of white nose syndrome in bats being spread by hikers or cavers identified that specialised and targeted biosecurity guidelines were needed to manage the risks of this pathway (Box 2).

Box 2 Biosecurity guidelines for white nose syndrome in bats

White nose syndrome (WNS) is an emerging disease caused by the fungus *Pseudogymnoascus destructans*, which affects hibernating bats. First identified in New York in 2006, it has caused the deaths of more than 5 million cave-hibernating bats across North America. The fungus that causes WNS can spread between caves by surviving on clothing, footwear and caving gear.

Australia is free of WNS but the movement of cavers, researchers, karst managers, tourists (and their equipment) between affected caves in China, Europe and North America and caves in Australia is one pathway that the disease-causing fungus could enter Australia. Agriculture recognises the risks that international cavers visiting Australia may introduce WNS and has provided some guidelines including:

- do not bring into Australia any clothing, footwear and caving gear that has been used in other countries
- contact Australian caving groups to ask about loan gear
- if you must bring personal gear comply with published cleaning protocols to decontaminate gear before and after field trips.

5.2.4 Invasive fish

Invasive fish such as carp, mosquito fish and tilapia have tremendous environmental impacts, crowding out native species and destroying many habitats. A massive and controversial biocontrol program for carp is under consideration, while an intense surveillance program is attempting to detect and prevent tilapia from extending its range from south-eastern Queensland rivers into the Murray–Darling Basin.

Thirty-four exotic freshwater fish species have already established in Australia—22 from ornamental/aquarium releases, eight from acclimatisation, two from ballast water, one aquaculture species (carp) and one failed biocontrol (*gambusia*) (Lintermans 2004). Two of these species, brown trout (*Salmo trutta*) and rainbow trout (*Oncorhynchus mykiss*), are considered a valuable recreational fishing resource and are actively restocked (government funded) in Australian waterways despite being on the IUCN list of the world's most invasive alien species.

5.2.5 Aquatic animal diseases

Aquatic animal diseases may be imported on ornamental fish. For example, species of iridovirus that cause infectious spleen and kidney necrotic disease in gourami have been shown to be able to spread in water and cause severe disease in Australian native fish species such as golden perch. In March 2016 Agriculture implemented new pre-export iridovirus-free certification requirements for imported freshwater ornamental fish that belong to the gourami, cichlid and poeciliid groups. However, this is only a small section of the more than 5,000 species of fish in the global aquarium trade, many of which are poorly known or difficult to identify as fingerlings and have poorly-defined disease-carrying potential.

In August 2017 Agriculture and Environment worked with the aquarium industry to close down the illegal trade of Cajun dwarf crayfish (*Cambarellus shufeldtii*)—a known carrier of crayfish plague, an exotic disease that has had catastrophic effects on endangered native crayfish populations in other countries. Environment officers removed more than 45 specimens from several homes across New South Wales and Victoria.

Disease incursions can rapidly move from aquaculture facilities into nearby aquatic environments where they may establish. This was shown by the 2016–17 outbreak of white spot disease in prawn farms near the Logan River, Queensland, and its subsequent detection in Moreton Bay. Environmental surveillance of various wild crustaceans will be needed until at least two years of negative results, after which movement controls on prawns, crabs and bloodworms from Moreton Bay and nearby waterways may be lifted.

5.2.6 Invasive marine pests

Invasive marine pests may be carried into Australian waters and ports by shipping, particularly in ballast water and as biofouling on ships' hulls.

Ballast water management to international standards has been oversighted more effectively by Agriculture since the introduction of the Maritime Arrivals Reporting System in 2016, as detailed in the IGB's Hitchhiker report (IGB 2018).

Biofouling is a significant pathway for the introduction and spread of environmental marine pests and diseases. The 2015 Senate inquiry and a 2015 review of national marine pest biosecurity recommended that the Australian Government develop regulations to reduce the biosecurity risks associated with biofouling (Agriculture 2015).

In 2018 the NZ Ministry for Primary Industries (MPI) implemented a Craft Risk Management Standard (CRMS) for vessel biofouling. The CRMS requires all vessels entering New Zealand to manage biosecurity risks associated with biofouling by:

- cleaning the hull vessel less than 30 days before or within 24 hours of arrival (long stay)
- applying MPI-approved treatment and continual maintenance (short stay).

Agriculture is developing a biofouling policy for public consultation in mid 2019 and, if approved, implementation over five years. The policy will be based on IMO 2011 guidelines for the control and management of ships' biofouling to minimise the transfer of invasive aquatic species. These guidelines are based on pathway controls (ship hull designs and ports visited) rather than species specific threats (IMO 2012).

Technological innovation does not wait for Australian Government policy to be developed. In August 2018 a Norwegian company began using underwater hull-cleaning technology in the Port of Townsville, Queensland. HullWiper uses adjustable seawater jets on a remotely operated vehicle to clean the hull and collect the filtered waste for onshore disposal. Vessels are cleaned while they are unloading cargo. Expansion of these operations into major ports of entry would greatly reduce the environmental biosecurity risk associated with biofouling.

Research to validate molecular techniques to survey ships' ballast water and ports for priority marine pests has commenced. In mid 2017 Agriculture began monitoring key Australian ports including Brisbane, Devonport, Gladstone, Gove, Hay Point, Hobart, Melbourne and Weipa.

Box 3 Tassal flags biosecurity questions over oil rig in Hobart, Tasmania

Tasmanian salmon aquaculture company (Tassal) raised biosecurity concerns about an oil rig that was anchored in Hobart. In 2017 the oil rig Ocean Monarch travelled from Singapore to Western Australia and onto Bass Strait. In November 2018 the oil rig was towed into the River Derwent, Hobart for maintenance and minor repairs. On 12 December 2018, following discussions from Tassal, the Tasmanian Environment Protection Authority (EPA) issued an Environmental Protection Notice to the Diamond Offshore General Company. The notice was based on concerns the activity of the oil rig may cause serious or material environmental harm or environmental nuisance.

The EPA was concerned that the vessel had an invasive marine pest, the white colonial sea squirt (*Didemnum perlucidum*), attached to its hull because the sea squirt was introduced into Western Australia in 2010.

The Ocean Monarch was not inspected before being allowed into Tasmanian waters and the owners of the vessel resisted requests for a hull inspection. The EPA considered its legal options in being able to undertake an inspection without the vessel owner's approval. The Diamond Offshore company agreed to an inspection and provided a report to the EPA. The report found that the oil rig was unlikely to pose a risk to the Derwent. Questions have since been raised about the decision to allow the company to self-assess.

5.2.7 Invasive plants (weeds)

Weeds are recognised to have caused enormous environmental damage in Australia. The potential for many exotic plants to become major weeds if introduced is profound. Twenty established Weeds of National Significance (WONS) were listed by Australian governments in 1999 and a further 12 added in 2012, due to their invasiveness, potential for spread and the environmental damage they caused. Limited national action is undertaken to address potential weed biosecurity risks/pathways via the horticultural and nursery industries, with the exception of pre-border weed risk assessment.

Agriculture sets conditions for seeds and live plants that are imported to be grown in Australia. These conditions protect Australia from the risk of introducing exotic weeds and diseases that could harm our environment and economy. All import conditions for seeds are detailed in Agriculture's Biosecurity Import Conditions system (BICON).

Import conditions vary depending on the genus and species of the plant or seed, and on other factors including country of export. A person wanting to import a species that is not listed on BICON can complete and submit a New Plant Introduction form. The information provided on the form is used by Agriculture to conduct a weed risk assessment of the species, after which Agriculture may choose to develop import conditions for the new species.

Environment maintains a Weeds in Australia website, which contains databases of plants or plant material prohibited from import into Australia. Agriculture consults this information when conducting weed risk assessments (WRAs).

As part of the WRA, if a weed species is already present in Australia but is not listed as noxious and is not under 'official control', it cannot be prohibited entry under Australia's international obligations, regardless of whether it is considered a weed in other situations. This seems to contradict the basis of environmental biosecurity to 'protect the environment and/or social amenity from the risks and negative effects of pests and diseases entering or spreading in Australia'.

5.2.8 Wildlife diseases

Wildlife Health Victoria are concerned about the spread of animal diseases from domestic and feral animals to wildlife.

There is increasing evidence that many infections of introduced domestic and feral animals have spread to wildlife, are impacting environmental biosecurity and biodiversity, and have created wildlife reservoirs of infections that may spill back to domestic animals and into humans. Consideration needs to be given to preventing and managing the establishment of these diseases. These may include: sheep and cattle Johne's disease (*Mycobacterium paratuberculosis*) into macropods, sheep and cattle *Chlamydia pecorum* into koalas, free range poultry/turkey/duck Avian Cholera (*Pasteurella multocida*) into waterbirds, cat toxoplasmosis into marsupials, dog and fox hydatids into marsupials, dog and fox mange *Sarcoptes scabiei* mites into wombats (Wildlife Health Victoria submission).

Chapter 6

Surveillance and wider scientific and community engagement

6.1 Australian Government border surveillance programs

Agriculture conducts several biosecurity surveillance programs focusing on its specific border and pre-border areas of authority. It also provides coordination and funding for a larger number of wider surveillance programs that are implemented in collaboration with state and territory governments and relevant industry, scientific and community groups.

6.1.1 National Border Surveillance program

In November 2016 Agriculture began a National Border Surveillance (NBS) program by sampling, recording and identifying insect and plant species around first points of entry (international airports and seaports) and approved arrangements (industry-run facilities where imported goods and conveyances are first received and unpacked). The NBS is delivered by Agriculture's Operational Science Services group and forms part of the biosecurity continuum by managing the risk of incursions of pests and diseases on high risk pathways at or near the border. Environmental pests such as tramp ants are a key target of this surveillance.

From 2017 to 2018 the NBS detected 42 pests and diseases of environmental concern. Most of these were snails (23.8 per cent) and ants (16.6 per cent) found at approved arrangements (66 per cent) (Table 3). Victoria accounted for the most detections (35 per cent) followed by Queensland (28.6 per cent) (Figure 3).

TABLE 3 National Border Surveillance detections of exotic environmental pests and diseases, 2017 to 2018

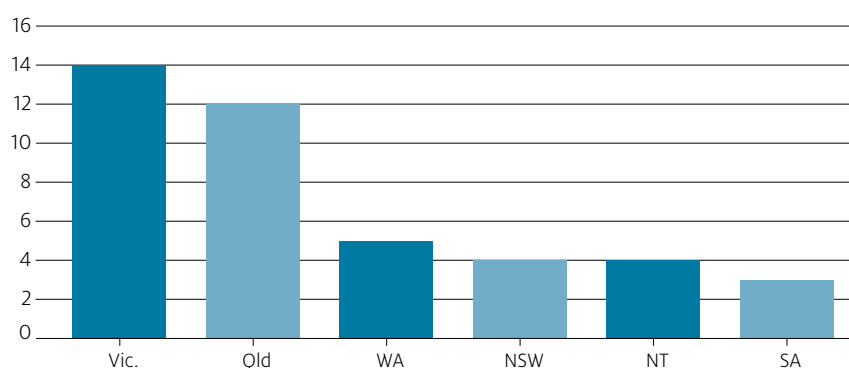
Date	Location	Common name	Scientific name	Site	External notification	Proposed action
May 17	Darwin	Ludwigia begomovirus	<i>Begomovirus</i> sp.	AA	No	No action
Jun 17	Melbourne	Citrus canker	<i>Xanthomonas citri</i>	AA	Yes	Treatment
Jul 17	Brisbane	Monomorium tramp ant	<i>Monomorium dichroum</i>	Wharf	Yes	Treatment
Jul 17	Darwin	Begomovirus plant virus	<i>Begomovirus</i> sp.	AA	Yes	Investigation
Aug 17	Melbourne	Tramp ant	<i>Hypoponera eduardi</i>	AA	Yes	Surveillance
Sep 17	Perth	Giant African snail	<i>Lissachatina fulica</i>	Wharf	Yes	Surveillance
Aug 17	Brisbane	Alluaud's little yellow ant	<i>Plagiolepis alluaudii</i>	Port	Yes	No action
Nov 17	Brisbane	Monomorium tramp ant	<i>Monomorium dichroum</i>	Port	Yes	Treatment
Dec 17	Melbourne	Chocolate-banded snail	<i>Massylaea vermiculata</i>	AA	Yes	Surveillance
Jan 18	Melbourne	Snail	<i>Monacha ocellata</i>	AA	Yes	Surveillance
Jan 18	Melbourne	Snail	<i>Xerotricha conspurcata</i>	AA	Yes	Surveillance
Jan 18	Melbourne	Snail	<i>Laeocathaica</i> sp.	AA	No	Surveillance
Feb 18	Perth	Buckthorn potato aphid	<i>Aphis nasturtii</i>	AA	Yes	Surveillance
Feb 18	Brisbane	Red imported fire ant	<i>Solenopsis invicta</i>	AA	Yes	DNA test for origin
Feb 18	Brisbane	Red imported fire ant	<i>Solenopsis invicta</i>	AA	Yes	DNA test for origin
Feb 18	Brisbane	Ashy gray lady beetle	<i>Olla v-nigrum</i>	Wharf	Yes	Surveillance
Feb 18	Melbourne	Rotund disc snail	<i>Discus rotundatus</i>	AA	Yes	Surveillance
Mar 18	Melbourne	Minute cypress scale	<i>Carulaspis minima</i>	AA	No	No action
Mar 18	Perth	Concentric leaf spot	<i>Phyllosticta concentrica</i>	AA	Yes	Surveillance
Mar 18	Perth	Browsing ant	<i>Lepisiota frauenfeldi</i>	RAAF	Yes	Surveillance
Apr 18	Melbourne	European firebug	<i>Pyrrhocoris apterus</i>	AA	Yes	Surveillance
Apr 18	Melbourne	European firebug	<i>Pyrrhocoris apterus</i>	AA	Yes	Surveillance
Apr 18	Brisbane	Monomorium tramp ant	<i>Monomorium dichroum</i>	Wharf	No	No action
May 18	Brisbane	Keyhole wasp	<i>Pachodynerus nasidens</i>	Port	No	No action
May 18	Brisbane	Monomorium tramp ant	<i>Monomorium dichroum</i>	AA	Yes	No action
May 18	Darwin	False powderpost beetle	<i>Dinoderis papuanus</i>	Wharf	Yes	Surveillance
Jun 18	Brisbane	Red imported fire ant	<i>Solenopsis invicta</i>	AA	Yes	DNA test for origin
Jun 18	Brisbane	Keyhole wasp	<i>Pachodynerus nasidens</i>	Port	Yes	No action
Jun 18	Adelaide	Snail	<i>Xerotricha conspurcata</i>	AA	Yes	No action
Jun 18	Melbourne	European firebug	<i>Pyrrhocoris apterus</i>	AA	Yes	No action
Jul 18	Darwin	Pygmy borer	<i>Ernoladius</i> sp.	Wharf	Yes	No action
Jul 18	Sydney	Ptinid beetle	<i>Ozognathus cornutus</i>	AA	Yes	No action
Jul 18	Perth	Myrmicine ant	<i>Tetramorium caldarium</i>	RAAF	Yes	No action
Aug 18	Melbourne	Snail	<i>Xerotricha conspurcata</i>	AA	Yes	No action

continued ...

TABLE 3 National Border Surveillance detections of exotic environmental pests and diseases, 2017 to 2018 *continued*

Date	Location	Common name	Scientific name	Site	External notification	Proposed action
Aug 18	Adelaide	Snail	<i>Caracollina lenticulata</i>	AA	Yes	Surveillance
Sep 18	Adelaide	Snail	<i>Xerotricha conspurcata</i>	AA	Yes	Surveillance
Sep 18	Sydney	Snail	<i>Xerotricha conspurcata</i>	Other	Yes	Surveillance
Oct 18	Brisbane	Powdery mildew of sowthistle	<i>Golovinomyces sonchicola</i>	AA	Yes	Surveillance
Oct 18	Sydney	Snail	<i>Xerotricha conspurcata</i>	AA	Yes	Surveillance
Oct 18	Sydney	Grove snail	<i>Cepaea nemoralis</i>	Wharf	Yes	Treatment
Nov 18	Brisbane	Anthrachnose of Liriope	<i>Colletotrichum liriope</i>	AA	Yes	No action
Nov 18	Melbourne	Seed-bearing soursob	<i>Oxalis pes caprae</i>	AA	Yes	Surveillance

AA Approved arrangements. RAAF Royal Australian Air Force.

FIGURE 3 Exotic environmental detections from National Border Surveillance activities, 2017 to 2018

6.1.2 Northern Australia Quarantine Strategy

The Torres Strait is on a major international shipping route between Northern Australia and Asia. Pathways that could bring in pests or disease include itinerant yachts, dinghies, onshore winds and tides (including major storms or cyclones), migrating birds and 27,000 human movements, some with animals, between the Torres Strait Islands, Papua New Guinea and northern Queensland every year.

In 1989 the Australian Government established the Northern Australia Quarantine Strategy (NAQS). NAQS provides an early warning system for exotic pest, weed and disease detections across Northern Australia and its near neighbours. The program initially received funding for two years' operation from the Queensland, Western Australian and Northern Territory governments until it became an Australian Government responsibility in 2000.

The role of NAQS is to:

- manage the biosecurity aspects of border movements through the Torres Strait
- identify and evaluate the unique biosecurity risks facing Northern Australia
- develop and implement measures for early detection of targeted pests and diseases
- contribute to collaborative surveillance and capacity building in neighbouring countries.

NAQS covers almost 10,000 km of coastline from Broome in Western Australia to Cairns in Queensland, and includes the Torres Strait Islands. The distance from Saibai Island, Torres Strait to Papua New Guinea is only 3.6 km. In 2018 NAQS had 117 staff, including specialist scientists, community liaison officers, rangers and project officers. Twenty-nine per cent of NAQS staff were Aboriginal and Torres Strait Islander people.

NAQS targets more than 100 insect species, 50 plant diseases and 40 weed species and conducts an average of 18 plant early detection surveys/activities each year. It also monitors animal health through sampling sentinel cattle and pig herds for a range of animal diseases and monitoring of biting midge vectors for arboviruses. NAQS annually diagnoses 2,500 animal samples, 500 plant pathology samples, 400 botany samples, thousands of observational weed/host records and 2,500 trap insect trap clearances (more than 500,000 specimens). NAQS detects and notifies authorities about five nationally significant pests, diseases or weeds each year.

The Senate Environmental Biosecurity Inquiry Committee recommended that Agriculture review and update NAQS by mid 2016 and that this review examine the adequacy of resources available to implement the strategy and suggest changes to improve environmental biosecurity outcomes under the strategy. The Australian Government responded that it had committed more than \$60 million to surveillance practice and technologies in Northern Australia and an additional \$12.4 million in funding for Indigenous Ranger groups between 2015–16 and 2018–19.

NAQS considers Aboriginal and Torres Strait Islander partnerships critical for successful outcomes. Under the Indigenous Ranger Program, Agriculture has contracted 68 Indigenous Ranger groups across northern Australia to undertake fee-for-service biosecurity monitoring activities on Country, and invested more than \$1.8 million in training and equipment to build on the existing capability of rangers. More than 100 rangers have been provided emergency response training and each of the ranger groups are invited to represent their community at the annual Biosecurity Ranger Forum. Agriculture also collaborated with the Queensland Government to pilot the Biosecurity Indigenous Traineeship, with four trainees completing the 18-month traineeship in the Torres Strait and Northern Peninsula Area. Three of the trainees have subsequently obtained biosecurity related employment.

In 2018 a review of the Indigenous Ranger Program found that the program was contributing to safeguarding Australia's animal and plant health, but that improvements could be made in its next phase. Additionally, the program has provided direct and indirect benefits to communities by unlocking significant and new employment opportunities.

Agriculture is also a key partner developing the Torres Strait–Northern Peninsula Area Biosecurity Strategy with a range of local stakeholders. The strategy was developed in recognition of the need to protect the unique environment of the Torres Strait and the Northern Peninsula Area of Cape York from biosecurity risks. Agriculture has also been a key partner in collaborating to improve telecommunication in the area, resulting in increased 4G coverage and upgraded inter-island links. The investment has resulted in improved communications between biosecurity officers in the Torres Strait and better management of biosecurity risks. It has provided better outcomes in the provision of services such as health, education and economic development, as well as in the social wellbeing of the residents through being more connected to each other.

Agriculture has also continued to invest in a range of tools, data collection initiatives and collaborative measures supporting improved biosecurity surveillance and regulation approaches across the Torres Strait. This work has streamlined the work of biosecurity officers working across the Torres Strait and Indigenous Rangers undertaking biosecurity activities on a fee-for-service basis across the north.

This review commends Agriculture's effort in developing the Indigenous Ranger Program and considers it should work with Top End governments to expand biosecurity surveillance and compliance activities to facilitate early detection and management of biosecurity threats.

Recommendation 6

The department should ensure the Northern Australia Quarantine Strategy program, and other surveillance programs, are coordinated with state and territory biosecurity surveillance activities and environmental biosecurity projects (as appropriate) to encourage collaborative resourcing and avoid possible duplication.

Department's response: The department is currently implementing several initiatives that will improve the national surveillance system. These include better coordination of departmental, state and territory and industry biosecurity activities, and capacity building in near neighbour countries to ensure Australia's biosecurity risk is managed effectively and collaboratively. Surveillance activities across Australia are overseen by the National Biosecurity Committee and its subcommittees, which include input by representatives from all jurisdictions, industry and non-government organisations. The Chief Environmental Biosecurity Officer will work with the Northern Australia Quarantine Strategy (NAQS) program, Biosecurity Plant Division, Biosecurity Animal Division and the states and territories to ensure that environmental biosecurity priorities are included in both surveillance activities and projects.

The department supported the establishment of Wildlife Health Australia (WHA) in 2013 (from the former Australian Wildlife Health Network) to facilitate coordination and collaboration of wildlife health surveillance and other activities across different levels of government and with non-government organisations and community groups. The organisation is now co-funded by the Commonwealth and state and territory governments and chaired by the inaugural Chief Environmental Biosecurity Officer. The department (including NAQS) participates in WHA programs, as do the states and territories, zoos, wildlife hospitals, universities and private veterinary clinics. Other environmental biosecurity surveillance activities are coordinated through the Animal Health Committee and Animal Health Australia.

6.2 Wider post-border research, development and extension

The natural environment is complex. Submissions to this review have suggested some knowledge gaps that could be filled with research and communication. For example, the Australian Network for Plant Conservation believe improving communication across scientific expertise fields relating to invasive species such as species-level and ecosystem-level researchers could provide major benefits for the environmental biosecurity effort. These lie outside the current consultative processes of the biosecurity apparatus and are beyond reach for the current level of engagement.

Wildlife Health Australia also believes that improving education and knowledge of diseases with wildlife as part of their ecology that may impact on Australia's environment and biosecurity will help to prepare for and respond to these risks.

Environment noted that surveillance for new invasive species may be conducted by Parks Australia staff as part of ongoing reserve management practices, such as myrtle rust surveillance at Booderee National Park, Jervis Bay.

Formal arrangements with zoos, universities and botanical gardens should be developed to improve the environmental biosecurity knowledge gaps associated with native animals, including birds, invertebrates and reptiles.

Funding has emerged as a key issue for many environmental biosecurity issues needing further research and innovative approaches.

Agriculture and Environment have not aligned processes for allocating funding under their natural resource management (NRM) programs. The Grant Connect website provides information on all federal grants but it does not include NRM as a category, so it is difficult to find collated information on existing grants. This would be a desirable improvement to the system.

Stocktake of general surveillance

In late 2018 the ABARES Social Sciences team (part of Agriculture) initiated a stocktake of biosecurity general surveillance programs in primary production and natural resource management across Australia and New Zealand. General surveillance is defined as 'all pests, weeds and/or diseases surveillance activities that have elements of opportunism or flexibility' and includes passive surveillance ('fortuitous finds'), citizen science and industry or community-based surveillance initiatives. General surveillance initiatives typically involve considerable contributions from industry, private businesses, community groups or the general public.

The stocktake formed part of an ABARES project seeking to develop a set of guidelines for designing sustainable and effective general surveillance programs, to understand the state of play of general surveillance in Australia and New Zealand and to facilitate cross-program learning.

Similarly to the project for prioritising national environmental pests and diseases, this stocktake should be conducted in a transparent and dynamic manner.

In 2018 the Agriculture Senior Officials Committee agreed to a protocol for information sharing and a national trusted network to allow real-time sharing of sensitive interception data and intelligence. Agriculture is coordinating the development of a national data platform and data analytics, which will support data sharing. An interim data platform has been developed to enable data sharing.

Information about illegal imports such as exotic wildlife seizures could be shared through this platform. However, the bulk of environmental biosecurity pests are more likely to enter inadvertently. Maximum transparency and timely data sharing between governments and with community stakeholders is preferable to secrecy in dealing with these risks.

6.2.1 Invasive Species Council

The Invasive Species Council (ISC) was formed in 2002 to advocate for stronger laws, policies and programs to keep Australian biodiversity safe from weeds, feral animals, exotic pathogens and other invaders.

In January 2017 the ISC and Monash University School of Biological Sciences, with support from the Ian Potter Foundation, began an environmental biosecurity risks and pathways project. The two-and-a-half-year project is to develop a national priority list of potential insect and plant disease invaders that could harm the natural environment and identify their likely pathways of arrival and impacts.

The project will establish a best practice method for identifying priorities that can be applied to other groups of organisms and create an open-source database that will allow for regular updates. The first stage of the project will address insects. The work will extend to plant pathogens pending the result of additional grant applications. ISC work is funded by donations from supporters and philanthropic organisations.

6.2.2 Centre for Invasive Species Solutions

The Centre for Invasive Species Solutions (CISS) succeeded the Cooperative Research Centres for Invasive Animals and Australian Weeds Management. CISS was funded for five years from 2017 to 2022 to develop research, development and extension (RD&E) projects to enhance invasive species management strategies among landholders and land managers. In 2017–18, the first year of CISS operation, key achievements were:

- agreement to portfolio research project funding by the Member/Industry Review Panel in September 2017, with total committed funds amounting to \$11.4 million
- cash investment by Agriculture of \$3,350,000 in 2017–18, leveraging an additional \$2,757,000 in other contributions
- the proportional investment of other contributors set to significantly increase in 2018–19
- refinement of all 21 portfolio projects to point of execution or to final draft stage
- mobilisation of more than 100 RD&E specialists across the project portfolio to strengthen collaboration within and between projects
- preparation and release of a public consultation draft of a 10-year Investment Plan for Weeds RD&E, and a national workshop in May 2018
- development of a draft National Incursion Management Framework for Invasive Species
- Australia's largest single collaboration of researchers working on deer projects across agricultural and environmental landscapes
- successful oversight leading to the development and delivery of a new Certificate III Rural and Environmental Pest Management course
- high PestSmart website usage, which received 449,527 page views from 171,514 users. Associated PestSmart social media pages have more than 5,900 followers and posts reached an estimated 2.2 million followers.

In 2018 the EIC tasked CISS with coordinating development of the National Environment and Community Biosecurity Research, Development and Extension Strategy 2016–20. Funding to support CISS in this important role over the next two years was agreed in 2018. However, by February 2019 funding had still not been allocated for the implementation phase expected from July 2019.

In March 2019 CISS received an Australian Government biosecurity award for its role in coordinating the release, monitoring and evaluation of a rabbit biocontrol agent. RHDV1 K5, a Korean strain of rabbit haemorrhagic disease virus, was released across 323 community sites within Australia in March 2017.

6.2.3 Plant Health Australia

Plant Health Australia (PHA) considers that environmental biosecurity is not entirely distinct from agricultural biosecurity. There is a significant overlap in pests that affect plants grown for agricultural purposes, those found in the natural environment and those for social amenity in urban spaces.

In their submission, PHA highlighted several key organisations that have the focus, drive and capacity to work on environmental biosecurity, such as PHA, research and development corporations, universities and local governments.

Nationally coordinated surveillance programs, supported by an effective diagnostic network, are needed to maximise the effectiveness and efficiency of detection of exotic pests. For example:

- the International Plant Sentinel Network facilitates collaboration around the world, linking botanic gardens and arboreta, national plant protection organisations and plant scientists
- the National Forest Biosecurity Surveillance Strategy, established by PHA, mitigates the risk of exotic forest pests establishing in Australia, and provides evidence to support claims of area freedom.

The Plant Biosecurity Research Initiative is a partnership between PHA, seven plant research and development corporations and Agriculture. It was established to minimise damaging consequences of established and exotic pests, diseases and weeds that affect Australian plant industries, the community and the environment. It has established a set of priorities that will guide the partners in funding biosecurity RD&E.

6.2.4 Australian Plant Biosecurity Science Foundation

The Australian Plant Biosecurity Science Foundation (APBSF) was established in July 2018 as a not-for-profit charity to follow the Plant Biosecurity Cooperative Research Centre (CRC). Its intent is to support plant biosecurity research, development, extension and capacity building. APBSF is particularly focused on cross-sectoral issues not well covered by other funding mechanisms, such as environmental plant biosecurity.

6.2.5 Wildlife Health Australia

Wildlife Health Australia (WHA) is the coordinating body for wildlife health in Australia. It undertakes research of, investigates and monitors wildlife diseases in Australia. WHA has a strong One Health focus with activities that link the environment, animal health and public health sectors. It coordinates a network including state/territory agriculture and environment departments, zoos, university veterinary schools and science departments, and sentinel veterinary practices. Additionally, universities have major capacity and expertise to contribute to surveillance and early disease detection and to help develop solutions for managing wildlife diseases.

Wildlife biosecurity information and response sources differ from production sources and need separate support. Current frameworks exist that can help but there is a gap in support for surveillance and preparedness for exotic wildlife diseases that could impact on environment and social amenity, rather than market access.

The value of obtaining and using overseas intelligence to assist in identifying risks and gaps should be recognised. Agriculture has encouraged WHA to produce regular digests and enter a new role with the World Organisation for Animal Health (OIE) Working Group on Wildlife.

In its submission, WHA commended the role of Agriculture in setting up and maintaining the biosecurity system. However, it noted that biosecurity animal health focuses primarily on agriculturally significant diseases and needs to bring environment into the system, by:

- developing a system to support wildlife diseases and biodiversity/social amenity impacts
- contingency planning for potential high risk diseases with wildlife as a part of their ecology
- furthering education and knowledge of diseases with wildlife as part of their ecology to prepare for and respond to these risks.

WHA questioned whether connections between the Agriculture and Environment departments are sufficient to take advantage of the work that Agriculture has led. WHA's view is that the good work of Agriculture can only be fully realised in the wildlife space if Environment properly identifies and funds priority work. WHA also believes that the CEBO, Agriculture and members of the NBC and EIC need significantly greater levels of resourcing to address the increasing risks.

6.3 Environmental stakeholder and community engagement

6.3.1 Environmental biosecurity roundtable

In October 2016 Agriculture, in collaboration with Environment, established an environmental biosecurity roundtable to discuss environmental biosecurity issues with key stakeholders, identify potential solutions to shape future actions and share information on initiatives. This is part of a program of biosecurity roundtables and a National Biosecurity Forum.

Two roundtables were held in 2018, the first in Canberra on 3 May (attended by 68 people) and the second in Brisbane on 9 October (attended by 72 people). The forums provided updates of activities from government departments and industry covering issues such as the National Biosecurity Statement, biosecurity information sources, introductions to the Chief Environmental Biosecurity Officer and Threatened Species Commissioner, and future stakeholder engagement.

A survey taken at the Canberra roundtable highlighted some issues:

- the need for outcomes-focused engagement opportunities for environmental biosecurity stakeholders and improving accessibility (for example, through webinars or live streaming)
- the importance of ongoing funding and research into social and behavioural economics to better target biosecurity promotion and compliance activities
- the need to better engage Indigenous stakeholders in environmental biosecurity.

The establishment of the environmental roundtable has been well received by stakeholders to this review, with hopes for better engagement with the environmental sector.

The establishment of environmental round tables, in which PHA has participated, that provide an opportunity for stakeholders such as industries and local communities to come together to discuss environmental biosecurity matters and share ideas (Plant Health Australia submission).

We strongly support regional and national environmental biosecurity roundtable series launched in 2016, and we note the steady growth in attendance at these events...and acknowledge that in many respects the environment sector owes a great debt to Agriculture technical staff. The ANPC strongly support the continuance of these forums, alongside more formal strengthening of interchange between DAWR and the environment sector (Australian Network for Plant Conservation submission).

There needs to be a greater level of awareness, engagement, and resource allocation from and within the environment agencies in all jurisdictions, and the Natural resource management sector at large, than has been the case to date. Fostering the transfer of knowledge and expertise from the agricultural sector to the environmental sector is critical (Australian Network for Plant Conservation submission).

The department should, through the roundtable process, develop a policy on engaging the environmental sector in more depth in biosecurity processes and develop options for collaboration (Invasive Species Council, pers. comm., 12 July 2018).

6.3.2 Raising community awareness and engagement

Raising awareness and engaging the local community on specific environmental biosecurity issues across Australia can be difficult. Action is needed at many levels and should be sustained or targeted depending on the issue.

In 2018 Agriculture created a 'Biosecurity matters' community website to increase community awareness of biosecurity. It provided information on how to be 'biosecurity aware' of your responsibilities while engaging in activities such as recreational fishing, bushwalking, online shopping and gardening. The webpage also introduces a character called Jeff, who, through some short animated videos, demonstrated how his careless biosecurity actions can have detrimental impacts on the environment.

While the 'Biosecurity Matters' web page is a good start in raising awareness of biosecurity issues amongst the broader community, it unfortunately targets individuals that are already aware of biosecurity issues and are searching for further information. A much more sustained, whole of community approach is needed nationally, to wake the Australian community up to their role in monitoring and reporting incursions of unwanted pests, diseases and weeds. There needs to be effective measurement of community understanding on biosecurity, captured on a regular basis (National Farmers' Federation submission).

The National Farmers' Federation also believe that community education targeted to identifying and reporting regionally specific weeds and pests would assist in raising awareness in communities of biosecurity issues in their area. For example, agricultural field days and local community shows could be used to showcase pests, weeds and diseases and provide information if incursions are detected.

Landcare is one community-based approach that has played a major role in raising awareness, influencing farming and land management practices and delivering environmental outcomes across Australia. Local group involvement has been the catalyst for voluntary community engagement, understanding and action in the development and adoption of sustainable land management practices and the acknowledgement of our shared responsibility for conserving biodiversity.

The environmental focus of the Landcare approach evolved to incorporate a strong social aspect. Communities have understood the benefits of joint action to analyse and solve local problems, including many that are beyond the capacity of individuals to solve. An environmental biosecurity criterion could be included in a wide range of Landcare grants for industry and community groups to help strengthen the link between Landcare and biosecurity.

The NSW Office of Environment and Heritage suggested that the Australian Government could also support or participate in projects that directly address nationally significant environmental biosecurity issues. For example, 'Plant Sure' is a project working with the horticultural industry to reduce or remove the use of ornamental plants that pose an environmental weed risk.

Wildlife Health Victoria believes that during a disease emergency involving wildlife populations, stakeholders are critical in providing information about the species affected, where, when, what clinical signs, mortality rate, and access to and provision of dead wildlife for diagnosis and sampling.

Wildlife Health Australia considers it vital that Australia can show that it is free of exotic diseases and disease agents that can affect or be carried by wildlife and feral animals that can jeopardise our trade and market access. Providing further emphasis and integration of the environment into arrangements as a complementary activity is needed. This could be improved with the establishment of wildlife disease surveillance networks.

6.3.3 Local environmental biosecurity plans

Agricultural agencies work with many farm industry bodies to develop on-farm biosecurity plans aimed at keeping farms safe from pests and diseases. Plans or community biosecurity guidelines can be developed for emerging environmental diseases, as shown by the guidelines for prevention of white nose syndrome in bats (Box 2).

Similar plans or guidelines could be developed for other individual sectors of the environment and community. Plans could address such issues as cleaning of camping equipment and transport when moving between national parks and the possible introduction of aquatic diseases by improper disposal of bait. The plans could give greater recourse to citizen science approaches and better resourcing and use of community groups.

Recommendation 7

The department should work with relevant stakeholders to contribute to the development of environmental biosecurity plans targeting specific pests or diseases aimed at environmental sectors of concern, and include the community as much as possible.

Department's response: A priority for the Environmental Biosecurity Project Fund in 2018–19 and beyond is the development of environmental biosecurity plans for priority species and ecological communities. Work is currently underway to revise a biosecurity plan for acacia species and to develop a plan for mangroves and associated communities. The Chief Environmental Biosecurity Officer will also work with stakeholders to help guide the direction and scope of future plans, ensuring that consultation is a key consideration in their development.

Conclusion

Since the Senate inquiry handed down its report in 2015 Australian Government has made considerable progress in tackling the complex task of delivering better environmental biosecurity risk management.

The Senate inquiry proposed that the Australian Government Environment department, rather than Agriculture, become the lead agency for environmental biosecurity, with commensurate responsibilities and resourcing. However, the *Biosecurity Act 2015* clearly ascribed the bulk of responsibilities and legal powers to Agriculture. Several specific areas were delegated to Environment, which also has biosecurity-related responsibilities under the *Environmental Protection and Biodiversity Conservation Act 1999*. Formalisation of the roles and responsibilities of the two departments through an MoU should improve understanding and acceptance of the interdependence of the two agencies in delivering environmental biosecurity.

Similarly, in response to the IGAB and the NEBRA reviews, the National Biosecurity Committee has taken steps to provide a greater focus on environmental biosecurity, adapting the structures and processes used for animal and plant biosecurity management to deliver an all-hazards approach with special features suited to particular environmental issues. It is hoped that this can provide a model for stronger cooperation on biosecurity between agricultural and environmental agencies at the state and territory level in different jurisdictions.

Stakeholder communication and engagement on environmental biosecurity is challenging. Australia has a huge variety of native animals, plants and ecosystems, all of which have different organisations and communities involved with them, and an even greater complexity of environmental biosecurity threats which beset them. Environmental biosecurity roundtables and inclusive threat prioritisation processes can contribute enormously to a shared community understanding of priority targets and ways to combat them.

At a broader level, ongoing engagement with the wider national and international scientific research community is needed, to find more innovative ways to identify and deal with environmental biosecurity threats.

The Australian Government, through both Agriculture and Environment, will need to play an ever-increasing part in the national and international efforts to safeguard our unique environment as biosecurity threats increase.

Appendix A

Agency response



Australian Government
Department of Agriculture
and Water Resources

SECRETARY

Ref: EC19-000284

Dr Helen Scott-Orr
Inspector-General of Biosecurity
PO Box 657
MASCOT NSW 1460


Dear Dr Scott-Orr

Thank you for providing your review report, *Environmental biosecurity risk management in Australia*, and for the opportunity to provide formal management comments on the findings and recommendations.

I am pleased to advise that the department has agreed to all of the recommendations. The department's specific comments in response to the recommendations are provided in Annex A.

The department has assessed the report and does not consider any information contained in the report to be prejudicial to the public interest.

Yours sincerely


Daryl Quinlivan

28 March 2019

ANNEX A

Department of Agriculture and Water Resources responses to recommendations

Recommendation 1

The department should include, in its forthcoming Memorandum of Understanding with the Department of the Environment and Energy, roles and processes for the two departments, to agree on desired environmental biosecurity outcomes at the Australian Government level, including performance reporting over time.

Department's response: Agreed

The department has been meeting regularly with officials from the Department of the Environment and Energy (DoEE) to discuss the development of a formalised arrangement on environmental biosecurity. The meetings to date have been productive and the department will continue to work with DoEE on developing shared biosecurity outcomes and further opportunities for collaboration including on improved data sharing, stakeholder engagement and environmental biosecurity preparedness.

Recommendation 2

The department, working with the Department of the Environment and Energy and through the National Biosecurity Committee, should promote the development of Memoranda of Understanding on environmental biosecurity in all Australian jurisdictions.

Department's response: Agreed

The department will promote the development of Memoranda of Understanding on environmental biosecurity through the National Biosecurity Committee, with input from the Department of the Environment and Energy, and relevant State and Territory representatives.

Recommendation 3

The Chief Environmental Biosecurity Officer, through the Environment and Invasives Committee, should work with jurisdictions and environmental groups to prepare an environmental biosecurity emergency preparedness plan (strategy), incorporating the exotic environmental pest and disease list once it has been determined.

Department's response: Agreed

The Chief Environmental Biosecurity Officer will work with the Environment and Invasives Committee, Environmental Biosecurity Advisory Group and other relevant stakeholders to further develop and refine environmental biosecurity preparedness arrangements, including where appropriate, individual biosecurity plans for species or ecological communities. Work is currently underway to develop a biosecurity plan for acacia species and will be used as a pilot to develop future plans, informed by priorities identified in the National Priority List of Exotic Environmental Pests and Diseases.

Recommendation 4

The department should work with relevant environmental groups and agencies to develop and conduct environmental biosecurity emergency preparedness exercises.

Department's response: Agreed

Work has begun on the development of a simulation exercise to test Australia's capability to respond to the detection of an exotic disease in a non-production animal using the National Environmental Biosecurity Response Agreement (NEBRA). This work will be funded by the Environmental Biosecurity Project Fund and will test and identify potential gaps in our environmental biosecurity preparedness.

Recommendation 5

The department should establish a dynamic and transparent environmental pest and disease risk prioritisation process, informed by new scientific knowledge, to allow emerging environmental pests and diseases to be added to the priority list as they arise. This list of priority environmental biosecurity pests and diseases, with the basis for their inclusion, should be published on the department's website and continuously reviewed.

Department's response: Agreed

The department is working with ABARES to prepare and finalise the National Priority List of Exotic Environmental Pests and Diseases. Once the process is complete and each of the sectoral committees (Environment and Invasives Committee, Animal Health Committee, Marine Pests Sectoral Committee, Plant Health Committee) have been consulted on the list, the department will engage stakeholders and ensure thorough consultation on the draft list. Following consultation, the list and final report will go to the Environment and Invasives Committee and the National Biosecurity Committee for endorsement.

The priority list, along with the basis for pest & disease inclusion, will be published on the department's website. The Environmental Biosecurity Office and Chief Environmental Biosecurity Officer will play a key role in using the data from the list to develop policies that guide priority areas of work in environmental biosecurity. The list will be routinely reviewed every five years, with the first review to occur in three years. The review will include revision of the purpose, use, criteria and methodology. Provision will also be made for ad-hoc amendments to the list, which will allow for the timely addition or removal of a species to ensure that the list remains up-to-date. This process will be coordinated through the Environment and Invasives Committee, in consultation with the relevant sectoral committees.

Recommendation 6

The department should ensure the Northern Australia Quarantine Strategy program, and other surveillance programs, are coordinated with state and territory biosecurity surveillance activities and environmental biosecurity projects (as appropriate) to encourage collaborative resourcing and avoid possible duplication.

Department's response: Agreed

The department is currently implementing several initiatives that will improve the national surveillance system. These include better coordination of departmental, state and territory and industry biosecurity activities, and capacity building in near neighbour countries to ensure Australia's biosecurity risk is managed effectively and collaboratively. Surveillance activities across Australia are overseen by the National Biosecurity Committee and its subcommittees, which include input by representatives from all jurisdictions, industry and non-government organisations. The Chief Environmental Biosecurity Officer will work with the Northern Australia Quarantine Strategy (NAQS) program, Biosecurity Plant Division, Biosecurity Animal Division and the states and territories to ensure that environmental biosecurity priorities are included in both surveillance activities and projects.

The department supported the establishment of Wildlife Health Australia (WHA) in 2013 (from the former Australian Wildlife Health Network) to facilitate coordination and collaboration of wildlife health surveillance and other activities across different levels of government and with non-government organisations and community groups. The organisation is now co-funded by the Commonwealth and state and territory governments and chaired by the inaugural Chief Environmental Biosecurity Officer. The department (including NAQS) participates in WHA programs, as do the states and territories, zoos, wildlife hospitals, universities and private veterinary clinics. Other environmental biosecurity surveillance activities are coordinated through the Animal Health Committee and Animal Health Australia.

Recommendation 7

The department should work with relevant stakeholders to contribute to the development of environmental biosecurity plans targeting specific pests or diseases aimed at environmental sectors of concern, and include the community as much as possible.

Department's response: Agreed

A priority for the Environmental Biosecurity Project Fund in 2018-19 and beyond is the development of environmental biosecurity plans for priority species and ecological communities. Work is currently underway to revise a biosecurity plan for acacia species and to develop a plan for mangroves and associated communities. The Chief Environmental Biosecurity Officer will also work with stakeholders to help guide the direction and scope of future plans, ensuring that consultation is a key consideration in their development.

Appendix B

Responses to Senate inquiry on Environmental Biosecurity recommendations

In May 2015 the Senate Environment and Communications References Committee released a report on [Environmental biosecurity](#). In June 2017 the Australian Government responded to recommendations in the report and the Department of Agriculture and Water Resources (Agriculture) initiated actions in response.

TABLE B1 Australian Government response to Senate inquiry recommendations and Agriculture actions to February 2019

Senate inquiry recommendations	Australian Government response	Agriculture actions
<p>Recommendation 1:</p> <p>The committee recommends that, once established, the Inspector-General of Biosecurity conduct a systematic review of how effectively high-risk environmental biosecurity concerns are addressed within the broader biosecurity system, with a particular focus on identifying gaps in pathway and risk analyses and on improving information gathering and sharing between jurisdictions.</p>	<p>Supported in principle</p> <p>The Inspector-General of Biosecurity may review the performance of functions, or exercise of powers, by biosecurity officials under one or more provisions of the <i>Biosecurity Act 2015</i>. As such, the Inspector-General of Biosecurity may undertake reviews of environmental biosecurity under their powers prescribed under the Act. The Department of Agriculture and Water Resources will bring the committee's recommendation to the attention of the Inspector-General.</p>	<p>Informed the Inspector-General of Biosecurity.</p>
<p>Recommendation 2:</p> <p>The committee recommends that the Commonwealth Government work with state and territory governments to revise the National Environmental Biosecurity Response Agreement such that disagreement by a single party need not prevent a response under the agreement from going ahead.</p>	<p>Not supported</p> <p>Consensus decision-making in emergency responses remains a core tenet underpinning the partnership approach to decision-making promoted by the National Environmental Biosecurity Response Agreement (NEBRA), other emergency response deeds and the IGAB. While under the current consensus approach to the NEBRA there is a possibility that a single party could vote down a response, the NEBRA does not prevent the remaining supporting parties from reaching agreement on a cost-shared eradication response.</p> <p>The Australian, state and territory governments recently commissioned the first five-yearly review of the NEBRA, which is being undertaken by an external third party (KPMG). The NBC will consider any recommendations for improvement following the finalisation of the report in the second half of 2017.</p>	<p>Australian Government is working with other NEBRA signatories to respond to the review through the NBC.</p>
<p>Recommendation 3:</p> <p>The committee recommends that the Commonwealth Government work with state and territory governments to include in the National Environmental Biosecurity Response Agreement an explicit precautionary principle which states that a lack of full scientific or technical certainty regarding the feasibility of eradication must be weighed against potential biosecurity risks when determining whether to mount a response.</p>	<p>Not supported</p> <p>The purpose of the NEBRA is to establish national arrangements for responses to nationally significant biosecurity incidents where there are predominantly public benefits. Although the NEBRA does not explicitly incorporate the precautionary principle, it includes appropriate mechanisms to take into account scientific or technical uncertainty. The National Biosecurity Management Consultative Committee (NBMCC) must assess the pest or disease based on its national significance; whether it is 'likely' to be eradicable and whether it is cost beneficial to mount a national biosecurity incident response.</p> <p>This assessment considers the potential economic, environmental and social amenity impacts, drawing on information from a variety of sources including peer-reviewed scientific papers, personal communications from people with experience with the species under assessment and anecdotal data from non-experts. Information sources used for the assessment are considered according to a determined level of confidence (for example, information from general reference books is given a medium confidence rating).</p> <p>If there is a lack of scientific or technical certainty about a disease or pest, an assessment based on the best available evidence is presented for the National Biosecurity Management Group (NBMG) to consider.</p> <p>The NEBRA guidelines for risk assessment (Schedule 2 of the NEBRA) provide a balance between allowing for uncertainty in technical data and still meeting the requirements for the response to be technically feasible and cost beneficial to be mounted. This approach is consistent with the Emergency Animal Disease Response Agreement (EADRA) and the Emergency Plant Pest Response Deed (EPPRD).</p> <p>The Australian, state and territory governments recently commissioned the first five-yearly review of the NEBRA, which is being undertaken by an external third party (KPMG). The NBC will consider any recommendations for improvement following the finalisation of the report in the second half of 2017.</p>	<p>Australian Government is working with other NEBRA signatories to respond to the review through the NBC.</p>

TABLE B1 Australian Government response to Senate inquiry recommendations and Agriculture actions to February 2019

Senate inquiry recommendations	Australian Government response	Agriculture actions
<p>Recommendation 4:</p> <p>The committee recommends the Commonwealth Government work with state and territory governments to develop a nationally consistent methodology for incorporating environmental impacts into cost-benefit analyses under the National Environmental Biosecurity Response Agreement.</p>	<p>Supported</p> <p>The Australian Government will work through the NBC, which consists of representatives from each state and territory, to consider a nationally consistent methodology for incorporating environmental impacts into cost-benefit analyses as part of its review of the NEBRA.</p> <p>The Australian, state and territory governments recently commissioned the first five-yearly review of the NEBRA, which is being undertaken by an external third party (KPMG). The NBC will consider any recommendations for improvement following the finalisation of the report in the second half of 2017.</p>	<p>Australian Government is working with other NEBRA signatories to respond to the review through the NBC.</p>
<p>Recommendation 5:</p> <p>The committee recommends that the Commonwealth Government work with signatories to the National Environmental Biosecurity Response Agreement to include in that agreement a transition to management framework to clarify the responsibilities of the parties for ongoing management activities if eradication is deemed to be no longer feasible.</p>	<p>Supported</p> <p>The Australian Government recognises the importance of transition to management frameworks and how they assist in clarifying parties' responsibilities for ongoing management activities when eradication is deemed to be no longer feasible. For example, transition to management programs were piloted for myrtle rust, branched broomrape and Asian honey bees after the eradication of each was concluded to be no longer technically feasible. These pilot programs provided funding for activities that allowed industry and/or the community to adapt to living with the particular pest or disease and to set up systems for management within affected jurisdictions.</p> <p>Transition to management arrangements were recently included in the EPPRD. Under the EPPRD, transition to management programs can only be considered if an incursion is no longer technically feasible or cost beneficial to eradicate. Signatories to the EADRA and the NEBRA have agreed to explore options to incorporate transition to management frameworks into those agreements.</p> <p>The Australian, state and territory governments recently commissioned the first five-yearly review of the NEBRA, which is being undertaken by an external third party (KPMG). The NBC will consider any recommendations for improvement following the finalisation of the report in the second half of 2017.</p>	<p>Australian Government is working with other NEBRA signatories to respond to the review through the NBC.</p>
<p>Recommendation 6:</p> <p>The committee recommends that the Department of the Environment review targets contained in Australia's Biodiversity Conservation Strategy 2010–2030 and develop measurement methodologies to ensure that Australia's progress can be meaningfully assessed.</p>	<p>Supported</p> <p>The Department of the Environment and Energy has undertaken a review of the first five years of Australia's Biodiversity Conservation Strategy 2010–2030 in conjunction with all state and territory governments and the Australian Local Government Association.</p> <p>The review assessed implementation of the strategy, including the national targets. It also considered opportunities to improve the strategy, including the robustness and durability of objectives, responsibility and accountability for the delivery of outcomes, monitoring and reporting systems, and alignment with other national and international obligations.</p> <p>The review was presented for consideration at the Meeting of Environment Ministers on 25 November 2016. It found there were opportunities to build on good outcomes achieved so far including by enhancing partnerships to take practical and focused action to implement the strategy.</p> <p>As the strategy supports Australia's implementation of the United Nations Convention on Biological Diversity, Ministers agreed that it should be updated to meet current and emerging challenges.</p>	<p>Not applicable</p>

TABLE B1 Australian Government response to Senate inquiry recommendations and Agriculture actions to February 2019

Senate inquiry recommendations	Australian Government response	Agriculture actions
<p>Recommendation 7: The committee recommends that the Australian National Audit Office conduct a performance audit of the Department of the Environment's implementation of Australia's Biodiversity Conservation Strategy 2010–2030 with a particular focus on how progress towards targets is measured.</p>	<p>Noted The Department of the Environment and Energy will bring the committee's recommendation to the attention of the Australian National Audit Office. It should be noted that implementation of the Biodiversity Conservation Strategy is the responsibility of all jurisdictions.</p>	<p>Not applicable</p>
<p>Recommendation 8: The committee recommends that the Department of Agriculture and the Department of the Environment review processes for allocating funding under their natural resource management programs with a view to minimising delays for time-sensitive projects.</p>	<p>Supported in principle The Australian Government is committed to minimising delays for time-sensitive projects. It does so through a number of mechanisms, not limited to natural resource management (NRM) programs, including as a signatory to response agreements, implementation of the Stronger Biosecurity and Quarantine Initiative (SBQI) and initiatives funded through the White Papers on Agricultural Competitiveness and Developing Northern Australia. Arrangements for responding to exotic pests and diseases that are detected within Australia and have the potential to impact on animal, plant or human health or the environment are set out in the NEBRA, EADRA, and the EPPRD, to which the Australian Government is a signatory. The effectiveness and implementation of these agreements is reviewed every five years. In addition to being a signatory to the response agreements, the Australian Government has committed \$20 million over four years to enhance rapid response capability to address urgent biosecurity issues through the SBQI. The SBQI includes dedicated resources to support a pool of skilled and experienced personnel and a best practice national network for diagnostic and response management expertise. It is available to assist with an incursion in the early stages to reduce adverse impacts, including to the environment. The SBQI does not replace normal commitments undertaken by state and territory governments but complements their efforts, particularly in the initial stage of an incursion. The commitment also includes a range of preparedness activities to build national capability and provide long-term benefits beyond the completion of this initiative. Under the Agricultural Competitiveness White Paper, the Australian Government has committed \$50 million over four years (starting 1 July 2015) to support nationally significant agricultural and environmental pest and disease eradication programs and enhanced response capability. The Australian Government delivers NRM programs to assist with the management of established pests and diseases in line with Australian Government priorities and grant administration policy. This includes providing NRM funding for the community to achieve the strategic objectives of the National Landcare Programme (NLP) through investment of more than \$450 million over four years (2014–18) with the 56 regional NRM organisations across Australia. These regional NRM organisations have been allocated funding under this investment until 2018. The funding is provided on a yearly basis through the state (where the regional bodies are state-based entities) or direct to community-based regional organisations (regional NRM groups and entities). The regional NRM organisations act as delivery agents under the program and address Australian Government outcomes and regional priorities such as weed and pest control, uptake of sustainable farming practices and biodiversity conservation. Planning, management and timing of activities associated with this funding is decided by the regional body in consultation with the Australian Government and their communities. Regional bodies are required to allocate a minimum of 20 per cent of their annual Australian Government NLP funding to local, on-ground projects and related activities that are delivered by, or directly engage with, the local community. This funding is available over short (one year) and longer-term timeframes, and contributes to providing outcomes for projects that can be regarded as time-sensitive.</p>	<p>The Australian Government has committed \$20 million over four years to enhance rapid response capability to address urgent biosecurity issues through the SBQI. The Australian Government has committed \$50 million over four years (starting 1 July 2015) to support nationally significant agricultural and environmental pest and disease eradication programs and enhance response capability.</p>

TABLE B1 Australian Government response to Senate inquiry recommendations and Agriculture actions to February 2019

Senate inquiry recommendations	Australian Government response	Agriculture actions
Recommendation 8 (continued): The committee recommends that the Department of Agriculture and the Department of the Environment review processes for allocating funding under their natural resource management programs with a view to minimising delays for time-sensitive projects.	<p>The Australian Government will continue to review NRM program delivery arrangements with a view to simplifying arrangements so it can quickly and easily respond to emerging issues. Stakeholder feedback is sought and reviewed following program funding rounds to ensure that future processes minimise administrative costs and avoid unnecessary delays. The Australian Government will continue to take into consideration lessons learnt and opportunities for improvement in the development of future funding rounds to improve efficiency.</p> <p>The management of established pests is primarily the responsibility of state and territory governments and land managers. However, the Australian Government does make some strategic investments in pest and weed management where it is in the national interest. For example, as part of the Department of the Environment and Energy's Threatened Species Strategy, more than \$10 million has been mobilised for projects committed to reduce the threat of feral cats.</p> <p>Through the Agricultural Competitiveness White Paper, the Australian Government is providing funding to state and territory governments to deliver projects to build the skills and capacity of landholders, industry and community groups in managing established animal pests and weeds on the ground. Funding is also available to develop and improve better technologies and tools to tackle established pest animal and weed species.</p>	

TABLE B1 Australian Government response to Senate inquiry recommendations and Agriculture actions to February 2019

Senate inquiry recommendations	Australian Government response	Agriculture actions
<p>Recommendation 9:</p> <p>The committee recommends that the Department of the Environment work with the Department of Agriculture to develop and publish a national priority list of pests and diseases not yet established in Australia that are of environmental biosecurity concern.</p>	<p>Supported in principle</p> <p>The Australian Government, state and territory governments and industries maintain a range of pest and disease lists for a variety of purposes. For example, there are a range of notifiable pest or disease lists to meet domestic or international reporting obligations or to prioritise action, such as surveillance, diagnostic or intervention effort.</p> <p>In July 2015, the Department of Agriculture and Water Resources commenced working through the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) to identify potential invasive species and diseases that have predominately environmental impacts, and to develop processes to better differentiate between weed threats that have environmental versus production impacts. This work will strengthen existing national biosecurity arrangements to manage the risk of entry to Australia of exotic weeds and better inform preparedness and eradication arrangements to respond to exotic weeds and environmental biosecurity threats if they arise.</p> <p>The Plant Health Committee (PHC) has endorsed a Plant Pest Prioritisation Framework which provides a generic and systematic approach to prioritisation of exotic plant pests, including those pests that impact on the environment, to enable governments and other decision makers to focus their biosecurity investment.</p> <p>The framework applies the national significance and national interest principles developed by the NBC, and sets out the policy objectives and criteria for prioritisation. Through a national expert elicitation process which applied the principles and criteria set out in the framework, 43 National Priority Plant Pests (NPPPs) have been identified and endorsed by the PHC. A complete list of the 43 NPPPs is available from the Department of Agriculture and Water Resources website.</p> <p>Of these individual pests or groups of similar pests, 16 are expected to have a significant negative impact on Australian native plants, animals and/or the environment.</p> <p>The NPPP will be used to guide government effort, investment and national action, and the PHC will review the pests to identify gaps in prevention and preparedness. The Department of Agriculture and Water Resources will use the national priorities to focus preparedness activities, including with funding provided through the Agricultural Competitiveness White Paper.</p> <p>The Invasive Plants and Animals Committee (IPAC), a subcommittee of the NBC, is currently developing a list of national surveillance targets for exotic vertebrates. The 10 species on the list are intended as leading examples of amphibians, reptiles, birds, mammals and fish that could become established in the Australian environment either through an accidental pathway to Australia (for example, stowaways) or a likely illegal deliberate introduction (for example, smuggled or illegally kept). Each of the 10 species would pose nationally significant impacts, and could form the basis of surveillance, education and preparedness activities coordinated among governments and with industry and the wider community.</p> <p>The Animal Health Committee (AHC) maintains the National List of Notifiable Animal Diseases to facilitate disease reporting and control of terrestrial animals. The list includes key diseases on the World Organisation of Animal Health (OIE) list of notifiable diseases as well as endemic diseases of national significance. The requirement to report a notifiable disease is contained in state and territory legislation and occurrences of diseases on this list must be reported to state or territory authorities. The list is regularly reviewed and updated by the AHC—it was last reviewed in 2013 and is currently under review.</p> <p>In relation to marine pests, the Marine Pest Sectoral Committee (MPSC) is currently developing the Australian Priority Marine Pests List. This list will include both established and exotic species and will form the basis of Australia's reporting system for marine pests, and will also facilitate responses to marine pest emergencies. Exotic marine pests will be included if they meet the national significance criterion outlined in the NEBRA. Environmental impacts are included in the national significance criterion.</p> <p>A National List of Reportable Disease of Aquatic Animals has also been developed to identify priority aquatic animal diseases of importance to Australia, many of which could affect both industry and/or the environment. This includes both exotic and endemic diseases.</p> <p>While these lists will assist in prioritising high impact pests, the Department of Agriculture and Water Resources continues to conduct activities at the border for all exotic pest incursions.</p>	<p>In July 2015 Agriculture commenced working through the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) to identify potential invasive species and diseases that have predominately environmental impacts, and to develop processes to better differentiate between weed threats that have environmental versus production impacts.</p> <p>In relation to marine pests, the Marine Pest Sectoral Committee (MPSC) is currently developing the Australian Priority Marine Pests List. This list will include both established and exotic species and will form the basis of Australia's reporting system for marine pests, and will also facilitate responses to marine pest emergencies.</p> <p>A National List of Reportable Disease of Aquatic Animals has also been developed to identify priority aquatic animal diseases of importance to Australia, many of which could affect both industry and/or the environment. This includes both exotic and endemic diseases.</p>

TABLE B1 Australian Government response to Senate inquiry recommendations and Agriculture actions to February 2019

Senate inquiry recommendations	Australian Government response	Agriculture actions
<p>Recommendation 10:</p> <p>The committee recommends that the Department of Agriculture review and update the Northern Australia Quarantine Strategy by mid-2016, and that this review specifically examine the adequacy of resources available to implement the strategy and suggest changes that can be made to improve environmental biosecurity outcomes under the strategy.</p>	<p>Supported</p> <p>The Northern Australia Quarantine Strategy (NAQS) will continue to monitor for incursions of new pests and diseases establishing in the north and potentially moving south. The Australian Government has committed to strengthen biosecurity in northern Australia as part of its commitment to ensure that biosecurity risks in the north continue to be appropriately managed through the White Papers on Agriculture Competitiveness and Developing Northern Australia. For example, under the Agriculture Competitiveness White Paper, the Australian Government has committed over \$60 million to design, implement and promote collaborative biosecurity surveillance practice and technologies for priority pests, diseases and/or locations in northern Australia. An additional \$12.4 million in funding for Indigenous Ranger groups to expand surveillance and compliance activities in northern Australia was also announced in the White Paper on Developing Northern Australia.</p>	<p>The Australian Government has committed over \$60 million to design, implement and promote collaborative biosecurity surveillance practice and technologies for priority pests, diseases and/or locations in northern Australia. An additional \$12.4 million in funding for Indigenous Ranger groups to expand surveillance and compliance activities in northern Australia</p>
<p>Recommendation 11:</p> <p>The committee recommends that both the Department of Agriculture and the Department of the Environment conduct reviews to assess whether their existing resources can be better targeted to address known areas of environmental biosecurity risk. In particular, the committee recommends that the Department of the Environment examine whether resources can be directed towards effective implementation of existing threat abatement plans under the Environment Protection and Biodiversity Conservation Act.</p>	<p>Supported</p> <p>Biosecurity is the management of the risks to the economy, the environment and the community, of pests and diseases entering, emerging, establishing or spreading—it is not possible or desirable to manage biosecurity risks to one sector in isolation of another. The Australian Government is considering a range of initiatives to better target risk management activities and strengthen the management of environmental biosecurity, including the development of an environmental biosecurity policy statement, and progress reports on the Australian Government's management of biosecurity. This work will include examining the Australian Government's effort in relation to environmental biosecurity. The NRM programs implemented by the Department of the Environment and Energy and the Department of Agriculture and Water Resources target Australian Government priorities, including known areas of environmental biosecurity risk. For example, under the Green Army Program a number of Green Army teams used bait stations to control yellow crazy ants next to the Wet Tropics World Heritage Area.</p> <p>Under the regional stream of the NRM funding under the NLP, over \$450 million is being spent to support local action by local communities. These actions are expected to address a range of priorities including environmental biosecurity risk. Examples include:</p> <ul style="list-style-type: none"> • a project spending over \$1 million to control woody Weeds of National Significance in the Lake Eyre catchments of Queensland • the Natural Resources Kangaroo Island's project Too Good to Spoil, Too Precious to Lose: a better biosecurity future for Kangaroo Island, which is addressing environmental biosecurity risks through a community education and surveillance program to build frontline defence against new and existing land and marine infestations. <p>The outcomes of these programs reference Australia's relevant national and international obligations, such as the Convention on Biological Diversity, and protecting and conserving matters of national environmental significance under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). Outcomes also contribute to actions identified under existing threat abatement plans (TAPs).</p> <p>NRM programs such as the Green Army and 20 Million Trees Programme include assessment criteria relating to the extent to which projects contribute towards the implementation of relevant national and regional environmental or conservation management plans. These plans may include TAPs.</p>	<p>A number of Green Army teams used bait stations to control yellow crazy ants next to the Wet Tropics World Heritage Area.</p> <p>Under the regional stream of the NRM funding under the NLP, over \$450 million is being spent to support local action by local communities. These actions are expected to address a range of priorities including environmental biosecurity risk. Examples include:</p> <ul style="list-style-type: none"> • a project spending over \$1 million to control woody Weeds of National Significance in the Lake Eyre catchments of Queensland • the Natural Resources Kangaroo Island's project Too Good to Spoil, Too Precious to Lose: a better biosecurity future for Kangaroo Island, which is addressing environmental biosecurity risks through a community education and surveillance program to build frontline defence against new and existing land and marine infestations.

TABLE B1 Australian Government response to Senate inquiry recommendations and Agriculture actions to February 2019

Senate inquiry recommendations	Australian Government response	Agriculture actions
<p>Recommendation 12: The committee recommends that the Department of Industry, Innovation and Science develop a strategy to address the current, and projected, decline in the level of scientific expertise in areas relevant to biosecurity.</p>	<p>Supported in principle In September 2014, Australia's Chief Scientist released Science, technology, engineering and mathematics: Australia's future, which made 24 recommendations in the areas of Australian competitiveness, education and training, research, and international engagement. The Australian Government has already taken actions to address many of the areas highlighted for attention, through the National Innovation and Science Agenda, announced December 2015. As part of the National Innovation and Science Agenda, the Australian Government has addressed many of these issues. This includes funding to get students more excited by science, for example through science and mathematics Olympiads, Maker projects, attendance at science events and competitions, and supporting National Science Week. The Australian Government is committed to ensuring Australia continues to develop and support scientific expertise in areas relevant to biosecurity. For example, the Australian Government has committed \$20 million over five years, from 1 July 2017, to boost research and development aimed at eradicating invasive pest species by supporting the transition of the Invasive Animals Cooperative Research Centre into the Centre for Invasive Species Solutions in 2017.</p>	<p>–</p>

TABLE B1 Australian Government response to Senate inquiry recommendations and Agriculture actions to February 2019

Senate inquiry recommendations	Australian Government response	Agriculture actions
<p>Recommendation 13:</p> <p>The committee recommends that the Department of Industry, Innovation and Science, in cooperation with the Department of Agriculture and the Department of the Environment, conduct a review to prioritise Australia's biosecurity research needs, both environmental and industry-focused, and determine what long-term institutional structure will best address these needs.</p> <p>The committee also recommends that this review specifically investigate whether Australia possesses sufficient research capacity to examine the effects of climate change on invasive species and, if not, how this can be addressed.</p>	<p>Supported in principle</p> <p>There are a number of Australian Government initiatives that include review processes to prioritise research, including research capacity and research to examine the effects of climate variability. The Australian Government has established a set of science and research priorities and associated practical research challenges. The priorities have been implemented by the National Science, Technology and Research Committee of the Commonwealth Science Council, led by the Chief Scientist, Dr Alan Finkel AO, and considered input from researchers, industry leaders and government representatives.</p> <p>The science and research priorities are: food; soil and water; transport; cyber security; energy; resources; advanced manufacturing; environmental change; and health. These priorities will likely address many areas relevant to biosecurity and climate variability, particularly through the food, soil and water and environmental change priorities.</p> <p>The Department of the Environment and Energy administers the National Environmental Science Programme (NESP), which funds world-class environmental and climate science research to inform decision-making.</p> <p>The NESP is delivered through six multidisciplinary hubs, each with distinct research objectives. Research themes include threatened species recovery, climate change, the sustainable development of northern Australia, marine biodiversity, water quality in the Great Barrier Reef, and air quality and liveability in urban landscapes.</p> <p>The NESP encourages a collaborative approach to developing and delivering research objectives. Over the six years of the NESP the Department of the Environment and Energy will work with the Minister for the Environment and Energy to determine research priorities for NESP hubs to guide annual updates of the Hub Research Plans. Input will also be sought from other government departments, levels of government, environment non-government organisations, Indigenous groups and industry in developing their Hub Research Plans.</p> <p>A range of Australian Government research initiatives inform biosecurity management and natural resource management through climate projections, research on climate variability impacts and modelling of the potential distribution of exotic pests. CSIRO is establishing a new Climate Science Centre to be based in Hobart; a new decadal climate monitoring and forecasting capacity within the new Hobart Centre, which represents a \$37 million investment over 10 years, and 15 new positions within the new CSIRO Climate Science Centre, which represents an increase on current staffing levels of approximately 13 per cent. The centre will bring together the core of CSIRO's capability in climate modelling and observations of the atmosphere and ocean. It is being developed in close collaboration with existing research programs and with research partners including the Bureau of Meteorology, Australian universities and overseas institutions. The projections are the most comprehensive ever released for Australia and were prepared with an emphasis on informing impact assessments and planning in the natural resource management sector.</p> <p>The Australian Institute of Marine Science (AIMS), Australia's tropical marine science agency, operates monitoring programs contributing to the sustainable use and development of the tropical marine environment. For example, AIMS has the only long-term, comprehensive dataset covering the health of the Great Barrier Reef, spanning three decades and including monitoring of reef organisms and environmental monitoring of water quality, weather and sea temperatures. AIMS also undertakes interdisciplinary research to provide managers and policymakers with the best understanding of the vulnerability of tropical marine ecosystems to climate change, ocean acidification and local environmental stressors. Its National Sea Simulator (SeaSim) also plays a key research role by replicating future climate scenarios to better understand the impact of complex environmental changes on tropical marine ecosystems.</p> <p>ABARES has developed Climatch, a web-based application for comparing climate characteristics between regions. This program is typically used for predicting the potential spread of introduced or invasive species by using known geographic distributions of exotic pests and diseases to model potential distribution in Australia based on climatic parameters (temperature, rainfall). The Multi-Criteria Analysis Shell for Spatial Decision Support (MCAS-S) is another software and mapping package developed by ABARES that provides a powerful tool for spatial information assessment in decision-making contexts. Climatch and MCAS-S can be combined in a preparedness context to model the potential distribution of exotic pests, based on climatic and land use data.</p>	-

TABLE B1 Australian Government response to Senate inquiry recommendations and Agriculture actions to February 2019

Senate inquiry recommendations	Australian Government response	Agriculture actions
<p>Recommendation 14: The committee recommends that, following the example of the New Zealand Marine Invasive Taxonomic Service, the Commonwealth Government work with state and territory governments to establish a coordinated taxonomic identification service that utilises existing scientific expertise, particularly that present in natural history museums.</p>	<p>Noted Taxonomic services are currently provided on an ad hoc basis by state and territory museums, universities and independent experts. The Australian Biological Resources Study, administered by the Department of the Environment and Energy, has coordinated taxonomic research in Australia for more than 40 years and is a recognised world leader in making authoritative taxonomic information widely available through internationally recognised scientific publications, identification tools and publicly accessible online biodiversity information databases. The Department of Agriculture and Water Resources recently conducted a review of National Marine Pest Biosecurity arrangements, which considered input from a range of stakeholders. Some stakeholders expressed the need for a coordinated approach to marine pest taxonomy. The review report and recommendations are available at agriculture.gov.au. The review made a number of recommendations toward a new focus on prevention activities, such as better relationships between researchers, marine based industries, government and the community. It also recommends the development of stronger response arrangements for dealing with incursions. The recommendations will be implemented over 2015–18. This work will involve working closely with stakeholders to strengthen national marine pest biosecurity arrangements to reduce the risk of marine pests from establishing in Australian waters.</p>	<p>–</p>
<p>Recommendation 15: The committee recommends that the Department of Agriculture undertake enforcement activities against internet retailers and marketplaces that repeatedly breach Australia's plant and seed import requirements and work with these businesses to ensure warnings are displayed when customers attempt to purchase prohibited plants and seeds.</p>	<p>Supported in principle Under Australia's Biosecurity Act, the Australian Government's regulatory (enforcement) reach only extends to Australian-based entities. The Australian Government has a very limited ability to take enforcement action against entities that operate beyond the Australian jurisdiction. Generally enforcement action in places outside of Australia can only be achieved through requests for mutual assistance via the Attorney-General's Department. The Department of Agriculture and Water Resources currently uses cooperative arrangements with a number of common internet marketplaces where warnings are published when Australian purchasers attempt to buy items of biosecurity concern. It is not possible to achieve such cooperative arrangements with all internet marketplaces due to the number and lack of visibility of such marketplaces, and as a result these approaches often have only partial effect. At the request of the Department of Agriculture and Water Resources, eBay Australia has closed down a number of sellers of biosecurity risk products. This does not stop sellers re-opening on other sites or under new identities. The Department of Agriculture and Water Resources also uses a combination of alternative measures to improve compliance and minimise the incidence of risk items sold via internet marketplaces passing through the Australian border. This includes information sharing between Australia and foreign jurisdictions through the International Plant Protection Convention network and the improved use of intelligence and targeting of known offenders. The Department of Agriculture and Water Resources recently completed a review of current mail pathway 'profiles'. The department uses 'profiles' to determine risk pathways and manage intervention practices. As a result of the review, updated passenger profiles have been implemented and a periodic review will be conducted at appropriate intervals.</p>	<p>Agriculture uses cooperative arrangements with a number of common internet marketplaces where warnings are published when Australian purchasers attempt to buy items of biosecurity concern. This includes information sharing between Australia and foreign jurisdictions through the International Plant Protection Convention network and the improved use of intelligence and targeting of known offenders.</p>

TABLE B1 Australian Government response to Senate inquiry recommendations and Agriculture actions to February 2019

Senate inquiry recommendations	Australian Government response	Agriculture actions
<p>Recommendation 16:</p> <p>The committee recommends that the Department of the Environment work to ensure that the measures described in the Tramp Ant Threat Abatement Plan are fully implemented.</p>	<p>Supported</p> <p>The 2012 review of the tramp ant TAP identified six fully implemented actions in the plan; the remaining nine have been partially implemented. The TAP was sunset on 1 October 2016 and the Minister for the Environment and Energy will consider whether a new TAP should be made.</p> <p>Each financial year, the Australian Government funds TAP development and implementation as part of a broader budget outcome related to biodiversity conservation. The funding provided by the Department of the Environment and Energy for the implementation of individual TAPs may vary from year to year as a range of biodiversity conservation priorities are addressed.</p>	<p>–</p>
<p>Recommendation 17:</p> <p>The committee recommends that, within the next 12 months, the Department of Agriculture review its cargo surveillance measures with the aim of achieving better detection rates of invasive species in general and of tramp ants in particular.</p>	<p>Supported in principle</p> <p>To ensure that ongoing activities are targeted to areas of risk, the Department of Agriculture and Water Resources agrees that there is value in reviewing the broad surveillance approach at the border (not just limited to cargo) to consider the types of pests to be targeted, the times and terms of surveillance, the potential for additional off-shore surveillance and the best form of data capture (and sharing).</p> <p>This review will consider specific groups of pests, plant diseases and weeds which will influence decision-making for effective surveillance methods at specific locations throughout the year and will be ongoing. It will also consider general and targeted surveillance activities undertaken by the states and territories; obligations under the IGAB; and the Australian Government's role in undertaking surveillance activities at premises operating under an approved arrangement and/or government-owned and operated land and facilities.</p> <p>The Department of Agriculture and Water Resources has developed a National Border Surveillance Policy (NBS) to ensure coordination of biosecurity surveillance activities conducted at border locations, and establish principles for undertaking these surveillance activities. As NBS is brought into effect, there will be three main products. These are:</p> <ul style="list-style-type: none"> • a list of priorities for border surveillance • a description of relative efforts towards each priority • resourcing for specific surveillance activities. <p>The purpose of NBS is to facilitate the timely detection of opportunistic or hitchhiking pests that might have entered Australia on import pathways and present on lands or at facilities that are in the broad sense part of the Australian border. The information collected will be used to:</p> <ul style="list-style-type: none"> • enable a timely response to a potential incursion and establishment event • provide performance information and feedback on quarantine pathways • monitor trends in arrival/escape of biosecurity risk • monitor changes to trends in respective air and sea pathways to inform business improvement and NBS deliberation • identify established species in specific environments as a baseline • assist in targeting and prioritising post-border surveillance activities. 	<p>Agriculture has developed a National Border Surveillance Policy (NBS) to ensure coordination of biosecurity surveillance activities conducted at border locations, and establish principles for undertaking these surveillance activities.</p>

TABLE B1 Australian Government response to Senate inquiry recommendations and Agriculture actions to February 2019

Senate inquiry recommendations	Australian Government response	Agriculture actions
<p>Recommendation 17 (continued):</p> <p>The committee recommends that, within the next 12 months, the Department of Agriculture review its cargo surveillance measures with the aim of achieving better detection rates of invasive species in general and of tramp ants in particular.</p>	<p>Initial work is focused on border management (first points of entry) activities but will then extend into an integrated offshore, onshore and at border surveillance program. Involvement of state and territory governments will continue to be an important component of an effective and integrated surveillance approach and is an ongoing point of discussion through the NBC.</p> <p>The Department of Agriculture and Water Resources performs a range of activities designed to minimise the likelihood of an incursion of exotic pests and diseases. The department's biosecurity activities include inspections of imported commodities for the presence of biosecurity risks commonly associated with those commodities—and surveillance of vessels, aircraft, cargo and places for hitchhiker pests that are not specifically associated with an import commodity.</p> <p>Current surveillance activities conducted by the Department of Agriculture and Water Resources take several forms and includes visual surveillance targeting locations or arrival pathways where imported cargo is handled, stored or unpacked, rather than targeting particular organisms or types of biosecurity risk.</p> <p>Specialist surveillance activities are conducted in Northern Australia under NAQS where proximity to Indonesia and Papua New Guinea, sparse settlement and a tropical environment necessitate special surveillance activities that typically extend well beyond port areas.</p> <p>The Department of Agriculture and Water Resources uses vector monitoring (traps or lures) to detect the presence of specific pest types—at airports, seaports, container terminals and premises operating under approved arrangements—including extensive mosquito trapping conducted in collaboration with the Department of Health.</p> <p>Surveillance activities to target various pests may also differ between regions. Some of the differing approaches arise from lower levels of risk associated with the various pests in each location (Asian Gypsy Moths are not trapped at Darwin port, for instance, as Darwin is not a risk port due to the incompatible environment) or from lower risks associated with the particular pathway(s) specific to each location.</p> <p>State departments of agriculture and/or health also conduct surveillance for a variety of organisms, both in port areas and more broadly. The Department of Agriculture and Water Resources has provided funding for state departments of agriculture to deliver some of these activities (for example, a trapping program for Asian Gypsy Moth and exotic fruit flies near first points of entry). Ongoing liaison between the Department of Agriculture and Water Resources and state and territory agencies responsible for biosecurity ensures effective resourcing, trap placement and reduction in duplication.</p>	

TABLE B1 Australian Government response to Senate inquiry recommendations and Agriculture actions to February 2019

Senate inquiry recommendations	Australian Government response	Agriculture actions
<p>Recommendation 18:</p> <p>The committee recommends that the Commonwealth Government work with state and territory governments, and the horticulture industry, on establishing standardised labelling, weed identification, and sales tracking protocols across the industry.</p>	<p>Supported</p> <p>The Australian Government supports this recommendation, noting that domestic trade requirements are a state and territory government responsibility. The Australian Government actively supports harmonisation of interstate trade protocols for plants and plant products through a subcommittee of the national PHC—the Subcommittee on Domestic Quarantine and Market Access, which is the national government group with responsibility for interstate trade arrangements.</p> <p>The ability to appropriately identify and trace horticultural products through the supply chain is essential. Some mechanisms already exist and are integrated into emergency response arrangements and existing programs such as the Nursery and Garden Industry Australia Biosecure HACCP (Hazard Analysis Critical Control Point) initiative. The Australian Government will continue to work with other governments and industry to strengthen these mechanisms.</p> <p>The Australian Government applies an integrated national approach to the prevention and management of issues associated with weeds through its participation in the Invasive Plants and Animals Committee (IPAC). The IPAC oversees the implementation of the Weeds of National Significance (WoNS) initiative, the Australian Weeds Strategy (AWS) and the National Invasive Plants Surveillance Framework (NIPSF).</p> <p>The WoNS initiative coordinates national effort against 32 of Australia's invasive plants. It benefits Australia by increasing accessibility to weed information and strengthening networks from national to local levels to increase the sharing of information, experiences and resources as well as regulatory consistency.</p> <p>The AWS is the national strategy for weed management in Australia. Following a review of it in 2012, a new weed strategy has been developed by IPAC and was endorsed by NBC on 7 June 2017.</p> <p>The NIPSF aims to increase Australia's post border capability for early detection of, and rapid response to, new invasive plant incursions and range expansions of existing plants. The IPAC is currently developing an implementation plan for the NIPSF.</p> <p>The Australian Government also works with the Atlas of Living Australia website, which publishes weed information and a weed identification tool.</p> <p>The Australian Government is committed to working with state and territory governments and the horticulture industry to harmonise weed identification and sales tracking protocols across the industry through these initiatives.</p>	<p>—</p>

TABLE B1 Australian Government response to Senate inquiry recommendations and Agriculture actions to February 2019

Senate inquiry recommendations	Australian Government response	Agriculture actions
<p>Recommendation 19:</p> <p>The committee recommends that the Department of Agriculture review and, where appropriate, strengthen current regulations governing private aviculture imports, given the high rate at which privately kept birds escape into the wild.</p>	<p>Noted</p> <p>The Australian Government regulates the international movement of wildlife. Legally imported exotic wildlife, including birds, are the responsibility of the relevant state and territory governments.</p> <p>The import of live animals, such as exotic birds, into Australia is controlled under the Biosecurity Act, administered by the Department of Agriculture and Water Resources and the Department of Health, and the EPBC Act, administered by the Department of the Environment and Energy.</p> <p>The Department of the Environment and Energy has responsibility for assessing applications to amend the List of Specimens taken to be Suitable for Live Import (the Live Import List) under the EPBC Act to include a new species.</p> <p>Each new animal species proposed for inclusion on the live import list is the subject of a detailed risk assessment by the Department of the Environment and Energy. This assessment focuses on the potential impacts on the Australian environment of the organism to be listed. To apply for any animal specimens (excluding biocontrol agents) to be included on the live import list, the applicant must submit a draft assessment report that addresses the potential impacts of the species on the Australian environment.</p> <p>The standard terms of reference for this report are designed to account for Australian conditions. They include requirements for information regarding: whether the species has previously established feral populations anywhere in the world; any previous risk assessments carried out in Australia or overseas; an assessment of the likelihood of the species establishing a breeding population in Australia; the potential impacts of the species should it become established in Australia; and relevant state/territory legislative controls. In order to be eligible for import into Australia, a species must be listed on the Live Import List and meet all requirements relevant to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) under the EPBC Act and the biosecurity requirements set out under the Biosecurity Act.</p> <p>Current import policies limit the import of live birds to certain species of pet birds from New Zealand, providing current import requirements are fully complied with. Only a small number of birds enter Australia this way. Between 2012 and 2015, 18 birds were imported from New Zealand. On 2 May 2016, the Department of Agriculture and Water Resources announced a review of the biosecurity risks associated with importation of pet and non-commercial psittacine birds (parrots). The Australian Government notes that many exotic bird species are bred in Australia.</p>	<p>On 2 May 2016, Agriculture announced a review of the biosecurity risks associated with importation of pet and non-commercial psittacine birds (parrots). In October 2018 Agriculture revised the scope to include all aviary (non-commercial, commercial and zoo) imports of psittacine birds. The draft review is anticipated to be available for comment early 2019.</p>
<p>Recommendation 20:</p> <p>The committee recommends that the Department of Agriculture identify the pathways by which exotic birds are entering the country, including illegal pathways, and work to better regulate or close these pathways.</p>	<p>Supported in principle</p> <p>There are initiatives in place to identify the pathways by which exotic birds enter the country and combat illegal importation through those pathways. The Australian Government is committed to continuing to regulate these pathways across a range of agencies.</p> <p>The Department of Immigration and Border Protection is primarily responsible for identifying and regulating illegal pathways into Australia such as smuggling. This includes the illegal pathways through which exotic birds might enter Australia. However, the Department of Agriculture and Water Resources actively targets the illegal importation of all animals into Australia, including avian species. Investigations and intelligence collection and sharing are ongoing as are relationships with other border agencies and international partners. The smuggling of fertilised eggs is also an area of focus for the Department of Agriculture and Water Resources and work on identifying pathways and high risk individuals is ongoing.</p> <p>In addition, the Department of Agriculture and Water Resources develops import conditions to meet Australia's appropriate level of protection (ALOP), under which legal trade in animals and their products can occur.</p> <p>As previously mentioned, the Department of Agriculture and Water Resources has announced a review of the biosecurity risks associated with importing pet and non-commercial psittacine birds (parrots). It has been proposed that providing for managed, legal imports is one way to reduce the likelihood and impacts of smuggling.</p> <p>The Department of the Environment and Energy is responsible for implementing Australia's obligations under CITES. Australia is one of 181 Parties to CITES that cooperate to ensure that wild species, including a number of bird species listed in the convention, are not threatened by international trade.</p>	<p>There are initiatives in place to identify the pathways by which exotic birds enter the country and combat illegal importation through those pathways. The Australian Government is committed to continuing to regulate these pathways across a range of agencies.</p> <p>Agriculture actively targets the illegal importation of all animals into Australia, including avian species. Investigations and intelligence collection and sharing are ongoing as are relationships with other border agencies and international partners. The smuggling of fertilised eggs is also an area of focus for Agriculture and work on identifying pathways and high risk individuals is ongoing.</p> <p>Agriculture has announced a review of the biosecurity risks associated with importing pet and non-commercial psittacine birds (parrots).</p>

TABLE B1 Australian Government response to Senate inquiry recommendations and Agriculture actions to February 2019

Senate inquiry recommendations	Australian Government response	Agriculture actions
<p>Recommendation 21:</p> <p>The committee recommends that the Department of Agriculture work with relevant state and territory agencies to develop a national database of seized exotic wildlife.</p>	<p>Supported in principle</p> <p>The Australian Government supports, in principle, a number of the reforms that are being progressed under Schedule 3 of the IGAB to develop a collaborative approach to collecting, collating, analysing, storing and sharing biosecurity information to improve decision-making and enhance efficiency of biosecurity operations. However, a singular database may not be practicable.</p> <p>The IPAC has developed reporting systems to share information between the Australian and state and territory governments on detection of new pest animals including stowaway, smuggled, seized, escapes/releases and field detections. IPAC has been annually collating and sharing the detection data between jurisdictions for over five years. Over time, the national dataset will provide vital information for scientific analysis on trends in the type, location, pathway and propagate pressure of new vertebrate detections at the border and post-border.</p> <p>To improve timely data sharing, the NBC is developing agreements for sharing information and the development of national biosecurity minimum data sets to facilitate the exchange of agreed information between jurisdictions as a priority under IGAB. Minimum data sets have been drafted for emergency response and surveillance for pests and diseases.</p> <p>The Department of the Environment and Energy currently maintains a database of exotic wildlife, seized under Part 13A of the EPBC Act. The Department of the Environment and Energy works collaboratively with the Department of Agriculture and Water Resources to provide information on seized exotic wildlife to state and territory agencies.</p>	<p>Environment works collaboratively with Agriculture to provide information on seized exotic wildlife to state and territory agencies.</p>
<p>Recommendation 22:</p> <p>The committee recommends that, following the completion of the current review of national maritime pest policy by the Department of Agriculture, the Commonwealth Government amend biosecurity legislation to incorporate a national mandatory biofouling management regime.</p>	<p>Noted</p> <p>During the recent review of National Marine Pest Biosecurity arrangements, the Department of Agriculture and Water Resources released issue and discussion papers and held stakeholder workshops in each state capital city. Through these consultation mechanisms, it explored stakeholder views on the need for, and nature of, regulation and risk management controls of biofouling on vessels.</p> <p>The review made a number of recommendations toward a new focus on prevention activities, such as better relationships between researchers, marine-based industries, government and the community. It also recommends the development of stronger response arrangements for dealing with incursions.</p> <p>The recommendations will be implemented over 2015–18. Implementation will involve working closely with stakeholders to strengthen national marine pest biosecurity arrangements to reduce risk of marine pests from establishing in Australian waters. The review report and recommendations are available at the Department of Agriculture and Water Resources website.</p> <p>The Biosecurity Act provides broad powers for the Australian Government to assess and manage biosecurity risks for incoming vessels. These powers are flexible and would enable management of biofouling.</p>	<p>Agriculture is investigating regulatory options to manage biosecurity risks associated with biofouling on vessels arriving in Australian territory. Agriculture's actions are consistent with the 2015 Review of National Marine Pest Biosecurity recommendations and activity 1.3 of the Marine Pest Plan 2018–2023.</p> <p>Agriculture is currently developing a consultation regulation impact statement that will present policy options for the management of vessels arriving in Australian territory to minimise unacceptable biofouling related biosecurity risk. Agriculture aims to formally engage with stakeholders on the RIS in March 2019.</p> <p>Agriculture is collaborating with state and territory governments in developing biofouling policy.</p> <p>Agriculture works closely with international partners to promote international consistency in biofouling regulations and the development of regulations that align with the direction set by the International Maritime Organization (IMO). Australia, along with New Zealand, are leading in IMO initiatives relating to biofouling, including the review of the IMO Biofouling Guidelines and being strategic partners in the GloFouling Partnerships project.</p>

TABLE B1 Australian Government response to Senate inquiry recommendations and Agriculture actions to February 2019

Senate inquiry recommendations	Australian Government response	Agriculture actions
Recommendation 23: The committee recommends that the Department of Agriculture conduct more regular ship inspections targeted at biofouling.	Noted The recent review of National Marine Pest Biosecurity arrangements, explored stakeholder views on the need for, and nature of, regulation and risk management controls of biofouling on vessels. The review made a number of recommendations toward a new focus on prevention activities, such as better relationships between researchers, marine-based industries, government and the community. It also recommends the development of stronger response arrangements for dealing with incursions. The recommendations will be implemented over 2015–18. Implementation will involve working closely with stakeholders to strengthen national marine pest biosecurity arrangements to reduce risk of marine pests from establishing in Australian waters. The review report and recommendations are available at www.agriculture.gov.au .	As part of the biofouling policy development process, Agriculture is developing policies to validate compliance with the proposed mandatory requirements to ensure vessels are targeted for inspection appropriately. Agriculture is assessing the feasibility and scope of amendments to the Biosecurity Regulation 2015 and the Maritime Arrivals Reporting System (MARS) to enable Agriculture to target high risk vessels for inspection using information provided through pre-arrival reports.
Recommendation 24: The committee recommends that the Commonwealth Government work with state and territory governments to establish a national monitoring and data sharing regime for freshwater fish incursions.	Supported in principle Freshwater fish incursions requires co-operation between all levels of government to monitor, noting that there are a range of difficulties in collecting data at the species level for fish imports. The Australian Government will work with state and territory governments to consider the possibility of establishing a national monitoring and data sharing regime for freshwater fish incursions, noting there are related initiatives currently underway that would achieve this outcome. Under Schedule 3 of the IGAB, a number of reforms are being progressed to facilitate a collaborative approach to collecting, collating, analysing, storing and sharing biosecurity information to improve decision-making and enhance efficiency of biosecurity operations. IPAC is promoting the maintenance of a national freshwater fish list for species that are identified as noxious across jurisdictions and is developing a nationally agreed risk assessment methodology to assess species whose potential is not yet known and have yet to be assessed. It is also developing a communication strategy to raise awareness in the community and industry about the management, control and regulation of ornamental fish, as well as raising awareness of pest fish and their management with key stakeholders.	–
Recommendation 25: The committee recommends that the Department of Agriculture improve border surveillance of freshwater fish imports, review the relevance of its risk assessments for Australian conditions and implement as soon as practicable the on-arrival fish health monitoring program.	Supported in principle The import of live animals, such as fish, into Australia is regulated by a number of agencies under the Biosecurity Act, administered by the Department of Agriculture and Water Resources and the Department of Health, and the EPBC Act, administered by the Department of the Environment and Energy. An import permit is required to import live ornamental fish to Australia. Only certain permitted species may be imported from approved countries. The live fish import conditions, including the list of permitted species and approved countries, is specified in the Department of Agriculture and Water Resources Biosecurity Import Conditions system (BICON). The Australian Government will work with state and territory governments to consider the possibility of establishing a national monitoring and data sharing regime for freshwater fish incursions as discussed under recommendation 24. The Australian Government, through the Department of Agriculture and Water Resources, is implementing the ornamental fish import risk reform project, which is aimed at improving the department's capacity to conduct on-arrival disease surveillance of freshwater and marine ornamental fish species imported into Australia. Current approaches for border surveillance of freshwater fish imports are being strengthened to manage risks associated with asymptomatic diseases of biosecurity concern (for example, iridovirus). On 1 March 2016, the Department of Agriculture and Water Resources implemented new pre-export iridovirus free certification requirements for imported freshwater ornamental fish that belong to the gourami, cichlid and poeciliid groups. It recently conducted four on-arrival surveillance trials as part of the reform project. The purpose of the trials were to: <ul style="list-style-type: none"> • identify key biosecurity risk pathways for iridoviruses • test the operational feasibility of, and make appropriate changes to, the fish health surveillance and pathway analysis system prior to full implementation. The test results of the trials have been provided to the relevant overseas competent authorities of approved exporting countries to help them target the highest risk areas of their freshwater ornamental fish export industry. Results have also been provided to importers to help them source fish free of iridovirus.	On 1 March 2016, Agriculture implemented new pre-export iridovirus free certification requirements for imported freshwater ornamental fish that belong to the gourami, cichlid and poeciliid groups. It recently conducted four on-arrival surveillance trials as part of the reform project.

TABLE B1 Australian Government response to Senate inquiry recommendations and Agriculture actions to February 2019

Senate inquiry recommendations	Australian Government response	Agriculture actions
<p>Recommendation 26:</p> <p>The committee recommends that the Commonwealth Government work with state and territory governments to establish a national framework for managing biosecurity on Australia's islands.</p>	<p>Supported in principle</p> <p>The Australian Government considers that it is more effective to strengthen management of biosecurity on Australia's islands within the existing biosecurity framework, rather than creating an additional framework for this purpose.</p> <p>Regulation of the movement of pests and diseases between Australia's islands, and management of established pests and diseases on Australia's islands, is primarily the responsibility of the states and territories (except for the islands that are under Commonwealth control). The Australian Government contributes to biosecurity activities within Australia, in partnership with state and territory governments, industry and other stakeholders where there is a discernible national interest.</p> <p>The Australian, state and territory governments are working through the NBC to improve how the effects of established pests and diseases of national significance on Australia's economy, environment and way of life are managed. This work would also be relevant for biosecurity management on islands.</p> <p>In July 2016, the NBC endorsed the National Framework for the Management of Established Pests and Diseases of National Significance, which was a key deliverable under Schedule 5 of the IGAB. The framework outlines a new approach to managing weeds, pest animals, plant and animal pest or diseases that become established in Australia and have a significant impact at the national level. It provides for:</p> <ul style="list-style-type: none"> • activities to be undertaken by the most appropriate party • appropriate prioritisation of EPDNS based on risk • effort to be targeted where the greatest biosecurity outcomes can be achieved in the national interest • investment return to be optimised • adoption of national investment principles involving beneficiaries and risk creators • minimisation of regulatory burdens associated with containment of established pests and diseases. <p>In addition to this work, the Australian Government has committed \$50 million over four years under the Agricultural Competitiveness White Paper to improve the way established pest animals and weeds are managed.</p> <p>Further, a key action area in the Australian Government's Threatened Species Strategy is to establish safe havens for species most at risk. This includes islands from which all invasive animals and plants are eradicated to provide long-term protection to threatened species.</p> <p>Within these areas, species are able to thrive and increase their numbers without the pressure of threats.</p> <p>Another action in the strategy is to limit the impact of feral cats. One of the targets under this action is the eradication of feral cats from five Australian islands within five years.</p>	<p>Agriculture worked with the Western Australian Government to transition to management the Macau Paper wasp on Cocos (Keeling) Islands, following a failed eradication program under the NEBRA.</p>

Agriculture Department of Agriculture and Water Resources. **ALOP** appropriate level of protection. **BICON** Biosecurity Import Conditions system. **CITES** Convention on International Trade in Endangered Species of Wild Fauna and Flora. **Environment** Department of the Environment and Energy. **EPBC** Environmental Protection and Biodiversity Conservation. **IGAB** Intergovernmental Agreement on Biosecurity. **IMO** International Maritime Organization. **IPAC** Invasive Plants and Animals Committee. **MARS** Maritime Arrivals Reporting System. **NBC** National Biosecurity Committee. **NBMCC** National Biosecurity Management Consultative Committee. **NEBRA** National Environmental Biosecurity Response Agreement. **SBQI** Stronger Biosecurity and Quarantine Initiative. **TAP** Threat Abatement Plan.

Source: Senate Environment and Communications References Committee 2015.

In May 2015 the Senate Environment and Communications References Committee released a report on Environmental biosecurity. The Australian Greens also provided a Minority Report as an annexure. In June 2017 the Australian Government responded to recommendations in the Minority Report and the Department of Agriculture and Water Resources (Agriculture) initiated actions in response.

TABLE B2 Australian Government response to Australian Greens recommendations and Agriculture actions to October 2018

Australian Greens recommendations	Australian Government response	Agriculture actions
Recommendation 1: The Australian Greens recommend that the government establish and resource the proposed Environment Health Australia that can act as the key body for environment health in the same manner as Plant Health Australia and Animal Health Australia, and that this body establish a partnership between community, governments and environmental businesses in order to deliver high priority policy and planning in environmental biosecurity.	Not supported The Australian Government agrees with the Committee's (majority) conclusion that the establishment of a new body along the lines suggested in the Environment Health Australia proposal would not be the best use of the limited resources available for biosecurity measures. The Australian Government considers a more effective approach is to continue to integrate environmental issues into existing governance structures, functions and activities and to strengthen collaboration and consultation with relevant stakeholders, including community members. This approach builds on already strong arrangements through the NBC, its sectoral committees and other relevant organisations, rather than creating a separate system.	—
Recommendation 2: The Australian Greens recommend that the federal government fund Environment Health Australia on an equal footing with Plant Health Australia and Animal Health Australia and at a minimum level of \$20 million over 5 years, with co-contribution from State and Territory governments of at least \$10 million over 5 years. This funding must not come out of existing funding for biosecurity measures.	Not supported See Australian Government response to Recommendation 1.	—
Recommendation 3: The newly-established Environment Health Australia should, through a transparent, scientific process, identify and rank Australia's priority environmental biosecurity threats. Undertake pathway analysis of these high priority threats to identify where biosecurity should be focused.	Not supported See Australian Government response to Recommendation 1.	—

TABLE B2 Australian Government response to Australian Greens recommendations and Agriculture actions to October 2018

Australian Greens recommendations	Australian Government response	Agriculture actions
Recommendation 4: The newly-established Environment Health Australia should develop a timetable for bringing environmental biosecurity planning up to the level achieved for plant and animal industries.	Not supported See Australian Government response to Recommendation 1.	–
Recommendation 5: The newly-established Environment Health Australia should, within 3 years, develop contingency plans for 30 high priority environmental pests.	Not supported See Australian Government response to Recommendation 1.	–
Recommendation 6: The newly-established Environment Health Australia should establish an independent expert panel to review recent incursions and to recommend ongoing responses to those incursions and reforms to reduce the risks of future incursions. An immediate priority should be to review whether smooth newts are eradicable.	Not supported See Australian Government response to Recommendation 1.	–
Recommendation 7: The Australian Greens recommend that the federal government implement the key recommendations of the Beale Review, in particular the creation of a separate Biosecurity Agency, with a Director that is separate from the Secretary of the Department of Agriculture.	Not supported The Australian Government has implemented many of the key recommendations of the Beale Review and is committed to support the delivery of effective and efficient biosecurity services as a core function of the Department of Agriculture and Water Resources. The Australian Government does not consider it necessary to create a separate Biosecurity Agency. The Biosecurity Act provides a strong decision-making framework with explicit statutory requirements for the Director of Biosecurity. This includes section 541 of the Act, which provides that, in performing functions or exercising powers under the Act, the Director of Biosecurity must have regard to the objects of the Act.	–

TABLE B2 Australian Government response to Australian Greens recommendations and Agriculture actions to October 2018

Australian Greens recommendations	Australian Government response	Agriculture actions
<p>Recommendation 8:</p> <p>The Queensland or federal governments should urgently allocate at least \$1.3 million per year for at least 10 years towards the eradication program for yellow crazy ants before more time is lost to delay.</p>	<p>Partially supported</p> <p>The Australian Government has committed \$8.8 million over three years to tackle yellow crazy ants in Far North Queensland. This comprises \$7.5 million for action within and adjacent to the Wet Tropics World Heritage Area and \$1.3 million to build skills and capabilities among farmers and landholders to assist with control of tramp ants such as yellow crazy ants. In addition to this new funding, funding from the Green Army Program has supported ten teams contributing to addressing the problem of yellow crazy ants, including the use of bait stations to control yellow crazy ants next to the Wet Tropics World Heritage Area. The Queensland Government has also committed \$3 million over three years to the program. The Australian Government will seek an additional \$4.5 million from the Queensland Government as matching funding.</p>	<p>The Australian and Queensland governments have committed \$11.8 million over three years. (Commonwealth \$8.8 million, which includes \$7.5 million for eradication and \$1.3 million for extension, and Queensland \$3.01 million).</p>

Appendix C

Responses to IGAB review recommendations on environmental biosecurity

On 29 November 2018 the Australian agriculture ministers supported the 42 recommendations in the IGAB report (Craig, Palmer & Sheldrake 2017). Several of these recommendations directly or indirectly relate to environmental biosecurity that have either already been implemented or are in the process of being implemented.

TABLE C1 IGAB recommendations and Agriculture actions to February 2019

IGAB recommendations	Agriculture actions
Recommendation 7: Jurisdictions should institute formal arrangements between agriculture and environment agencies, including through memoranda of understanding, to define the objectives of cooperation, leading and support roles, information flows, resources and deliverables.	Agriculture will progress a memorandum of understanding or other appropriate arrangements with the Department of the Environment and Energy. The Chief Environmental Biosecurity Officer will be responsible for progressing these arrangements.
Recommendation 8: Jurisdictions should make clearer commitments to environmental biosecurity within IGAB2, including in relation to: <ul style="list-style-type: none">• a clear definition of environmental biosecurity such as that proposed by this review• the principle of ecologically sustainable development• acknowledgement of Australia's international responsibilities under the Convention on Biological Diversity program of work to determine, plan and prepare for national priority pests and diseases impacting on the community, environment and native species• a focus on environment and community as well as industry partnerships• diseases transmitted to humans by invertebrates as well as vertebrates.	Agriculture coordinated a revised Intergovernmental Agreement on Biosecurity. Agriculture Ministers have signed the revised agreement by in February 2019.

TABLE C1 IGAB recommendations and Agriculture actions to February 2019

IGAB recommendations	Agriculture actions
<p>Recommendation 9:</p> <p>The Australian Government should establish the senior, expert position of Chief Community and Environmental Biosecurity Officer within the environment department. A far less preferred alternative is to house the position in the agriculture department.</p>	<p>Agriculture established the position of Chief Environmental Biosecurity Officer.</p>
<p>Recommendation 10:</p> <p>The NBC should establish a new Community and Environmental Biosecurity Committee (CEBC) to support the role of the Chief Community and Environmental Biosecurity Officer. The CEBC should comprise government and external community and environmental biosecurity experts and representatives from both the animal and plant sectoral committees of the NBC. The role of the CEBC should be reviewed following its work to prioritise national biosecurity risks impacting on the environment and social amenity (Recommendation 11).</p>	<p>Agriculture supported and helped lead the establishment of the new Environment and Invasives Committee (EIC) and provides secretariat support for this committee. The EIC replaces the Invasive Plants and Animals Committee, but has a greater focus on environmental biosecurity issues. The CEBO will chair this committee.</p>
<p>Recommendation 11:</p> <p>The NBC should adopt a systematic approach to determine and plan for national priority pests and diseases:</p> <ul style="list-style-type: none"> • Three national priority lists—one each for animal, plant and environmental pests and diseases—should be developed in partnership with system participants. • The three national lists should be completed by 2020. • Thereafter, the NBC should lead reviews of the national priority lists at least every five years, reporting to AGSOC and AGMIN. 	<p>Priority lists have been established for animals and plants. Agriculture is leading work on development of a priority list for environmental pests of concern. NBC is expected to endorse this list in mid-2019.</p> <p>In July 2017, the department commenced the development of a national priority list of exotic environmental pests and diseases. Public consultation on the priority list is expected in mid-2019, with the final list to be available by the end of 2019. Agriculture already maintains priority plant and animal lists and will continue to do so. The plant list is reviewed biennially or as new information becomes available. A review process for the plant list has recently been initiated, with an expected completion date of June 2019.</p>
<p>Recommendation 12:</p> <p>The Australian Government should assign lead responsibility for driving and coordinating implementation of the National Environment and Community Biosecurity Research, Development and Extension Strategy 2016–19 to the Australian Government environment department.</p>	<p>The NBC has agreed that the Centre for Invasive Species Solutions will coordinate implementation of this strategy, with oversight being provided by the Environment and Invasives Committee, which includes representatives from Agriculture and Environment.</p>

TABLE C1 IGAB recommendations and Agriculture actions to February 2019

IGAB recommendations	Agriculture actions
<p>Recommendation 13:</p> <p>The NBC should authorise and drive development of an agreed set of National Biosecurity R&I Priorities, in consultation with key biosecurity R&I system participants, to guide national R&I investment:</p> <ul style="list-style-type: none"> • The sectoral committees of the NBC should lead the development of sectoral and cross-sectoral level national priorities in line with the national priority exotic animal, plant and environmental risks and their pathways, once agreed. • The NBC, CSIRO, CEBRA and ABARES should jointly develop system-level national biosecurity priorities (including for the environment) focusing on the policy and decision-making frameworks, tools, innovations and behavioural changes needed to build an effective national system. • The NBC should determine the final integrated list of National Biosecurity R&I Priorities. The priorities should be developed within eighteen months of the IGAB review report, and should be reviewed at least every five years. 	<p>–</p>
<p>Recommendation 14:</p> <p>To accelerate national system innovation the Australian Government should:</p> <ul style="list-style-type: none"> • establish a \$25 million National Biosecurity Innovation Program to enable strategic co-investment in the system-level (including environmental) national priorities developed under Recommendation 13. The program should be funded initially for a five-year period from 2018–19 through the funding mechanisms in Chapter 8 and be administered by the Australian Government agriculture department • increase the funding appropriation to the Rural Industries RDC by \$2 million annually for a new cross-sectoral biosecurity R&I coordination and investment function for the RDCs. Cross-sectoral investments should be in line with the national cross-sectoral priorities developed under Recommendation 13 • require RDCs to invest in and report against the new National Biosecurity R&I Priorities through additional provisions in each RDC statutory funding agreement. Cross-sectoral biosecurity R&I will be coordinated by the Rural Industries RDC. 	<p>On 29 June 2018 the Australian Government announced the establishment of a \$25.2 million Biosecurity Innovation Program.</p> <p>Agriculture is working to establish the Biosecurity Innovation Program, which was announced on 29 June 2018. The program will cost \$25.2 million over five years. Agriculture is working with RDCs on progress against the national rural research and development priorities.</p>

TABLE C1 IGAB recommendations and Agriculture actions to February 2019

IGAB recommendations	Agriculture actions
<p>Recommendation 34:</p> <p>Funding for the national biosecurity system should be increased by:</p> <ul style="list-style-type: none"> • implementing a per-container levy on incoming shipping containers of \$10 per twenty-foot equivalent unit and a levy of \$5 on incoming air containers, effective from 1 July 2019 • increasing the Passenger Movement Charge by \$5, effective from 1 July 2022, with the revenue generated hypothecated to the Australian Government agriculture department for use nationally to enhance activities across Australia's biosecurity system • more widespread implementation by states and territories of land-based levies, with each jurisdiction to determine the magnitude of a levy based on its circumstances, but to include properties at least two hectares or greater. <p>The revenue raised by these mechanisms should be directed to those areas of the national biosecurity system that are currently most underfunded, with a priority for strengthening environmental biosecurity activities, national monitoring and surveillance activities, R&I and national communications and awareness activities.</p>	<p>—</p>
<p>Recommendation 37:</p> <p>The emergency response deeds for aquatic animals and exotic production weeds should be finalised within eighteen months of the IGAB review report.</p>	<p>The NBC, through the aquatic deed working group and the exotic weed taskforce, is continuing to progress the development of national arrangements for rapid response to aquatic emergency animal disease outbreaks (Aquatic deed) and exotic production weeds (Weed deed). A complete draft of the Aquatic Deed is now available. Government and aquatic animal industries have been consulted regularly throughout its development. A draft of the Weed deed is expected to be developed in 2019. The emergency response funding announced on 29 June 2018 will increase Agriculture's response budget to meet deed responsibilities under new and current deeds.</p>

AGMIN Agriculture Ministers Forum. Agriculture Department of Agriculture and Water Resources. **AGSOC** Agriculture Senior Officials committee. **CEBC** Community and Environment Biosecurity Committee. **IGAB** Intergovernmental Agreement on Biosecurity. **IGAB2:** Revised Intergovernmental Agreement on Biosecurity. **NBC** National Biosecurity Committee. **NEBRA** National Environmental Biosecurity Response Agreement.

Source: Craik, Palmer & Sheldrake 2017

Appendix D

Policy and legal frameworks for environmental biosecurity in Australia

TABLE D1 International agreements on environmental biosecurity

Name	Jurisdiction/agency with primary responsibility
Agreement on the Application of Sanitary and Phytosanitary Measures	Commonwealth/Department of Agriculture and Water Resources
Convention on Biological Diversity	Commonwealth/Department of the Environment and Energy
Convention on International Trade in Endangered Species of Wild Fauna and Flora	Commonwealth/Department of the Environment and Energy
International Convention for the Control and Management of Ships' Ballast Water and Sediments (The Ballast Water Management Convention)	Commonwealth/Department of Agriculture and Water Resources
International Plant Protection Convention	Commonwealth/Department of Agriculture and Water Resources
International Maritime Organisation Convention	Commonwealth/Department of the Environment and Energy Commonwealth/Department of Agriculture and Water Resources Commonwealth/Australian Maritime Safety Authority
World Organisation for Animal Health	Commonwealth/Department of Agriculture and Water Resources
Memorandum of Understanding with PNG and Timor-Leste and Subsidiary Agreement with Indonesia	Commonwealth/Department of Agriculture and Water Resources

TABLE D2 Intergovernmental agreements on environmental biosecurity

Name	Jurisdiction/agency with primary responsibility
Intergovernmental Agreement on Biosecurity	All jurisdictions
National Environmental Biosecurity Response Agreement	All jurisdictions
Intergovernmental Agreement on the Environment	All jurisdictions
Heads of agreement on Commonwealth and state and territory roles and responsibilities for the Environment	All jurisdictions
Emergency Animal Disease Response Agreement	All jurisdictions
Emergency Plant Pest Response Deed	All jurisdictions
National System for the Prevention and Management of Marine Pest Incursions	All jurisdictions
ACT/NSW Biosecurity Memorandum of Understanding	ACT/Environment, Planning and Sustainable Development Directorate, NSW/Department of Primary Industries
WA Memorandum of Understanding	Western Australia/Department of Primary Industries and Regional Development Western Australia/ Department of Biodiversity Conservation and Attractions Western Australia/Forests Products Commission

TABLE D3 National, state and territory legislation on environmental biosecurity

Name	Jurisdiction/agency with primary responsibility
<i>Biosecurity Act 2015</i> (and regulations and notices)	Commonwealth/Department of Agriculture and Water Resources
<i>Biological Control Act 1984</i> (and regulations and notices)	Commonwealth/Department of Agriculture and Water Resources
<i>Agricultural and Veterinary Chemicals (Administration) Act 1992 and Agricultural and Veterinary Chemicals Code Act 1994</i> (and regulations and notices)	Commonwealth/Department of Agriculture and Water Resources Commonwealth/Australian Pesticides and Veterinary Medicines Authority
<i>Natural Heritage Trust of Australia ACT 1997</i>	Commonwealth/Department of the Energy and Environment Commonwealth/Department of Agriculture and Water Resources
<i>Fisheries Management Act 1991</i>	Commonwealth/Department of Agriculture and Water Resources Commonwealth/Australian Fisheries Management Authority
<i>Imported Food Control Act 1992</i>	Commonwealth/Department of Agriculture and Water Resources
<i>Environment Protection and Biodiversity Conservation Act 1999</i> (and Regulations 2000)	Commonwealth/Department of the Environment and Energy
<i>Environment Protection and Management Ordinance 1987</i> (made pursuant to the <i>Heard Island and McDonald Islands Act 1953</i>)	Commonwealth/Department of the Environment and Energy
<i>Antarctic Treaty (Environment Protection) Act 1980</i>	Commonwealth/Department of the Environment and Energy
<i>Environment Protection (Sea Dumping) Act 1981</i>	Commonwealth/ Department of the Environment and Energy
<i>Local Government Act Shire of Christmas Island Cats Local Law 2010</i>	Local Government/Shire of Christmas Island
<i>Fisheries Management Act 2007</i>	South Australia/Department of Primary Industries and Regions SA

TABLE D3 National, state and territory legislation on environmental biosecurity

Name	Jurisdiction/agency with primary responsibility
<i>Natural Resources Management Act 2004</i>	South Australia/Department of Environment, Water and Natural Resources
<i>Aquaculture Act 2001</i>	South Australia/Department of Primary Industries and Regions SA
<i>Environment Protection Act 1999</i>	South Australia/Environment Protection Authority
<i>Biological Control Act 1986</i>	South Australia/Department of Primary Industries and Regions SA
<i>Agricultural and Veterinary Chemicals Act 1994</i>	South Australia/Department of Primary Industries and Regions SA
<i>Livestock Act 1997</i>	South Australia/Department of Primary Industries and Regions SA
<i>National Parks and Wildlife Act 1972</i>	South Australia/Department of Environment, Water and Natural Resources
<i>Marine Parks Act 2007</i>	South Australia/Department of Environment, Water and Natural Resources
<i>Animal Welfare Act 1985</i>	South Australia/Department of Environment, Water and Natural Resources
<i>Dog and Cat Management Act 1995</i>	South Australia/Department of Environment, Water and Natural Resources
<i>Plant Health Act 2009</i>	South Australia/Department of Primary Industries and Regions SA
<i>Biological Control Act 1986</i>	Tasmania/Department of Primary Industries, Parks, Water & Environment
<i>Weed Management Act 1999 and Weed Management Regulations 2000</i>	Tasmania/Department of Primary Industries, Parks, Water & Environment
<i>Nature Conservation Act 2002</i>	Tasmania/Department of Primary Industries, Parks, Water & Environment
<i>Wildlife (Exhibited Animals) Regulations 2010 and the Wildlife (General) Regulations 2010</i>	Tasmania/Department of Primary Industries, Parks, Water & Environment
<i>Vermin Control Act 2000</i>	Tasmania/Department of Primary Industries, Parks, Water & Environment
<i>Cat Management Act 2009</i>	Tasmania/Department of Primary Industries, Parks, Water & Environment
<i>Living Marine Resources Management Act 1995</i>	Tasmania/Department of Primary Industries, Parks, Water & Environment
<i>Inland Fisheries Act 1995</i>	Tasmania/Department of Primary Industries, Parks, Water & Environment
<i>Biosecurity Act 2015 (and regulations), Biosecurity Order (Permitted Activities) 2017 and supporting policies and procedures</i>	New South Wales/Department of Primary Industries
<i>Biological Control Act 1985</i>	New South Wales/Department of Primary Industries
<i>State Emergency Rescue Management Act 1989</i>	New South Wales/Department of Primary Industries
<i>Local Land services Act 2015</i>	New South Wales/Local Land Services New South Wales/Department of Primary Industries
<i>Biodiversity Conservation Act 2016</i>	New South Wales/Office of Environment and Heritage
<i>National Parks and Wildlife Act 1974</i>	New South Wales/Office of Environment and Heritage
<i>Environmental Trust Act 1998</i>	New South Wales/Office of Environment and Heritage
<i>Biological Control Act 1986</i>	Northern Territory/Department of Primary Industry and Resources
<i>Plant Health Act 2008; Plant Health Regulations 2011</i>	Northern Territory/Department of Primary Industry and Resources
<i>Weeds Management Act 2001</i>	Northern Territory/Department of Environment and Natural Resources
<i>Territory Parks and Wildlife Conservation Act 1977</i>	Northern Territory/Department of Environment and Natural Resources
<i>Livestock Act 2008</i>	Northern Territory/Department of Primary Industry and Resources
<i>Animal Diseases Act 2005</i>	ACT/Environment, Planning and Sustainable Development Directorate
<i>Plant Diseases Act 2002</i>	ACT/Environment, Planning and Sustainable Development Directorate
<i>Pest Plant and Animals Act 2005</i>	ACT/Environment, Planning and Sustainable Development Directorate
<i>Nature Conservation Act 2014</i>	ACT/Environment, Planning and Sustainable Development Directorate
<i>Biosecurity and Agriculture Management Act 2007</i>	Western Australia/Department of Primary Industries and Regional Development

TABLE D3 National, state and territory legislation on environmental biosecurity

Name	Jurisdiction/agency with primary responsibility
<i>Biological Control Act 1986</i>	Western Australia/Department of Primary Industries and Regional Development
<i>Fish Resources Management Act 1994 and Regulations 1995</i>	Western Australia/Department of Primary Industries and Regional Development
<i>Aquatic Resource Management Act 2016 and Regulations 1995</i>	Western Australia/Department of Primary Industries and Regional Development
<i>Pearling Act 1990 and Regulations</i>	Western Australia/Department of Primary Industries and Regional Development
<i>Exotic Diseases of Animals Act 1993 and Regulations</i>	Western Australia/Department of Primary Industries and Regional Development
<i>Biodiversity Conservation Act 2016</i>	Western Australia/Department of Biodiversity, Conservation and Attractions
<i>Conservation and Land Management Act 1984 and supporting regulations and Forest Management Regulations 1993</i>	Western Australia/Department of Biodiversity, Conservation and Attractions Western Australia/Forest Products Commission
<i>Biosecurity Act 2014 (and regulations and notices)</i>	Queensland/Department of Agriculture and Fisheries
<i>Biological Control Act 1987</i>	Queensland/Department of Agriculture and Fisheries
<i>Exhibited Animals Act 2015, section 17</i>	Queensland/Department of Agriculture and Fisheries
<i>Nature Conservation Act 1992 (and regulations and notices)</i>	Queensland/Department of Environment and Heritage Protection
<i>Conservation Forests and Lands Act 1987</i>	Victoria/Department of Environment, Land, Water and Planning
<i>Catchment and Land Protection Act 1994</i>	Victoria/Department of Environment, Land, Water and Planning Victoria/Department of Economic Development, Jobs, Transport and Resources
<i>Biological Control Act 1986</i>	Victoria/Department of Economic Development, Jobs, Transport and Resources
<i>Domestic Animals Act 1994</i>	Victoria/Department of Economic Development, Jobs, Transport and Resources
<i>Flora and Fauna Guarantee Act 1988</i>	Victoria/Department of Environment, Land, Water and Planning
<i>Wildlife Act 1975</i>	Victoria/Department of Environment, Land, Water and Planning Victoria/Department of Economic Development, Jobs, Transport and Resources
<i>Agriculture and Veterinary Chemicals (Control of use) Act 1992</i>	Victoria/Department of Economic Development, Jobs, Transport and Resources
<i>Fisheries Act 1995</i>	Victoria/Department of Economic Development, Jobs, Transport and Resources
<i>Environment Protection Act 1970</i>	Victoria/Department of Environment, Land, Water and Planning
<i>National Parks Act 1975</i>	Victoria/Department of Environment, Land, Water and Planning Victoria/Parks Victoria
<i>Prevention of Cruelty to Animals Act 1986</i>	Victoria/Department of Economic Development, Jobs, Transport and Resources
<i>Emergency Management Act 2013</i>	Victoria/Emergency Management Victoria
<i>Game Management Authority Act 2014</i>	Victoria/Game Management Authority
<i>Forests Act 1958</i>	Victoria/Department of Environment, Land, Water and Planning
<i>Port Management Act 1995 and Marine Safety Act 2010</i>	Victoria/Department of Economic Development, Jobs, Transport and Resources

TABLE D4 National, state and territory strategies/plans/lists on environmental biosecurity

Name	Jurisdiction/agency with primary responsibility
AQUAPLAN 2014–2019	Commonwealth/Department of Agriculture and Water Resources
Australian Aquatic Veterinary Emergency Plan (AQUAVETPLAN)	Commonwealth/Department of Agriculture and Water Resources
Australian Veterinary Emergency Plan (AUSVETPLAN)	Animal Health Australia
Australian Pest Animal Strategy	Commonwealth/Department of Agriculture and Water Resources Commonwealth/Department of the Environment and Energy
Guidelines for the Import, Movement and Keeping of Non-Indigenous Vertebrate Animals in Australia	Commonwealth/Department of Agriculture and Water Resources
Australian Weeds Strategy	Commonwealth/Department of Agriculture and Water Resources Commonwealth/Department of the Environment and Energy
Biosecurity Compliance Statement	Commonwealth/Department of Agriculture and Water Resources
Biosecurity Incident Management System	Commonwealth/Department of Agriculture and Water Resources
Biodiversity Conservation Strategy	Commonwealth/Department of the Environment and Energy
Biosecurity Risk Management Operating Model	Commonwealth/Department of Agriculture and Water Resources
Critical Incident Response Plan	Commonwealth/Department of Agriculture and Water Resources
National Biosecurity Response Team Arrangements 2017–2019	Commonwealth/Department of Agriculture and Water Resources/ Animal Health Australia/Plant Health Australia
Engagement and communication strategy for consulting with community and environmental stakeholders	Commonwealth/Department of Agriculture and Water Resources
Emergency Marine Pest Plan	Commonwealth/Department of Agriculture and Water Resources
Marine Pest Plan 2017–2022	Commonwealth/Department of Agriculture and Water Resources
National Animal Biosecurity Research, Development and Extension Strategy	Animal Health Australia/Commonwealth/Department of Agriculture and Water Resources
National Animal Health Surveillance and Diagnostics Strategy	Commonwealth/Department of Agriculture and Water Resources
National Animal Health Surveillance and Diagnostics Business Plan 2016–19	
National Diagnostic Protocols	Commonwealth/Department of Agriculture and Water Resources
National Environment and Community Research, development and Extension Strategy	Commonwealth/Department of Agriculture and Water Resources
National Framework for Management of Established Pests and Diseases of National Significance	Commonwealth/Department of Agriculture and Water Resources
National Plant Biosecurity Strategy	Commonwealth/Department of Agriculture and Water Resources
National Plant Biosecurity Diagnostic Strategy	Commonwealth/Department of Agriculture and Water Resources
National Plant Biosecurity Surveillance Strategy	Commonwealth/Department of Agriculture and Water Resources
National Plant Biosecurity Research, Development and Extension Strategy	Commonwealth/Department of Agriculture and Water Resources

TABLE D4 National, state and territory strategies/plans/lists on environmental biosecurity

Name	Jurisdiction/agency with primary responsibility
National Primary Industries Research, Development and Extension Framework and strategies developed under this framework	Commonwealth/Department of Agriculture and Water Resources
National Surveillance and Diagnostics Framework	Commonwealth/Department of Agriculture and Water Resources
National Wild Dog Action Plan	Commonwealth/Department of Agriculture and Water Resources/ Invasive Animals CRC
The Science Strategy	Commonwealth/Department of Agriculture and Water Resources
Rural Research and Development Priorities	Commonwealth/Department of Agriculture and Water Resources
The Country Action List	Commonwealth/Department of Agriculture and Water Resources
The National List of Notifiable Animal Diseases	Commonwealth/Department of Agriculture and Water Resources
Australian Priority Marine Pests List	Commonwealth/Department of Agriculture and Water Resources
The National List of Notifiable Aquatic Animal Diseases	Commonwealth/Department of Agriculture and Water Resources
National Priority Plant Pests List	Commonwealth/Department of Agriculture and Water Resources
Weeds of National Significance	Commonwealth/Department of Agriculture and Water Resources Commonwealth/Department of the Environment and Energy
National Ornamental Fish Strategy	Commonwealth/Department of Agriculture and Water Resources
National RD&E Invasive Species Plan	Commonwealth/Department of Agriculture and Water Resources
National System for Prevention and Management of Marine Pest Incursions	Commonwealth/Department of Agriculture and Water Resources
Northern Australia Quarantine Strategy Target Lists	Commonwealth/Department of Agriculture and Water Resources
List of specimens taken to be suitable for live import, 2001	Commonwealth/Department of Agriculture and Water Resources
Threat Abatement Plans for key threatening processes established under the EPBC Act	Commonwealth/Department of the Environment and Energy
National incursion prevention and response strategy for potentially invasive animals 2017–2022 (in draft)	Invasive Plant and Animal Committee/Centre for Invasive Species Solutions
National incursion response plan for terrestrial snakes 2016	Invasive Plant and Animal Committee/Centre for Invasive Species Solutions
List of exotic vertebrate animals in Australia 2007	Invasive Plant and Animal Committee Incursion Expert Group
Booderee National Park Management Plan 2015–2025	Commonwealth/Director of National Parks
Christmas Island National Park Management Plan 2014–2024	Commonwealth/Director of National Parks
Kakadu National Park Plan of Management 2016–2026	Commonwealth/Director of National Parks
Norfolk Island National Park and Norfolk Island Botanic Garden Management Plan 2008–2018	Commonwealth/Director of National Parks

TABLE D4 National, state and territory strategies/plans/lists on environmental biosecurity

Name	Jurisdiction/agency with primary responsibility
Pulu Keeling National Park Management Plan 2015–2025	Commonwealth/Director of National Parks
South-east Commonwealth Marine Reserves Network Management Plan 2013–2023	Commonwealth/Director of National Parks
Uluru-Kata Tjuta National Park Management Plan 2010–2020	Commonwealth/Director of National Parks
Heard Island and McDonald Islands Marine Reserve Management Plan 2014–2024	Commonwealth/Department of the Environment and Energy
Kakadu National Park Feral Animal Management Strategy 2006–2016	Commonwealth/Director of National Parks
Kakadu National Park Weeds Strategy 2004–14 (new draft in progress)	Commonwealth/Director of National Parks
State Natural Resources Management Plan 2012–2017	South Australia/Department of Environment, Water and Natural Resources
National Noxious Fish List	South Australia/Department of Primary Industries and Regions SA
State Biosecurity Policy 2017–2021	South Australia/Department of Primary Industries and Regions SA
SA State Buffel Grass Strategic Plan 2012–2017	South Australia/Department of Primary Industries and Regions SA
State Opuntoid Cacti Management Plan	South Australia/Department of Primary Industries and Regions SA
South Australian Myrtle Rust Contingency Plan	South Australia/Department of Environment, Water and Natural Resources
South Australian Tramp Ants Policy Discussion Paper	South Australia/Department of Primary Industries and Regions SA
Policy and procedures for the import, movement and keeping of vertebrate wildlife in Tasmania	Tasmania/Department of Primary Industries, Parks, Water & Environment
Importing and Keeping Birds in Tasmania	Tasmania/Department of Primary Industries, Parks, Water & Environment
Tasmanian Biosecurity Strategy 2013–2017	Tasmania/Department of Primary Industries, Parks, Water & Environment
NSW Biosecurity Strategy 2013–2021	New South Wales/Department of Primary Industries
Saving our Species; Species Projects	New South Wales/Office of Environment and Heritage
Saving our Species; Key Threatening Process Strategies	New South Wales/Office of Environment and Heritage
Threat Abatement Plan for Predation by the red fox <i>Vulpes vulpes</i>	New South Wales/Office of Environment and Heritage
Threat Abatement Plan for Invasion of native plant communities by <i>Chrysanthemoides monilifera</i> (bitou bush and boneseed)	New South Wales/Office of Environment and Heritage

TABLE D4 National, state and territory strategies/plans/lists on environmental biosecurity

Name	Jurisdiction/agency with primary responsibility
Biodiversity Priorities for Widespread Weeds	New South Wales/Office of Environment and Heritage
North Coast Regional Strategic Weed Management Plan 2017–2022	New South Wales/North Coast Local Land Services and partners
Hastings Wild Deer Management Strategy 2016–2018	New South Wales/North Coast Local Land Services and partners
North Coast Region Wild Dog Management Plan 2015–2020	New South Wales/North Coast Local Land Services
Murray Regional Strategic Weed Management Plan 2017–2022	New South Wales/Murray Local Land Services and partners
Hume, Upper Murray & Tumbarumba Wild Dog Management Plans 2015–2020	New South Wales/Murray Local Land Services New South Wales/National Parks and Wildlife Services New South Wales/Forestry Corporation NSW and private foresters and private land managers
NT Biosecurity Strategy 2016–2026	Northern Territory/Department of Environment and Natural Resources
Statutory Weed Management Plans for individual high priority species (Neem, Athel pine, Bellyache bush, Gamba grass, Cabomba, Mimosa)	Northern Territory/Department of Environment and Natural Resources
Regional Weed Management Plans (Darwin, Katherine, Barkly, Alice Springs)	Northern Territory/Department of Environment and Natural Resources
Weed Management Strategy for Crown Managed Lands	Northern Territory/Department of Environment and Natural Resources Northern Territory/Department of Infrastructure, Planning and Logistics
Integrated Natural Resource Management Plan (Territory Natural Resource Management)	Northern Territory/Territory Natural Resource Management
ACT Biosecurity Strategy 2016–2026	ACT/Environment, Planning and Sustainable Development Directorate
The ACT Pest Animal Management Strategy 2012–2022	ACT/Environment, Planning and Sustainable Development Directorate
The ACT Weeds Strategy 2009–2019	ACT/Environment, Planning and Sustainable Development Directorate
Western Australian Biosecurity Strategy 2016–2025	Western Australia/Department of Primary Industries and Regional Development Western Australia/Department of Biodiversity Conservation and Attractions Western Australia/Forests Products Commission
Invasive Species Plan for Western Australia 2015–2019	Western Australia/Department of Primary Industries and Regional Development Western Australia/Department of Biodiversity Conservation and Attractions
WA Surveillance Strategy for Invasive Species 2017–2022	Western Australia/Department of Primary Industries and Regional Development

TABLE D4 National, state and territory strategies/plans/lists on environmental biosecurity

Name	Jurisdiction/agency with primary responsibility
State notifiable disease list	Western Australia/Department of Primary Industries and Regional Development
Forest Management Plan 2014–2023, and other area management plan prepared in accordance with the Conservation and Land Management Act 1982	Western Australia/Conservation and Parks Commission Western Australia/Department of Biodiversity, Conservation and Attractions
Cane toad strategy for Western Australia 2014–2019	Western Australia/Department of Biodiversity, Conservation and Attractions
Wild dog management strategy	Queensland/Department of Agriculture and Fisheries
Weeds and Pest Animals Strategy (draft—post public consultation)	Queensland/Department of Agriculture and Fisheries
Feral deer management strategy 2013–2018	Queensland/Department of Agriculture and Fisheries
Back on Track species prioritisation framework/The Spring	Queensland/Department of Environment and Heritage Protection
Queensland State of the Environment	Queensland/Department of Environment and Heritage Protection
Invasive Plants and Animals Policy Framework and associated modules	Victoria/Department of Economic Development, Jobs, Transport and Resources
Action Plan for Managing Wild Dogs in Victoria 2014–2019	Victoria/Department of Environment, Land, Water and Planning Victoria/Department of Economic Development, Jobs, Transport and Resources Victoria/Parks Victoria
Protecting Victoria's Environment—Biodiversity 2037	Victoria/Department of Environment, Land, Water and Planning (note the Victorian CMA's utilise this strategy)
Protection of Alpine National Park—Feral Horse Strategic Action Plan 2018–2020 (draft)	Victoria/Parks Victoria
Greater Alpine National Parks Management Plan	Victoria/Parks Victoria
Victorian Waterway Management Strategy	Victoria/Department of Environment, Land, Water and Planning
Deer in Victoria's Parks and Reserves Management Framework (draft)	Victoria/Parks Victoria
Goulburn Broken Water Plan 2014–2022	Victoria/Goulburn Broken Catchment Management Authority
Goulburn Broken Biodiversity Strategy 2016–2021	Victoria/Goulburn Broken Catchment Management Authority
Our Catchment Our Communities	Victoria/Department of Environment, Land, Water and Planning
Regional Catchment Strategies	Victoria/Each of the ten Catchment Management Authorities
Emergency Management Manual Victoria	Victoria/Emergency Management Victoria
Sustainable Hunting Action Plan 2016–2020	Victoria/Department of Economic Development, Jobs, Transport and Resources
Code of Practice for Bushfire Management on Public Land	Victoria/Department of Environment, Land, Water and Planning

TABLE D4 National, state and territory strategies/plans/lists on environmental biosecurity

Name	Jurisdiction/agency with primary responsibility
Code of Practice for Timber Production 2014	Victoria/Department of Environment, Land, Water and Planning Victoria/Department of Economic Development, Jobs, Transport and Resources
Codes of Practices for Feral Pig, Feral Goat, Fox, Rabbit and Wild Dog Control	Victoria/Department of Economic Development, Jobs, Transport and Resources
Forest and Fire Management Science Catalogue	Victoria/Department of Environment, Land, Water and Planning
East Gippsland Feral Pig Management Plan and East Gippsland Feral Pig Options Paper	Victoria/Department of Environment, Land, Water and Planning
Wimmera Waterway Strategy 2014–2022	Victoria/Wimmera Catchment Management Authority
Wimmera Carbon Ready Plan	Victoria/Wimmera Catchment Management Authority
Wimmera Invasive Plant Animal Management Strategy	Victoria/Wimmera Catchment Management Authority

Appendix E

Governance arrangements

GOVERNANCE ARRANGEMENTS – ENVIRONMENTAL BIOSECURITY			
<p>Agriculture Ministers’ Forum (AGMIN)</p> <p>AGMIN facilitates collaboration between Australian, state and territory and the New Zealand governments on agricultural issues of national significance, including biosecurity.</p>			
<p>Agriculture Senior Officials Committee (AGSOC)</p> <p>AGSOC comprises heads of the Australian, state and territory and the New Zealand departments with responsibility for primary industries and provides advice to AGMIN on biosecurity issues.</p>			
<p>National Biosecurity Committee (NBC) – The NBC is responsible for providing advice to AGSOC and AGMIN on national biosecurity issues.</p>			
<p>Intergovernmental Agreement on Biosecurity (IGAB)</p> <p>The IGAB is an agreement between the Commonwealth and all state and territory governments that aims to strengthen working partnerships and improve the national biosecurity system.</p>			
Policy/planning		Preparedness	Response
<p>NBC Sectoral Committees</p> <div><div><p>Animal Health Committee (AHC) Advises governments on terrestrial, aquatic and environmental biosecurity through NBC, AGSOC & AGMIN.</p></div><div><p>Plant Health Committee (PHC) Advises governments on plant and environmental biosecurity through NBC and AGSOC.</p></div><div><p>Marine Pest Sectoral Committee (MPSC) Develops & coordinates the implementation of national arrangements to reduce marine biosecurity risks.</p></div></div> <p>Environment and Invasives Committee (EIC) – The EIC provides national policy leadership on the management of environmental biosecurity.</p>		<p>National Biosecurity Emergency Preparedness Group (NBEPEG) Enhances biosecurity emergency preparedness, response and initial recovery arrangements.</p>	<p>National Environmental Biosecurity Response Agreement (NEBRA) Signed in 2012, the NEBRA establishes the national arrangements for responding to significant pest and disease incursions where there are predominantly public benefits.</p> <div><p>NEBRA custodian Coordinates NEBRA decision making forums & develops cost sharing arrangements.</p><p>NEBRA Administration Group Responsible for considering and implementing the outcomes of the 2017 NEBRA review.</p></div>
<p>Environment and Invasives Committee Working Groups</p> <div><div><p>Freshwater vertebrates & invertebrates working group</p><p>Terrestrial invertebrates working group</p></div><div><p>Weeds working group</p><p>Terrestrial vertebrates working group</p></div><div><p>Environmental biosecurity advisory group</p></div></div>			<p>National Biosecurity Management Group (NBMG) Decision making body for exotic environmental plant pest and animal disease eradication programs under the NEBRA.</p> <p>Technical Consultative Committees Coordinating bodies providing technical links between governments and industry for decision making during biosecurity incidents. Consultative committees are formed during specific incidents and involves relevant technical expertise.</p>
<p>Coordinator – National Environment and Community Biosecurity Research Development and Extension (RD&E) Strategy – The strategy aims to establish a national coordinated and strategic approach to environmental biosecurity RD&E.</p>			

Appendix F

Environmental biosecurity preparedness and response activities

ENVIRONMENTAL BIOSECURITY PREPAREDNESS AND RESPONSE ACTIVITIES				
Inter-agency agreements	<p>FORMAL ARRANGEMENTS — AGRICULTURE AND ENVIRONMENT</p> <p>The 2017 IGAB review recommended the establishment of formalised arrangements between agriculture and environment. The Chief Environmental Biosecurity Officer is working with the Department of the Environment and Energy to formalise an agreement to work together to strengthen environmental biosecurity.</p>	<p>NEBRA</p> <p>The NEBRA was signed by the Commonwealth, state and territory governments in January 2012. It establishes the national arrangements for responding to significant pest and disease incursions where there are predominantly public benefits. The NEBRA is being reviewed and a draft revised NEBRA is expected to be released for public consultation in mid-2019.</p>		
	<p>CHIEF ENVIRONMENTAL BIOSECURITY OFFICER – The IGAB review recommended the establishment of the position of Chief Environmental Biosecurity Officer (CEBO) to provide a focus for national Environmental biosecurity response and engagement. The CEBO was appointed in late 2018.</p>			
	<p>NATIONAL ENVIRONMENTAL PRIORITY LIST – In mid-2017, the department commenced working with the Australian Bureau of Agricultural and Resource Economics and Sciences to develop a national priority list of exotic environmental pests and diseases. The list is expected to be finalised by the end of 2019.</p>			
	<p>DIDYMO PREPAREDNESS PLAN – Work is continuing on the development of a national Didymo preparedness plan. Jurisdictions will be asked for water quality data required to map potential distribution of Didymo. Work will then progress on developing a model.</p>			
	<p>NATIONAL EXOTIC INVASIVE ANT BIOSECURITY PLAN – The Plan covers activities to enhance the national capacity to manage the threat of invasive ants across the Biosecurity spectrum in the stages of prevention, detection, response, containment and asset-based protection/ongoing management. A draft plan was released for consultation in late 2018 and the plan is being considered for endorsement.</p>			
Policy/Planning	<p>ENVIRONMENTAL BIOSECURITY RESPONSE AND PREPAREDNESS CAPABILITY/CAPACITY REVIEW – In February 2018, the NBC agreed that the NBEPCG would lead a review of the biosecurity system's preparedness, and response capability and capacity, for environmental biosecurity incidents. October 2018.</p>			
	<p>NATIONAL INCURSION MANAGEMENT FRAMEWORK FOR INVASIVE SPECIES – Development of a national framework for guiding responses to incursions of invasive species where there is primarily a public good outcome. Stage one is expected to be completed by the Centre for Invasive Species Solutions in March 2019.</p>			
	<p>RESPONSE PLANS – Response plans set out the agreed approach for managing an outbreak involving animal diseases (AUSVETPLAN), aquatic animal diseases (AQUAVETPLAN), plant pests (PLANTPLAN), and marine pests (Emergency Marine Pest Plan). Wildlife Health Australia are currently drafting a Wildlife Health Plan.</p>			
	<p>VERTEBRATE PEST ERADICATION – Development of tools to support cost-effective decision-making for vertebrate pest eradication. To be developed by the Centre for Invasive Species Solutions by 2022.</p>			
	<p>NEBRA REVIEW – An independent review of the NEBRA was delivered in 2017. The response to the review recommendations is being developed by the NEBRA Administration Group (Admin Group), which was established by the National Biosecurity Committee. All jurisdictions are represented on this group which is chaired by the Department of Agriculture and Water Resources. A draft revised NEBRA is expected to be released for public consultation in mid-2019.</p>			
Resources	<p>eDNA</p> <p>Development of real time eDNA tools to improve early detection and response approaches for high risk pest animals by the Centre for Invasive Species Solutions by 2022.</p>	<p>PASSIVE AND ACTIVE SURVEILLANCE TOOLS AND NETWORKS</p> <p>The establishment of an ongoing national surveillance network in time to mount feasible responses to be developed by the Centre for Invasive Species Solutions by 2022.</p>	<p>CHIEF ENVIRONMENTAL BIOSECURITY OFFICER</p> <p>The IGAB review recommended the establishment of the position of Chief Environmental Biosecurity Officer to provide a focus for national environmental biosecurity response and engagement.</p>	<p>NATIONAL BIOSECURITY RESPONSE TEAM (NBRT)</p> <p>The NBRT is a group of trained and experienced personnel that may be deployed to assist a jurisdiction in the response to animal, plant, aquatic or environmental biosecurity incidents. The NBRT was established in July 2017.</p>
	<p>EXERCISE BORDER BRIDGE</p> <p>The exercise occurred in March 2018 to assess the capability of New South Wales and Queensland to respond to a biosecurity incident occurring across both jurisdictions. The scenario was based on a pest and disease incursion that affected livestock and the plant production industries. This Exercise also involved environmental biosecurity elements. The exercise report was released in late 2018.</p>	<p>EXERCISE CROWN AND ANCHOR</p> <p>The exercise occurred in Canberra, ACT, in March 2019. It aimed to enhance emergency response arrangements during a biosecurity incident in a Commonwealth-governed location with the potential to spread into an adjoining jurisdiction. The discussion exercise was based on two scenarios, detection of Varroa destructor in Jervis Bay and Red Imported Fire Ants at Canberra Airport.</p>	<p>Biosecurity Emergency Response Trainers Australia</p> <p>Responsible for developing training and assessment materials for all biosecurity incidents</p>	
Training/Exercises		Prevention	Preparedness	Response

Appendix G

List of committees, forums and groups that support government management of environmental biosecurity

Direct Consideration of Environmental Biosecurity

National/Commonwealth Government

Australian Marine Pest research Network
 Australian Alps Liaison Committee
 Bat health focus group
 Christmas Island Cat Eradication Steering Committee
 Christmas Island Cat Eradication Technical and Scientific Sub Committee
 Consultative Committee on Introduced Marine Pest Emergencies
 Consultative Committee for Exotic Plant Incursions
 Environmental Biosecurity Roundtable
 Invasive Plants and Animals Committee
 IMARST Biofouling Management Special Interest Group
 Marine Pest Sectoral Committee
 National Biosecurity Management Consultative Committees
 National Red Imported Fire Ant Eradication Program Steering Committee
 National Biosecurity Management Group
 National Feral Cat Taskforce
 Wildlife Health Australia Coordinator Group

State and Territory Government

ACT Pest Animal Management Committee
 ACT Weeds Advisory Group
 NSW Hastings Wild Deer Working Group
 NSW Murray Regional Weeds Committee
 NSW North Coast Regional Weeds Committee
 NSW North East Pest Animal Advisory Committee
 NSW North West Regional Weeds Committee
 NSW Tropical Soda Apple Taskforce
 Northern Territory Weeds Advisory Committee
 NT Zoonoses and Environmental Pathogens Committee
 QLD State Lands Pest Management Committee
 Queensland Invasive Plants and Animals Committee
 SA Buffel Grass Taskforce
 SA Declared Plants Working Group
 SA Marine Biosecurity Forum
 SA NRM Pest Animal And Plant Management Network
 VIC Established Pest Animals and Weeds Project Delivery Leadership Group
 VIC Blackberry Taskforce
 VIC Gorse Taskforce
 VIC Serrated Tussock Working Group
 VIC Carp Control Board and Working Group
 Parks Victoria Feral Horse Technical Reference Group
 VIC North East Deer Forum
 VIC Hume Regional Deer Roundtable
 VIC Springhurst Rabbit Roundtable and other regional rabbit forums
 Victorian Wild Dog Management Advisory Committee
 WA Dieback Working Group
 WA Freshwater Fish Expert Group

Supporting Consideration of Environmental Biosecurity

National/Commonwealth Government

Agriculture Ministers Forum
 Agriculture Senior Officials Committee
 Animal Health Committee
 Aquatic Consultative Committee on Emergency Animal Disease
 Australasian Environmental Law Enforcement and Regulators Network
 Biosecurity Research Steering Committee
 Biosecurity Roundtables
 Consultative Committee on Emergency Animal Disease
 Consultative Committee on Emergency Plant Pests
 Consultative Group on Biosecurity Cooperation
 National Biosecurity Committee
 National Biosecurity Emergency Preparedness Expert Group
 National Management Groups
 Northern Australia Biosecurity Framework Reference Group
 Plant Health Committee
 Quarantine Regulators Meeting
 Research & Innovation Committee
 Sub-committee on Aquatic Animal Health
 Subcommittee on Domestic Quarantine and Market Access
 Subcommittee on National Plant Health Surveillance
 Subcommittee on Plant Health Diagnostics
 Threatened Species Scientific Committee

State and Territory Government

ACT Biosecurity Coordination Committee
 Biosecurity Queensland Ministerial Advisory Council
 NSW Biosecurity Advisory Committee
 SA Biosecurity Advisory Committee to Kangaroo Island NRM Board
 SA Natural Resources Management Boards
 VIC Regional Biodiversity Recovery Groups
 VIC Scientific Advisory Committee
 WA Biosecurity Council
 WA Biosecurity Senior Officers Group
 WA DPIRD Livestock Biosecurity consultative groups
 WA Threatened Species Scientific Committee

Appendix H

Responses to NEBRA review recommendations

The Australian Government is working with other NEBRA signatories to respond to the review through the National Biosecurity Committee (NBC).

Recommendation	Update from NEBRA secretariat by February 2019
Recommendation 1: The language used in the NEBRA to describe stakeholders should be consistent with that used in the broader IGAB and the other biosecurity response agreements (EADRA and EPPRD).	The NBC most recently considered this recommendation at the NEBRA review specific workshop held on 18 December 2018. NBC are currently finalising the outcomes of their workshop and we expect more information to be available in late March.
Recommendation 2: The Commonwealth Department of Agriculture and Water Resources should remain as the custodian of NEBRA. If, following the IGAB Review, a new entity is created with responsibility for environmental biosecurity, consideration should be given to the role the entity should play in relation to NEBRA custodianship.	The NBC most recently considered this recommendation at the NEBRA review specific workshop held on 18 December 2018. NBC are currently finalising the outcomes of their workshop and we expect more information to be available in late March.
Recommendation 3: National Biosecurity Management Group (NBMG) meetings should be co-chaired by an executive from the Commonwealth Department of Environment and Energy (DoEE), potentially the Chief Environmental Biosecurity Officer if that position is created following the IGAB Review.	Jurisdictions have noted that Environment is already a member of the NBMG and has influence in decisions through this channel. However, a co-chair for meetings duplicates activities and would make NBMG decision-making more complex.
Recommendation 4: NBMG members should undertake formal consultation with their environment agency counterparts in each jurisdiction prior to any substantive decision being made under the NEBRA.	Jurisdictions have noted that environmental agencies are consulted at both the National Biosecurity Management Consultative Committee (NBMCC) and NBMG levels and have raised concern that making this consultation a formal requirement may delay decision-making in an emergency response.

Recommendation	Update from NEBRA secretariat by February 2019
<p>Recommendation 5:</p> <p>The NEBRA custodian role should be enhanced to support a maturing NEBRA. Areas of focus include greater public transparency around decision-making, greater support for the development of interpretative guides, enhanced communication with non-government stakeholders and general co-ordination of stakeholder activity. An enhanced custodian role would require a greater level of resourcing for the NEBRA custodian role.</p>	<p>NBC is currently considering options for an enhanced NEBRA custodian that is cost-shared between jurisdictions.</p>
<p>Recommendation 6:</p> <p>The NEBRA Administrative Group formed for the purpose of guiding this review should be instituted as an ongoing body to enable the states and territories to support and engage with an enhanced NEBRA custodian. It would also facilitate continuity of oversight and allow for feedback to the custodian in a structured manner.</p>	<p>The EIC was established after the NEBRA review report was delivered and provides overarching administration, policy advice and engagement on the NEBRA where this falls outside the custodian role. With the EIC in place, there is little need for the NEBRA Administrative Group to exist past its role in relation to the review.</p>
<p>Recommendation 7:</p> <p>A summary of decisions made by NBMGs on whether or not to apply NEBRA should be made publicly available in a timely manner to encourage wider understanding of the operation of the agreement.</p>	<p>This recommendation was adopted by the NBC, in February 2018, when it agreed to the public release of information regarding NBMG decisions, excluding financial information. Currently this information is published on the Department of Agriculture and Water Resources website though the NBMG communiqués.</p>
<p>Recommendation 8:</p> <p>The NEBRA should be re-drafted around four phases to a response: Incident Definition, Emergency Response, Proof of Freedom and Transition to Management (consistent with EPPRD). The commencement of each phase should require separate approval by NBMG of a phase plan in order to limit the scope of cost-shared activity.</p>	<p>Jurisdictions support the NEBRA being re-drafted around four phases of a response.</p>
<p>Recommendation 9:</p> <p>Analysis and documentation conducted during the Incident Definition Phase should be eligible for cost sharing, contingent on an initial assessment by NBMG of the likelihood that an incident will meet NEBRA criteria and approval of an Incident Definition Plan.</p>	<p>Jurisdictions continue to explore this recommendation and how adopting this approach in the NEBRA will impact on the existing emergency response deed framework, in particular the well-established understanding that jurisdictions are expected to undertake certain activity as part of their 'normal commitments'.</p>
<p>Recommendation 10:</p> <p>The NEBRA should be re-drafted to allow for a time-limited (12 month) cost-shared Transition to Management phase. This Transition to Management phase could follow on from an Emergency Response phase where eradication has been determined no longer to be possible.</p>	<p>Jurisdictions have indicated support for this recommendation.</p>

Recommendation	Update from NEBRA secretariat by February 2019
<p>Recommendation 11:</p> <p>The feasibility of conducting a five-yearly test of preparedness for the unique challenges posed by an environmental biosecurity response under NEBRA should be considered by the National Biosecurity Committee.</p>	<p>NBC will considered this at its October 2018 meeting.</p>
<p>Recommendation 12:</p> <p>Meeting and decision-making protocols in NEBRA should be redrafted to reflect that:</p> <p>The NBMCC provides technical and expert advice to the NBMG, it does not make decisions and its meetings should not involve voting. If members of the NBMCC hold different views all views should be incorporated into the written advice to the NBMG.</p> <p>Voting membership of the NBMG should be limited to parties who will be contributing to a cost-shared response. Jurisdictions who are not potentially affected by a pest or disease or who have indicated that they do not intend to contribute to a cost-shared response should be non-voting members of the NBMG.</p> <p>All decisions of the NBMG should need to be made unanimously between voting members.</p> <p>Where attendance at NBMG meetings is delegated, the jurisdiction must enable that delegate to make decisions during the meeting.</p>	<p>Jurisdictions agree with the principles put forward in this recommendation but suggest that the NEBRA should be re-drafted to align the NBMCC and NBMG meeting protocols and definitions of consensus and unanimous, with the existing deeds.</p>
<p>Recommendation 13:</p> <p>The NEBRA should be amended to allow any system participants to seek approval to participate in NBMG meetings as voting members if the system-participant has made (or will make) significant in-kind or financial contributions to a response in relation to an outbreak. Inclusion of system-participants as voting members should be at the discretion of the other NBMG members.</p>	<p>The NEBRA already allows private beneficiaries to be voting members at NBMG's, although in practice this has never occurred. Jurisdictions are working through the guidance material needed to make the process easier and more transparent and to set an understanding about level of financial or in-kind contribution required.</p>
<p>Recommendation 14:</p> <p>National significance for proposed NEBRA responses should be assessed in line with a broader risk prioritisation framework (such as that recommended in the draft IGAB report) rather than static criteria for national significance.</p>	<p>Jurisdictions note that the national significance criteria have been tested only a few times since they were agreed in 2012 and that a risk prioritization framework is not currently available to consider as an alternative.</p>

Recommendation	Update from NEBRA secretariat by February 2019
<p>Recommendation 15:</p> <p>Benefit-cost analysis requirements and guidance in NEBRA should be revised and simplified to accept qualitative descriptions of benefits where no pre-existing studies on the cost of an outbreak are available.</p>	<p>Jurisdictions have indicated support for this recommendation.</p>
<p>Recommendation 16:</p> <p>The National Biosecurity Committee should consider whether there is sufficient support to revise NEBRA to provide for cost-shared responses aimed at containment in some instances. These instances may include wildlife disease or environmental weeds where it be may be difficult to demonstrate feasibility of eradication but there are net benefits in a national, time-limited containment response. Alternatively, a different mechanism could be developed to facilitate cost sharing arrangements where eradication is not possible, but there are joint benefits to ensuring containment.</p>	<p>Jurisdictions continue to explore this recommendation and note that the issue of cost sharing containment activities is a broader issue than its treatment under the NEBRA.</p>

References

- Agriculture 2015, [Review of national marine pest biosecurity](#), Department of Agriculture and Water Resources, Canberra.
- 2018, [Live squirrels intercepted at Brisbane Airport](#), media release, Department of Agriculture and Water Resources, Canberra, 13 December, accessed 6 March 2019.
- Agriculture and Environment 2014, Submission to the Senate Standing Committee on Environment and Communications References Committee inquiry into environmental biosecurity, joint submission from the Department of Agriculture and the Department of the Environment, Canberra, August, p. 9.
- Beale, R, Fairbrother, J, Inglis, A & Trebeck, D 2008, [One biosecurity: a working partnership](#). The independent review of Australia's quarantine and biosecurity arrangements, report to the Australian Government, Department of Agriculture, Fisheries and Forestry, Canberra, 30 September.
- Brown, A 2017, [Deadly ants seized from ACT home after being advertised for sale on Gumtree](#), Canberra Times, 7 July, accessed 6 March 2019.
- Carnegie, AJ & Pegg, GS 2018, [Lessons learnt from the incursion of myrtle rust in Australia](#), *Annual Review of Phytopathology*, vol. 56, pp. 457–78, doi.org/10.1146/annurev-phyto-080516-035256, accessed 26 November 2018.
- Craik, W, Palmer, D & Sheldrake, R 2017, [Priorities for Australia's biosecurity system: an independent review of the capacity of the national biosecurity system and its underpinning intergovernmental agreement](#), Department of Agriculture and Water Resources, Canberra.
- Hawke, A 2009, [The Australian Environment Act: report of the independent review of the Environment Protection and Biodiversity Conservation Act 1999](#), Final report to the Australian Government, Commonwealth of Australia, Canberra.
- IGB 2018, [Hitchhiker pest and contaminant biosecurity risk management in Australia](#), Inspector-General of Biosecurity, Commonwealth of Australia, Canberra.
- IMO 2012, [Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species](#), International Maritime Organization, resolution MEPC.207(62).

- Kearney, SG, Cawardine, J, Reside, AE, Fisher, DO, Maron, M, Doherty, TS, Legge, S, Silcock, J, Woinarski, JC, Garnett, ST, Wintle, BA & Watson, JE 2018, [The threats to Australia's imperilled species and implications for a national conservation response](#), *Pacific Conservation Biology*, doi.org/10.1071/PC18024, accessed 19 February 2019.
- Lintermans, M 2004, [Human-assisted dispersal of alien freshwater fish in Australia](#), *New Zealand Journal of Marine and Freshwater Research*, vol. 38, no. 3, pp. 481–501, doi.org/10.1080/00288330.2004.9517255, accessed 26 November 2018.
- Makinson, RO 2018, [Myrtle rust in Australia—a draft action plan](#), presented at the Plant Biosecurity Cooperative Research Centre's National Science Exchange, Melbourne, accessed 26 November 2018.
- Scudamore, JM & Harris DM 2002, [Control of foot and mouth disease: lessons from the experience of the outbreak in Great Britain in 2001](#), *Revue Scientifique et Technique*, vol. 21, no. 3, pp. 699–710, doi.org/10.20506/rst.21.3.1351a, accessed 19 February 2019.
- Senate Environment and Communications References Committee 2015, [Environmental biosecurity](#), Commonwealth of Australia, Canberra.
- Strona, G, Carstens, CJ & Beck, PSA 2017, [Network analysis reveals why 'Xylella fastidiosa' will persist in Europe](#), *Scientific Reports*, vol. 7, no. 71, doi.org/10.1038/s41598-017-00077-z, accessed 19 February 2019.

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