Australian Government
Department of Agriculture

Australian Government
Department of the Environment

STANDING COMMITTEE ON ENVIRONMENT AND COMMUNICATIONS REFERENCES COMMITTEE

Inquiry into environmental biosecurity

JOINT SUBMISSION
FROM THE
DEPARTMENT OF AGRICULTURE
AND
DEPARTMENT OF THE ENVIRONMENT

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EXECUTIVE SUMMARY

The Australian Government Department of Agriculture and Department of the Environment welcome the opportunity to provide a submission to the Standing Committee on Environment and Communications References Committee's inquiry into environmental biosecurity.

Biosecurity is the management of risks to the economy, the environment and the community, of pests and diseases entering, emerging, establishing or spreading. Managing biosecurity is critical to sustaining a productive agricultural sector, protecting the environment and maintaining export markets. The absence of many significant pests and diseases in Australia safeguards and provides benefits to Australia's natural environment, which is an important community asset. Without it, Australians would not be able to enjoy the social and urban amenities to which they are accustomed.

Australia's biosecurity system supports our reputation as a safe and reliable trading nation. It provides assurance and certainty for the export of Australian agricultural, fisheries and forestry products, which typically account for 15 per cent of the value of Australia's merchandise exports each year.

The biosecurity system is complex, and operates in an environment characterised by the continual movement—in and out of the country—of living things and goods. It is not possible or desirable to manage biosecurity risk to one sector in isolation of another, or without a strong network that includes different levels of government, industry, non-government organisations and the community working together to achieve a common objective—one biosecurity. Zero risk is not achievable—however biosecurity threats are effectively managed using a risk-based approach.

The Department of Agriculture is the lead agency for biosecurity, working offshore and at the border to manage risks to Australia's environment and animal, plant and human health. The Department of the Environment develops and implements policies and programmes for the protection and conservation of the environment, especially those aspects that are matters of national environmental significance. The Australian Government through these departments also partners with state and territory governments that have primary responsibility for managing pests and diseases within Australia, as well as industry participants, the wider community and international trading partners.

Arrangements are in place for biosecurity partners to work together—the National Biosecurity Committee and its supporting committees deliver national biosecurity policies and programmes to strengthen the biosecurity system—underpinned by the Intergovernmental Agreement on Biosecurity. Nationally, there is a well developed capacity and capability across all sectors—animal and aquatic health, plant health and the environment—to prepare for, and respond to pest and disease incursions. Plant Health Australia and Animal Health Australia play an important role in these arrangements, and by coordinating the government-industry partnership.

Biosecurity risks are managed offshore, at the border, and within Australia—the biosecurity continuum—at the point where intervention is most effective.

- Offshore biosecurity activities play a key role in Australia's biosecurity system by reducing the biosecurity risk associated with imported goods and keeping the risks offshore. This is achieved by understanding global risks through intelligence and surveillance; working

with international trading partners in multilateral forums; conducting risk assessments and developing biosecurity conditions; and undertaking audit and verification activities.

- Border activities seek to verify that imports meet the required biosecurity conditions and intercept biosecurity risks that may be present in live animals and plants, cargo, mail and with passengers to reduce the likelihood of new pests and disease entering the country. This includes working with importers to achieve voluntary compliance; inspections of goods and baggage by trained biosecurity officers, utilising detector dogs and x-rays; and managing high risk live animals, production genetics and new plant varieties in post entry quarantine that can assist in further growing Australia's productivity and competitiveness in those industries.

- Within Australia, activities are undertaken in partnership with state and territory governments, industry and the community to reduce the likelihood that a pest or disease establishes and minimise their potential impact; through early detection activities such as surveillance and diagnosis; and a capability to prepare for, and respond to, an incursion. It also includes the management of established pests and diseases.

Prioritisation, compliance and continual improvement are integral to the operation of the biosecurity system, which is supported by research to drive innovation. Scientific principles continually inform decisions on how to best manage biosecurity risks. They underpin evidence-based policy development, intelligence gathering, decision-making and service delivery. Managing biosecurity draws on a range of skills including zoology, botany, molecular biology, microbiology, entomology, geospatial analysis, food and nutrition science, quantitative science, environmental science, plant pathology, ecology, aquatic animal health and veterinary science.

To provide context and to assist the Committee, this submission provides an overview of Australia's biosecurity system and the roles and responsibilities of the Australian Government and its biosecurity partners in the regulation, control and management of biosecurity risks. It also provides detail on arrangements relevant to the Committee's terms of reference. While the focus of the submission is on activities to prevent the entry and establishment of exotic pests and diseases, it also provides an overview of the management of those that have established. Further information on any aspects of this submission can be provided to the Committee on request.

1. INTRODUCTION

In the Commonwealth, the Department of Agriculture plays a central role in managing biosecurity. It leads the development of policy advice and provides services to improve the productivity, competitiveness and sustainability of the agriculture, fisheries, forestry and related industries; and assists people and goods to move in and out of Australia, while managing the risks to the environment and animal, plant and human health.

The Department of the Environment advises on and implements environment policy to support the Australian Government in achieving a healthy environment and strong economy. The department provides environmental and economic benefits to Australia through a range of programme, regulatory and operational functions that protect matters of national environmental significance. The Department of the Environment works closely with the Department of Agriculture on environmental biosecurity issues such as invasive species policy and operational matters including risk assessment and management of established invasive species.

For the purposes of this submission, biosecurity is defined as the *management of the risks to the economy, the environment, and the community, of pests and diseases entering, emerging, establishing or spreading* (Intergovernmental Agreement on Biosecurity, IGAB). The term pest in this context refers to any animal, plant, invertebrate or pathogen with the potential to have a negative impact. A number of acronyms and other terms used through the submission are at Attachment A.

2. BIOSECURITY IN AUSTRALIA

Australia's biosecurity system is extensive. It encompasses and fully integrates import and export activities, services and functions—into, within, and from Australia—and covers the spectrum of pest and disease threats to Australia's environment, production and people. The system—one biosecurity—relies on cooperation between those who create risk and those who benefit from the maintenance of the system contributing and playing a role.

Australia's environment and economy benefit significantly from a strong biosecurity system. Australia has some natural protection from biosecurity threats, based on relative geographical isolation, the absence of shared land borders and early implementation of border quarantine measures. These advantages have kept Australia free of many pests and diseases common elsewhere, protecting our natural environment and conferring a high degree of quality on our agricultural, fisheries and forestry exports.

The Australian Government's approach to managing biosecurity risks is integrated and multi-layered, involving complementary measures applied along the biosecurity continuum (Figure 1)—offshore (pre border), at the border, and onshore (within Australia)—to achieve the greatest return on investment from a risk management perspective. In this context, onshore includes the marine environment.

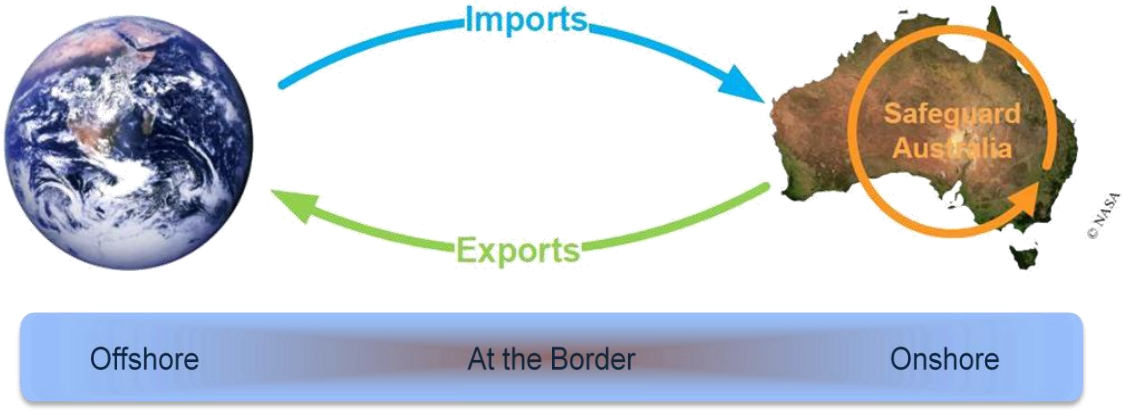

Figure 1: The biosecurity continuum

Australia's biosecurity system has been subject to review several times. Recommendations for improvements were made in the 1996 independent review by Nairn *et al.—Australian quarantine: a shared responsibility*; the 2003 Joint Committee of Public Accounts and Audit *Review of Australia's Quarantine Function* (House of Representatives); the 2008 independent review by Beale *et al.—One biosecurity: a working partnership* review; and to some extent the review of Australia's preparedness for the threat of foot and mouth disease (Matthews, 2011) and various audits by the Australian National Audit Office. These reviews found that Australia's biosecurity system operated well, but could be improved. The Department of Agriculture, in collaboration with its biosecurity partners, is continuing to strengthen Australia's biosecurity arrangements.

2.1. Why biosecurity matters

Biosecurity underpins the Australian way of life—it protects our environment and our farmers from the impacts of serious pests and diseases that can significantly affect our native flora and fauna and increase the costs of production and ability to access markets, both domestically and internationally. Australia's favourable biosecurity status also supports our economy—in 2012–13, the value to Australia's economy of farm production was around $48.6 billion. On average, Australia exported around 65 per cent of its agricultural production over the three years to 2012-13; in the 2013-14 season, farm export earnings reached an estimated high of $41 billion (Australian Bureau of Agricultural and Resource Economics and Sciences; ABARES, 2014a).

Pests and diseases represent a threat to both Australia's ecological diversity and agricultural industries. Australia's natural environment is unique in the world, but it is under threat from invasive species, many of which have been purposely introduced over a long period of time. CSIRO advises that the threat of invasive species to Australia's biodiversity is second only to habitat destruction (CSIRO, 2011).

Managing biosecurity is critical to a sustainable and productive agricultural sector. Preventing incursions protects our environment and economy and provides flow on benefits for businesses and farmers. Pests and diseases increase the cost of managing private and public land and the cost of production to farmers, who may also incur additional costs when exporting to meet importing country requirements, for example for fumigation or cold treatment of produce. For example, ABARES estimates that the annual value to broadacre farms of biosecurity services preventing foot and mouth disease and karnal bunt to be more than $8,000 per farm (ABARES, forthcoming).

While it is difficult to measure the economic benefits generated by Australia's biosecurity status, estimates suggest that major pest and disease incursions would have significant negative consequences. They would also impose significant costs on governments, industries and individuals. Twenty five per cent of costs to consumers associated with food products are estimated to be due to weeds, pests and diseases (CSIRO, 2011).

For example, controlling red imported fire ant, which is a significant environmental, agricultural and social amenity pest, has already collectively cost governments $411 million between 2001 and 2012 (in real 2012 dollars). The regulation of movement to contain the ants is a cost on business and the community, and if the ants were to spread further, the consequential losses over 70 years are estimated to be $8.5 billion. The benefit of eradication was estimated to be in excess of $5.3 billion over 20 years (ABARES, 2014b).

2.2. Biosecurity threats to Australia's environment

Exotic pests and diseases are a significant, increasing threat to Australia's environment. A pest or disease is considered an invasive species when it occurs beyond its accepted normal distribution and threatens environmental, agricultural or other social resources by the damage it causes. Invasive species can have a major impact on Australia's environment, threatening our unique biodiversity and reducing overall species abundance and diversity.

Established pests like weeds also reduce the quantity and quality of Australia's agricultural and forestry products, which affects both industry and consumers. It is estimated that the cost to the Australian economy from the agricultural impacts of weeds is in the vicinity of $4 billion per annum (Sinden *et al*., 2004). This estimate includes the direct costs of weed control, reduction in yield and contamination of agricultural products. Similarly, the annual economic cost to agriculture from six species of pest animal was $620.8 million, with a further $122.7 million expended on management, administration and research (Gong *el al.*, 2009). The economic impact of weeds and pest animals on nature conservation, tourism and landscape amenity, although not quantified, is thought to be of a similar magnitude.

Australia's native plants and animals adapted to life on an isolated continent over millions of years. Since European settlement they have had to compete with a range of introduced animals for habitat, food and shelter, and have also had to face new predators. These new pressures have also caused a major impact on soil and waterways. While managed domestic livestock can be removed from degraded areas until these areas are revegetated, it is much more difficult to keep pest animals out of these same areas.

In Australia, pest animals typically have few natural predators or fatal diseases and some have high reproductive rates. As a result, their populations are not naturally regulated and they can multiply rapidly if conditions are favourable. Feral animals impact on native species by predation, competition for food and shelter, destroying habitat, and by spreading diseases.

Pest animals can carry the same common diseases as domestic animals. They are a constant source of reinfection for wildlife and livestock, which works against efforts to control costly diseases such as tuberculosis. Feral animals are also potential carriers of other animal diseases (such as rabies and foot and mouth disease) and parasites (such as screw worm fly). So far, these do not occur in Australia and it could be very difficult to control these if they are carried by pest animals.

Under the *Environment Protection and Biodiversity Conservation Act 1999* fourteen key threatening processes caused directly by invasive species have been listed that threaten the survival, abundance or evolutionary development of native species or ecological communities. Invasive species listed include the European red fox; cane toads; feral rabbit, goat, cat and pig; and red imported fire ant. Some disease-causing organisms are also listed, such as *Phytophthora cinnamomi* and chytrid fungus infection in amphibians.

2.3. Global trends impacting biosecurity

The Department of Agriculture operates in a diverse range of environments across Australia and the world in its role of managing biosecurity risks; and facilitates the safe movement of significant volumes of people and goods across Australia's border. In 2013-14, the department:

- cleared 17.7 million international passengers, from whom 261,000 items were seized due to biosecurity concerns
- handled 186.6 million international mail items, of which 24,100 were seized due to biosecurity concerns
- assessed and granted entry to 17,460 vessels arriving from overseas
- processed 23,500 import permit applications, of which 18,700 permits were granted after assessment

- assessed 440,000 commercial and 621,000 air freight consignments (under $1000 value) for import into Australia
- inspected 45,600 sea containers from high risk ports
- monitored 6,060 live animals and 21,700 hatching eggs at government post entry quarantine facilities.

While the scale of the task to manage biosecurity risks is already substantial, Australia's biosecurity system is facing increasing challenges from a changing climate and global distribution of pests and diseases, as well as increasing movement of goods and of people. Every few years, new diseases emerge such as variants of highly pathogenic avian influenza and Ebola hemorrhagic fever. Changing climatic conditions mean the ranges for certain pests and diseases such as West Nile virus and Huanglongbing (citrus greening) are steadily extending. Invasive species are an emerging global problem threatening agriculture and biodiversity everywhere, evolving and adapting as they spread.

The Department of Infrastructure and Regional Development predicts a 107 per cent increase in total passenger movements through Australian airports by 2030, with significant annual growth projected from countries posing a greater biosecurity risk; and a 129 per cent increase in Australia's trade by 2025, with containerised trade almost doubling to 13.6 million units by 2025. At the same time, there is expected to be significant growth in the domestic movement of people and goods (Commonwealth of Australia, 2014). While letter volumes through domestic and international mail centres are declining, there is strong projected growth in parcels, driven primarily by online shopping (Department of Communications, 2013).

These trends, combined with changing global demands, increasing imports from a growing number of countries and new pathways, population expansion and climate change mean that there will be increasing complexity in Australia's biosecurity risk management.

2.4. Investment in biosecurity

In an environment of constrained and finite resources, governments need to prioritise investment to maximise return from a biosecurity risk perspective. The Australian Government places a strong emphasis on preventing a serious pest or disease from establishing as this generally provides a significantly higher investment return on public funds compared to managing that pest or disease in perpetuity should it become established.

The generalised biosecurity invasion curve (Figure 2) outlines the changing role (including funding) of governments and stakeholders as actions to respond to a pest or disease change from prevention, eradication, containment to asset-based protection. The 'return on investment' of public funds generally reduces when progressing along the invasion curve. For example, governments have a greater responsibility in the earlier stages of prevention and eradication, whereas those best placed to protect assets (public or private) from established pests and diseases are generally the owners of those assets. The environmental and production costs of inaction are high. While it is possible to determine the economic cost in terms of adverse effects on production; at present there is no agreed model to measure the ecological cost to the environment of exotic pests and diseases in economic terms.

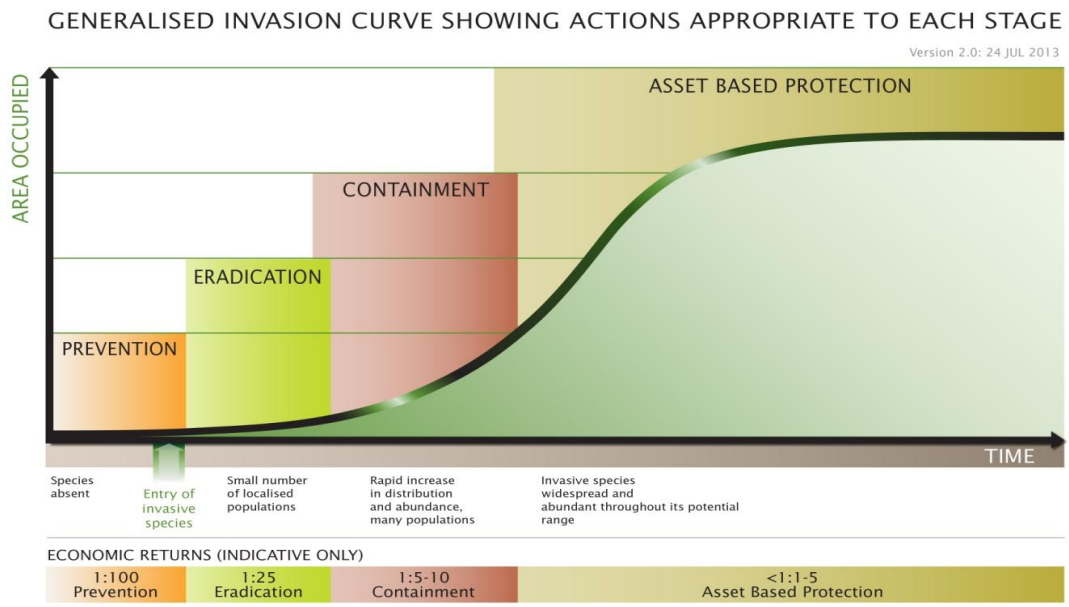

Figure 2: Biosecurity invasion curve (Department of Environment and Primary Industries, Victoria)

The Australian Government places high priority on strengthening biosecurity arrangements and has invested $20 million over four years to build on existing capabilities that enable early responses to both import and export related biosecurity issues. This builds on continuous reform to the biosecurity system that is underway.

A strong biosecurity system is dependent on a sustainable system of funding. A significant proportion of the Department of Agriculture's biosecurity budget, around 62 per cent, is cost recovered from importers and exporters. In 2013–14, import and export biosecurity services costs were $545 million, of which $335.5 million was cost recovered from users of the system. The Australian Government is undertaking comprehensive reviews of its funding arrangements to look at options to adjust fees and charges to better reflect the operating model for biosecurity and export services now and into the future.

2.5. International context

The Australian Government has entered into a number of multilateral, bilateral and regional agreements that influence Australia's biosecurity system.

2.5.1. Multilateral agreements

Australia is a contracting party to a number of conventions for the global protection of biodiversity and natural resources. Of particular relevance to biosecurity and trade are the Convention on Biological Diversity and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) which provide the global legal framework for action on biodiversity and protection of endangered species, respectively. The Australian Government is committed to protecting and conserving Australian native wildlife by regulating international trade which helps to protect targeted species against over exploitation, and Australian ecosystems against the introduction of invasive species. The Australian Government is also signatory to the Convention on Wetlands of International Importance (Ramsar Convention), the Convention Concerning the Protection of the World Cultural and Natural Heritage (the World

Heritage Convention) and several other agreements in relation to the protection of migratory species.

Australia's rights and obligations in relation to the movement of goods are set out under World Trade Organization agreements, particularly the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement). The SPS Agreement allows members to specify the level of risk that they consider acceptable to protect human, animal and plant life or health, also known as the Appropriate Level of Protection (ALOP). Australia's ALOP, which was agreed by the state and territory governments in 2002 and reflects community expectations, is expressed as: '*providing a high level of sanitary and phytosanitary protection aimed at reducing risk to a very low level, but not zero'*.

The International Plant Protection Convention (IPPC), the World Organisation for Animal Health (OIE) and the Codex Alimentarius Commission are recognised as the bodies responsible for establishing guidelines and recommendations with respect to all aspects of sanitary and phytosanitary measures. The Department of Agriculture is an active participant in these organisations and pursues the adoption of standards that are scientifically based and protect environmental and agricultural resources, while enabling trade.

The SPS Agreement recognises that governments need to develop trade measures that deal with scientific uncertainty in respect of the issues covered by the Agreement, namely the protection of human, animal and plant life and health. The Australian Government strongly supports the scientific basis of decision making; and in cases where the risks are unable to be fully assessed, it will provisionally apply measures while further information is sought to enable a more objective analysis of the risk. This provides for a level of precaution in the system.

Australia is also a party to the International Maritime Organization and signatory to the International Convention for the Control and Management of Ships' Ballast Water and Sediments which aims to prevent the spread of harmful aquatic organisms. While the Convention has not yet entered into force, a number of guidelines have been developed to facilitate implementation. A number of other agreements to which Australia is a party are also relevant, such as those that facilitate access to plant genetic resources.

2.5.2. Bilateral and regional agreements

Australia has seven operational free trade agreements and signed agreements with Korea in April 2014 and with Japan in July 2014, both still to enter into force. Negotiations are underway on a further seven agreements—three bilateral and four plurilateral (Department of Foreign Affairs and Trade, 2014).

It should be noted that free trade agreements do not override Australia's rights and obligations under the SPS Agreement to protect human, animal and plant life or health. Australia's bilateral and regional free trade agreements therefore reflect these rights and obligations to ensure that biosecurity risks can continue to be effectively managed, and often include formal consultations on sanitary and phytosanitary issues.

2.6. Roles and responsibilities

Maintenance of Australia's favourable pest and disease status is of significant interest to governments, industry and the community. With three levels of government, risk creators and private beneficiaries there is a need to share responsibility and for clarity on the roles and responsibilities for the involved parties. In some cases, this clarity is provided by the Australian Constitution and legislation; or is generated through agreements and consultations.

2.6.1. Australian Government

Under both the Australian Constitution and *Quarantine Act 1908* (the Quarantine Act), the Commonwealth is responsible for matters relating to the border, including development and enforcement of quarantine. The Quarantine Act has broad coverage over matters of biosecurity concern and provides a national approach to the protection of Australia's international borders from incursions of exotic pests and diseases. It provides for certain matters to be dealt with in more detail in regulations, proclamations and determinations.

These functions are delivered principally through the Agriculture portfolio, with the Department of Agriculture also responsible for monitoring Australia's pest and disease status to meet international obligations. The department contributes to biosecurity activities within Australia, in partnership with state and territory governments, industry and other stakeholders where there is a discernible national interest. Increasingly this is required to demonstrate sound biosecurity practices as a condition of export to some countries.

Since the Quarantine Act was first drafted over a century ago, Australia's biosecurity risks have changed significantly. The Biosecurity Bill 2014 is being developed to replace the Quarantine Act and aims to manage biosecurity risks more flexibly than the current legislation, whilst still ensuring a robust set of powers and mechanisms to protect Australia's unique biosecurity status and environment. The Bill is designed to meet the needs of Australia's biosecurity system now and into the future, and will be largely based on previous draft legislation introduced into Parliament in 2012. Under the Bill, the risks to the environment will continue to be given equal weighting alongside the consideration of risks to human, animal and plant health and the economy and there will be improved powers to manage biosecurity risks associated with ballast water.

The Department of the Environment develops and implements policies and programmes for the protection and conservation of the environment, especially those aspects that are matters of national environmental significance. The department administers the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act), the Australian Government's principal piece of environmental legislation. The EPBC Act provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places—defined in the EPBC Act as matters of national environmental significance. The nine matters of national environmental significance to which the EPBC Act applies are:

- world heritage properties
- national heritage places
- wetlands of international importance (often called 'Ramsar' wetlands after the international treaty under which such wetlands are listed)
- nationally threatened species and ecological communities

- migratory species
- Commonwealth marine areas
- the Great Barrier Reef Marine Park
- nuclear actions (including uranium mining)
- a water resource, in relation to coal seam gas development and large coal mining development.

Trade in wildlife can pose a serious threat to Australia's unique biodiversity and to plants and animals around the world. The Quarantine Act and the EPBC Act regulate the entry of animals and plants, and animal and plant products into Australia. The EPBC Act controls the import of live specimens into Australia to minimise the potential for species imported into Australia to become invasive. Both the Quarantine Act and the EPBC Act require that live specimens be assessed for their potential impacts, and the Department of Agriculture and the Department of the Environment have worked closely to develop an integrated process for the assessment of specimens. This reduces duplication and streamlines the assessment processes, both for the Australian Government and for the applicant (or potential importer). The agreement of both departments is required before a live specimen can be imported.

The international convention, CITES, helps to ensure that international trade does not threaten species with extinction, protecting about 5,000 species of animals and 30,000 species of plants. The Department of the Environment regulates international trade in wildlife under the EPBC Act, thereby ensuring that Australia complies with its obligations under CITES. While strategic planning for biosecurity is not a primary focus for the Department of the Environment, it works cooperatively with the Department of Agriculture and contributes to the national biosecurity planning process under the National Biosecurity Committee framework.

In delivering biosecurity services, the Department of Agriculture also seeks policy and operational input from a number of other Australian Government agencies, in particular the Department of Health, which co-administers the Quarantine Act, for policies relating to human health; the Australian Customs and Border Protection Service on border operations; the Department of Immigration and Border Protection on the movement of people in and out of Australia; and the Department of Foreign Affairs on trade-related issues.

The Australian Government retains responsibility for all biosecurity and environmental matters relating to Commonwealth land, including land owned or leased by the Commonwealth; the Jervis Bay Territory; external territories and Commonwealth reserves; and the Commonwealth marine environment, which is generally Australian waters beyond the three nautical mile limit of state/territory waters.

The EPBC Act identifies the statutory arrangements for the management of Commonwealth reserves, including control of invasive species. Reserve management plans prepared by the Director of National Parks (in conjunction with boards of management where they are in place) for terrestrial and marine Commonwealth reserves identify feral animal and weed threats to individual reserves and appropriate control actions. Surveillance for new invasive species may be conducted by Parks Australia staff as part of ongoing reserve management practices. An example is myrtle rust surveillance at Booderee National Park.

Three Commonwealth terrestrial reserves are established in Australia's remote external territories—Norfolk Island, the Cocos (Keeling) Islands and Christmas Island. The inherent vulnerability of the biodiversity of oceanic islands to biosecurity threats means effective management of new and existing invasive species is essential. The Department of the Environment, through Parks Australia, assists the agencies responsible for biosecurity management of those territories to minimise introduction of new species and to prevent their establishment. In the case of Christmas Island, the Department of Agriculture and the Department of the Environment are exploring enhanced arrangements, within available resources, for biosecurity management of the island, in line with the 2011 Australian Government response to the recommendations of the Expert Working Group on Christmas Island which reported on measures to address decline in the island's biodiversity.

2.6.2. State and territory governments

Under the Australian Constitution, state and territory governments have responsibility for biosecurity and environmental matters within their respective borders, which is underpinned by legislation to support delivery of these services. In some cases, for example Victoria and Tasmania, these functions are provided by a single agency or they may be through separate agriculture/primary industry and environment agencies. With respect to the environment, the Australian Constitution gives the state and territory governments' specific and clear primary responsibility for the legislative and administrative framework within which natural resources are managed.

State and territory governments also have responsibilities for border management, but in this case state/territory boundaries and the biosecurity requirements for interstate movement of goods. Legislation provides the ability of state or territory governments to undertake specific activities on private land, but only under certain circumstances; and the authority to undertake various biosecurity activities on public lands under their jurisdiction.

2.6.3. Industry and landholders

Primary responsibility for the management of established pests and diseases on private lands rests with the landholder, who is also generally the primary beneficiary of pest control activities. Many pests and diseases can be effectively managed on a property by property basis.

However, for a number of significant established pests such as fruit flies, a coordinated approach is the only one likely to achieve good outcomes. For these pests, the National Fruit Fly Strategy Advisory Committee has been established to implement a national approach to fruit fly management. Coordination of national action may occur through the national sectoral committees, Animal Health Australia or Plant Health Australia, peak industry bodies or via other means (refer Section 3).

Recognising that zero risk is not realistic as it would mean no trade or international travel, the Australian Government contributes, in collaboration with state and territory governments and industry to the preparation for, and response to, exotic pests and diseases should they be detected within Australia (Sections 5.2 and 5.4).

3. AUSTRALIA'S BIOSECURITY SYSTEM

This section provides an overview of Australia's biosecurity system, and arrangements that are in place to collaborate and engage on biosecurity issues. Further detail on aspects of the system relevant to the Committee's terms of reference is provided in Sections 4 and 5. Schematics of the arrangements and activities outlined in the following sections are provided at Attachments B and C, respectively. Activities shown in Attachment C have been mapped against the biosecurity invasion curve (Figure 2) to demonstrate how they support actions to prevent, eradicate, contain and manage pests and diseases.

3.1. Overview of the system

Exotic pests and diseases could potentially enter Australia through a number of pathways—legal trade, illegal, natural, passengers, mail and cargo. Activities across the continuum aim to minimise the threat of pests and diseases entering via these pathways; and then establishing and spreading in Australia.

3.1.1. Offshore activities

The Department of Agriculture has primary responsibility for offshore biosecurity activities. These are focused on minimising the likelihood of exotic pests and diseases reaching our border, while enabling the movement of people and goods across the border. They provide assurance to the community and producers about the biosecurity status of commodities imported into Australia.

Offshore activities include: conducting risk assessments to consider the level of biosecurity risk that may be associated with imports and identifying risk management measures; conducting offshore verifications, inspections and audits; collaborating with international partners on animal and plant health issues and standards; regional capacity building through collaborative activities; and intelligence and surveillance to determine and assess potential biosecurity risks.

Biosecurity risks, including risk assessments are managed in keeping with Australia's legislative framework for biosecurity and international obligations; in particular, obligations under the SPS Agreement.

3.1.2. Border activities

The Department of Agriculture has primary responsibility for border biosecurity activities. With increasing levels of international travel and trade, the detection of threats at the border remains an important element of the biosecurity system.

Biosecurity activities at the border are focused on: screening and inspection of international vessels, passengers, cargo, mail, animals, plants, and plant products arriving in Australia; managing the high biosecurity risks of live plants and animals through containment, observation and/or treatment at quarantine facilities; identifying and evaluating the specific biosecurity risks facing northern Australia through the Northern Australia Quarantine Strategy; and raising awareness of travellers, importers and industry operators of Australia's biosecurity requirements.

Activities at the border are risk-based, informed by evidence and subject to review and continual improvement, as shown through the examples and case studies presented in this submission.

3.1.3. Activities within Australia

Despite all of the precautions in place, some imported goods may still contain a pest or disease of biosecurity concern after they enter Australia. In addition, some pests and diseases may arrive through natural pathways such as the winds and tides or illegal activity.

As a result, the Department of Agriculture contributes to a range of measures within Australia in collaboration with stakeholders aimed at limiting the impact of a pest or disease should it be detected within Australia.

Activities within Australia, delivered in partnership with the state and territory governments, industry and other stakeholders, focus on: developing policies and programmes to deliver biosecurity outcomes in the national interest; coordinating national surveillance and diagnostic capability to assess and monitor Australia's pest and disease status; preparing for, and responding to exotic pest and disease incursions; contributing to national biosecurity research; assisting landholders to manage established pests and diseases; and working with biosecurity partners to build a shared understanding of biosecurity.

3.2. National agreements and arrangements

Well established relationships and national arrangements are in place between the Australian, state and territory governments and, where relevant, industry and other stakeholders to coordinate and implement national action on biosecurity issues.

3.2.1. Intergovernmental agreements

The Intergovernmental Agreement on Biosecurity (IGAB) is a Council of Australian Governments initiative that came into effect in January 2012, signed by all jurisdictions (with the exception of Tasmania[1]). The IGAB establishes a clear vision for building a smarter biosecurity system through improved collaboration between the Australian, state and territory governments. It also sets the foundation for improved partnerships between governments and industry, environment groups and the community to manage biosecurity threats.

The Schedules to the IGAB outline the activities that are essential for effective biosecurity management. Key areas earmarked for improved national coordination and integration under the schedules include government emergency planning and preparedness, surveillance and diagnosis for the early detection of exotic and emerging pests and diseases and to support market access, and the management of established pests and diseases. Other areas identified for attention include communication and engagement, information sharing, research and development, and investment and decision-making. The aim is to allow better targeting of government effort for greater return on the investment of public funds. This will also have flow-on benefits for industry, farmers and the wider community by reducing regulatory burden and the costs of the national system.

[1] Tasmania did not sign the IGAB due to concerns with section 7.19 which allowed the Commonwealth to override state and territory controls on interstate trade where a measure is scientifically unjustified and/or unnecessarily trade restrictive. Tasmania has agreed to abide by the other provisions of the IGAB and participates in all activities relating to the agreement.

3.2.2. Government to government arrangements

The National Biosecurity Committee is responsible for a national strategic approach to emerging and ongoing biosecurity policy issues, including those relating to the environment, across jurisdictions and implementing IGAB. It comprises heads of the Australian, state and territory governments concerned with biosecurity and includes representation from the Department of the Environment.

National animal and plant biosecurity issues, including environmental issues are considered by the National Biosecurity Committee with a view to resolution or for the development of advice to the Agriculture Senior Officials Committee and the Agriculture Ministers Forum as appropriate.

The National Biosecurity Committee is in turn supported by a number of sectoral committees which provide policy, technical and scientific advice on matters affecting their sector, covering all pests and disease risks to the terrestrial and aquatic (inland water and marine) animals and plants, and the environment. In 2011, responsibilities for environmental biosecurity were embedded into the sectoral committees to ensure environmental considerations were integrated into national biosecurity decision-making processes. Environmental biosecurity had previously been dealt with by a separate sectoral committee that was required to cover the full spectrum of biosecurity risks (plant, animal and invertebrate) to the environment, diluting focus and capability at the same time as the other sectoral committees were dealing with equivalent issues from production and human health perspectives. This has enabled biosecurity risks to be dealt with seamlessly within a single system.

The National Biosecurity Committee recently agreed to streamline its sectoral committees and replace the Australian Weeds Committee and Vertebrate Pests Committee with a new committee, the Invasive Pests Committee to bring together related bodies to improve decision-making processes and maximise administrative efficiency. The decision recognises that many of the issues managed by the two previous committees overlap and frequently concern the same stakeholder and industry groups. As such, the new Invasive Pests Committee will continue the valuable work associated with environmental, economic and social impacts of vertebrate pest animals and weeds, in both terrestrial and freshwater settings. The change will take place shortly following agreement on operational arrangements and scope of activity.

The sectoral committees reporting to the National Biosecurity Committee are the:

- Animal Health Committee (including aquatic health), information available at www.daff.gov.au/animal-plant-health/animal/committees/ahc
- Invasive Pests Committee, which will replace the Australian Weeds Committee (information available at www.weeds.org.au/awc.htm) and the Vertebrate Pests Committee (information available at www.feral.org.au/policy/vpc)
- Marine Pest Sectoral Committee, information available at www.daff.gov.au/animal-plant-health/pests-diseases-weeds/marine-pests/mp-sect-committee
- Plant Health Committee (including bees, ants and other invertebrates), information available at www.daff.gov.au/animal-plant-health/plant/committees/phc.

These committees have contributed to, or have developed sectoral specific strategies to guide action and investment of management of exotic and established pests and diseases, for example

the Australian Weeds Strategy, the Australian Pest Animal Strategy and the National Plant Biosecurity Strategy. The new sectoral committee structure will not affect the current review of the Australian Weeds Strategy and Australian Pest Animal Strategy which are nearing completion. Public consultation drafts of the revised strategies are expected to be released in September 2014. Environmental perspective is provided by representation from the Department of the Environment on most committees; and a requirement for each jurisdiction to bring a whole of government position to the table inclusive of environmental biosecurity interests.

3.2.3. Government and industry arrangements

Animal Health Australia and Plant Health Australia's roles are to facilitate a national approach to enhancing Australia's animal and plant health status, through government and industry partnerships for pest and disease preparedness, prevention, emergency response and management. These companies, and the emergency response agreements they administer (refer Section 5.4) ensure that national responses to emergency animal diseases and plant pests are facilitated and that uncertainty over response management and funding arrangements is minimised. Further information on Animal Health Australia and Plant Health Australia is available at: www.animalhealthaustralia.com.au and www.planthealthaustralia.com.au, respectively.

While the main focus of these entities is on primary production, environmental biosecurity considerations are integral to their role. Some stakeholders have proposed a similar and separate entity—Environment Health Australia—to manage preparedness, response and consultation for exotic pests and diseases impacting on the environment. Rather than establishing a new entity and funding stream, however, 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 National Biosecurity Committee, its sectoral committees and other relevant organisations, rather than creating a separate system.

Various mechanisms facilitate engagement and consultation on operational aspects of biosecurity, for example with industry clients through the Department of Agriculture's industry consultative committees. Ad hoc arrangements are also used to consult with a range of stakeholders on specific issues, or to manage specific biosecurity risks. The National Bee Pest Surveillance Programme (Box 1) is an example of how governments, industry and research providers work in partnership to achieve good biosecurity outcomes for risks with the potential to impact on both the environment and agricultural production.

Box 1: Exotic bee pest and pest bee surveillance

While the European honey bee is considered by some to be an environmental pest, it plays a significant role in the pollination of agricultural and amenity plants and in the production of honey and related products. Exotic bee pests and pest bees have the potential to impact directly on the honey bee industry by reducing productivity and on agricultural industries dependent on both managed and feral honey bee populations for plant pollination. Similarly, exotic bees have the potential to impact the environment by competing with native fauna for floral resources, disrupting natural pollination processes and displacing endemic wildlife from tree hollows.

Seagoing vessels are considered to present a significant risk for the transportation to Australia of exotic bees (and associated parasites) either in superstructure, containers or equipment, or in vessel holds. The Asian honey bee (*Apis cerana*), Giant honey bee (*Apis dorsata*) and Africanised honey bee (*Apis mellifera scutellata*) have all been detected and intercepted on ships destined for Australia or in port areas in recent years. The incursion and establishment of the Asian honey bee (*Apis cerana* Java genotype) in the Cairns region from 2007 onwards also confirmed the risk of incursions via ocean-going vessels.

The National Bee Pest Surveillance Programme is an early warning system to detect new incursions of exotic bee pests and pest bees to provide the best possible opportunity to eradicate an incursion, and to limit the size and cost of an eradication response.

The programme involves a range of surveillance methods, such as sentinel hives, floral sweeping and catch boxes, conducted at locations considered to be the most likely entry point for bee pests and pest bees throughout Australia. It complements existing measures required by the Department of Agriculture to minimise the likelihood of exotic bee pests and pest bees reaching Australian ports.

The programme is jointly funded by the Australian Honey Bee Industry Council, Horticulture Australia Ltd, Rural Industries Research and Development Corporation and Australian Government through the Department of Agriculture; and builds on funding provided by the Australian Government since 2000 for bee surveillance. In-kind contributions for the implementation of the programme are provided by the relevant agency in each state and territory. At a national level, Plant Health Australia coordinates and administers the programme.

Further information on the programme and honey bee biosecurity is available at: www.beeaware.org.au.

3.2.4. Arrangements with other organisations and the community

Communication, education and awareness of biosecurity issues are important aspects of the biosecurity system and are an essential tool in promoting an understanding of biosecurity among stakeholders and the community. The Department of Agriculture has a range of activities to increase awareness, including the regular Biosecurity Bulletin and awareness brochures, pamphlets and signage in a range of languages and aimed at a range of audiences.

The National Biosecurity Committee recently agreed to strengthen existing engagement mechanisms and to explore other avenues for engaging with non-production stakeholders. To support this approach, the sectoral committees are preparing a communication and engagement strategy for their sector.

Arrangements are established, as required, to manage specific issues. Wildlife Health Australia is an example of an effective arrangement between government and private organisations to manage biosecurity threats to Australia's wildlife (Box 2).

Box 2: Managing adverse affects of wildlife diseases

Internationally, wildlife is recognised as a major source of new and emerging diseases. Recent examples in Australia include Hendra virus and Australian bat lyssavirus. They may also be a pathway by which new diseases could be introduced: migratory birds are a potential pathway by which diseases like avian influenza can be introduced into new regions.

Recognising the importance of wildlife to Australia's biosecurity, the Department of Agriculture established the Australian Wildlife Health Network in 2002. The role of the network was to enhance reporting of disease detections in wildlife, collate wildlife disease information nationally, coordinate wildlife health related activities and liaise between wildlife and industry stakeholders, states and territories, and the department.

In 2013 longer term funding was secured under the Australian Government's former *Caring for Our Country* programme which has enabled the Australian Wildlife Health Network to transition to an independent incorporated body, Wildlife Health Australia. The responsibilities of the former Australian Wildlife Health Network have been transferred to Wildlife Health Australia.

Wildlife Health Australia creates linkages between stakeholders, facilitating effective communication and more rapid reporting of wildlife disease events to government. This is an important front-line early detection capability for new or introduced diseases. Wildlife Health Australia can engage with private stakeholders that otherwise may be unwilling to share information or have no effective pathway to do so.

Networks are maintained formally through a number of working groups and focus groups that meet periodically by teleconference. A wider and less formal network is maintained via mailing lists and informal communications. State and territory biosecurity agencies retain responsibility for investigating and responding to significant animal disease events (whether involving domestic animals or wildlife) within their jurisdiction.

Wildlife Health Australia enables detection of diseases that may emerge from wildlife to threaten livestock health and production, trade in livestock and animal products or public health. Disease in wildlife could also be associated with serious diseases previously exotic to Australia, and must be investigated. For example, when mass deaths occur in wild waterbirds, samples are tested for highly pathogenic avian influenza and Newcastle disease.

In addition to supporting livestock and public health, Wildlife Health Australia also provides an effective mechanism to detect diseases that may threaten wildlife populations themselves. For example, bats found with consistent clinical signs are tested for white nose syndrome, a disease that has caused the deaths of millions of bats in North America, but which has never been found in Australia.

Further information on Wildlife Health Australia is available at: www.wildlifehealthaustralia.com.au.

In addition, the Australian Government is investing in a number of programmes that contribute to environmental biosecurity outcomes and enable communities to take practical action to improve their local environment. The government has invested $2 billion in the National Landcare Programme, Green Army Programme, Reef 2050 Plan, 20 Million Trees Programme, Working on Country, the Land Sector Package and investments in the Great Barrier Reef Trust. The National Landcare Programme will reinvigorate community engagement by giving community groups a greater role in setting local and regional priorities that address environmental and sustainable agriculture issues. The Australian Government will continue to fund regional natural resource management organisations through the National Landcare Programme and they will be expected to determine regional priorities in consultation with local communities.

3.3. Research, development and extension (RD&E)

Research, development and extension (RD&E) is vital for understanding the impacts of pests and diseases on the environment and production and for driving innovations to manage these impacts. It is also important for ongoing growth and improvement in the productivity, profitability, competitiveness and sustainability of Australia's agriculture, fisheries, forestry and food industries.

RD&E is an important aspect of the reform agenda under the IGAB (Schedule 8) which calls for the development of a multi-disciplinary framework to ensure government's biosecurity RD&E activities are coordinated and aligned with national priorities. This includes the development of processes to better gather intelligence, improve modelling and analysis and translation of these into action, and defining the role governments will perform.

The national biosecurity RD&E framework will consist of three strategies—one each that relates to animal biosecurity and plant biosecurity, and a third strategy that will address matters predominantly relating to the environment and social amenity. This work is being done in parallel with the broader National Primary Industries RD&E framework, under which strategies for the animal and plant sectors have been developed. Work is continuing on the environment and community strategy. Once all three strategies have been finalised, they will be used to develop the national biosecurity RD&E framework.

The Australian Government has helped guide investment in rural research and development through its Rural Research and Development Priorities. Biosecurity is one of the five challenges identified by the priorities and aims to protect Australia's environment, community and primary industries from biosecurity threats through RD&E activities. These priorities focus investment in areas of greatest need and are particularly important in guiding the Rural Research and Development Corporations and Companies, the Australian Government's primary mechanism for rural research and development in Australia, and which also support the sustainability of Australia's natural resource base. Further information on the priorities is available at: www.daff.gov.au/agriculture-food/innovation/priorities.

National priorities for introduced marine pest research and development have also been developed through the Marine Pests Sectoral Committee to provide guidance to research providers, industry and government. Further information is available at: www.marinepests.gov.au/marine_pests/publications/Pages/RnD-priorities.aspx.

The Australian Government invests in research into key environmental issues through the National Environmental Science Programme. Under this programme, the Australian Government has committed funding of $25.5 million a year to deliver applied environmental science research. The programme will build on results achieved through the National Environmental Research Program and Australian Climate Change Science Programme. The programme will include a Threatened Species Recovery Hub which will support the management of threats to, and improve recovery of, threatened species through applied research and practical field trials.

The Australian Government also contributes to the Cooperative Research Centres (CRCs), such as the Invasive Animals CRC and Plant Biosecurity CRC; and the CSIRO Biosecurity Flagship to deliver research outcomes to support Australian's biosecurity system.

3.4. Managing established pests and diseases

Management of established pests and diseases by state and territory governments, industry and landholders is an integral part of primary production and natural resource management systems.

The Department of the Environment works with experts, state and territory governments and other stakeholders to manage invasive species which pose a threat to matters of national environmental significance. The EPBC Act provides a framework for the management of invasive species by providing for the listing of key threatening processes and the development of threat abatement and recovery plans.

Key threatening processes threaten the survival, abundance or evolutionary development of a native species or ecological community. The assessment of a threatening process as a key threatening process is the first step to addressing the impact of a particular threat under Commonwealth law. Some examples of invasive species listed as key threatening processes are rabbits, foxes, cats, pigs, red imported fire ant, *Phytophthora cinnamomi* and chytrid fungus.

Once a threatening process is listed under the EPBC Act a threat abatement plan can be put into place if the Minister for the Environment decides that it is 'a feasible, effective and efficient way' to abate the threatening process. Threat abatement plans are developed by the Department of the Environment in consultation with the Threatened Species Scientific Committee, state and territory governments, experts and other stakeholders and the draft plans are circulated for public comment for a three month period. In making a threat abatement plan, regard is given to the role and interests of Indigenous people in the conservation of Australia's biodiversity. Threat abatement plans outline the research, management and other actions necessary to reduce the impacts of a listed key threatening process on affected listed threatened species and ecological communities.

Recovery plans set out the research and management actions necessary to stop the decline, and support the recovery, of, listed threatened species or threatened ecological communities. The aim of a recovery plan is to maximise the long term survival in the wild of a threatened species or ecological community.

The Department of Agriculture works with state and territory governments and other stakeholders to develop and implement national plans and strategies for effective pest and disease management, including for weeds, vertebrate pest animals and some endemic species. For example, the Australian Plague Locust Commission was established in 1976 to overcome past difficulties in organising the control of an endemic pest which migrates over long distances and poses an interstate threat to agricultural industries.

Another significant disease—Hendra virus—is endemic in Australian bats, causing periodic outbreaks in horses in northern New South Wales and Queensland and resulting in seven human cases and four human deaths. The disease emerged from within Australia in 1994 and has not been found overseas. The Department of Agriculture is represented on the Intergovernmental Hendra Virus Taskforce which involves biosecurity, health, environment and science authorities at jurisdictional and national level, to ensure a consistent and coordinated approach in responding to the disease. The department was also a key contributor to the National Hendra Virus Research Programme established in 2011 which led to the recent development by the Australian Animal Health Laboratory of an effective Hendra vaccine for horses.

The National Framework for Management of Established Pests and Diseases of National Significance being developed under IGAB will provide a strategic, scientific approach and decision tool to minimise the impact of established pests and diseases meeting the criteria of national significance. A national issue of potentially significant biodiversity impact is the established fungal disease of amphibians, chytridiomycosis (caused by the chytrid fungus). This disease is considered widespread in Australia and is recognised worldwide as having a major environmental impact through declining amphibian populations. The Animal Health Committee, which includes the Department of the Environment as a member, is reviewing a Chytridiomycosis Disease Strategy Manual. Discussions are continuing between the Department of Agriculture, Department of the Environment, Wildlife Health Australia and the state and territory governments to establish, if feasible and effective, appropriate arrangements for the future management of this disease, which may also assist in informing management of other similar diseases in the future.

4. RISK-BASED APPROACH TO BIOSECURITY

Historically, elements of the Australian Government's past approach to biosecurity have been underscored by mandatory border intervention targets (known as Increased Quarantine Intervention or IQI), giving little regard to the differing level of risk posed by different passengers or goods or where along the continuum intervention is most effective. With increasing biosecurity risks and growth in trade and movement of passengers, this approach is not sustainable.

In line with recommendations from the 2008 independent review of Australia's quarantine and biosecurity arrangements (Beale *et al.*, 2008), the Australian Government has progressively moved from mandatory IQI targets to a risk-based approach for biosecurity supported by intelligence, analysis and risk profiling leading to operational improvements.

4.1. Risk assessments

Biosecurity risk is inherent in the production, trade, movement of goods and people, the natural migration of animal and bird species and climatic and other natural environmental events bringing exotic pests and diseases to Australia. Risk assessments are used as a tool to assist in considering the level of biosecurity risk that may be associated with the importation of a good or pathway, and to identify ways to manage these risks. Risk assessments may be reviewed at any point and conditions changed, such as when new scientific information becomes available or there are changes in the global distribution of a pest or disease (Box 3).

Box 3: Review of policy for the plant pathogen—sudden oak death

Sudden oak death, or *Phytophthora ramorum* is the most destructive pathogen of oak and a range of other host plants with significant commercial and environmental value, causing direct host mortality. It has a wide host range, including Australian native plants such as *Eucalyptus* and *Pittosporum* species. Heavy losses of susceptible genera could result in significant ecological effects, including changes in forest composition, loss of wildlife, reduced food and habitat availability, increased soil erosion and increased fuel loads in heavily populated urban-forest interfaces. The Department of Agriculture initiated a draft policy review on *P. ramorum* and several new species of *Phytophthora* that share similar symptoms to ensure that appropriate measures are in place to protect the Australian environment from these exotic pathogens.

The risk assessment process is an important part of Australia's biosecurity policies, enabling the Australian Government to formally consider the biosecurity risks associated with products imported into Australia. The assessment considers direct and indirect economic, environmental and social consequences. If the risks exceed Australia's Appropriate Level of Protection (expressed as very low, but not zero), risk management measures are required to reduce the risks to an acceptable level. If it is not possible to reduce the risks to an acceptable level, trade will not be allowed. Australia's risk assessments are undertaken by technical and scientific experts in relevant fields and involve stakeholder consultation.

The draft review found that these species have the potential to cause significant direct and indirect environmental consequences. The unrestricted risk estimate exceeds Australia's appropriate level of protection and therefore risk management measures are required. The review proposes several amendments to the existing policy, including updating the host list to ensure that appropriate measures are in place for all hosts that have the potential to introduce these pathogens into the Australian environment.

In keeping with the existing policy, host propagative material cannot be directly introduced into the environment. The review proposes that host propagative material be grown in closed quarantine with increased screening and testing. Material will not be released into the environment if these pathogens are detected. These amendments improve the efficacy and effectiveness of risk management measures.

Biosecurity risk assessments can be conducted as an import risk analysis through a regulated process provided for in the Quarantine Regulations 2000 or as a non-regulated assessment, such as scientific reviews of exiting policy, weed risk assessments or technical policy advice. The Department of Agriculture conducts risk assessments consistent with the provisions of the SPS Agreement, and based on the guidelines, standards and recommendations developed by relevant international organisations, the IPPC and OIE. Advice from the Department of the Environment and Department of Health is sought, as appropriate, on biosecurity risks that have an environmental or human health impact, respectively.

The Department of Agriculture has responsibility under the Quarantine Act to assess the biosecurity risk (potential to introduce pests and diseases) of imports, while the Department of the Environment under the EPBC Act is responsible for assessment of environmental risk (potential to become invasive) associated with the import of live specimens. The import of live specimens such as live animals and plants, seeds and biological control agents requires the agreement of both departments, and is of particular relevance to environmental biosecurity.

Under the EPBC Act, only animals listed on the List of Specimens taken to be Suitable for Live Import (live import list) can be imported into Australia (with or without conditions). If a specimen is included on the live import list it can be imported as either a whole organism or as reproductive material. Species not listed are prohibited, even if the species has previously been imported (prior to the EPBC Act) or is already known to be in Australia. The live import list is taken to include any live plant, the introduction of which into Australia is in accordance with the Quarantine Act, provided the plant is not included in the list of CITES specimens under the EPBC Act. Each animal species proposed for inclusion on the live import list is the subject of a detailed risk assessment by the Department of the Environment. The focus of this assessment is on the potential impacts on the environment of the organism to be listed, rather than the diseases that may be imported with it.

All new plant species proposed for introduction into Australia as seeds, tissue culture or any other material for propagation are assessed for their potential to become a weed. Plants which are found to have a high risk of becoming a weed, using the Australian Weed Risk Assessment system, are prohibited. Species considered to have a low weed risk are listed in the Quarantine Proclamation 1998, and permitted into Australia with appropriate conditions for pests and diseases. The Department of the Environment endorses the use of the system for the addition of plant species to the live import list under the EPBC Act. This system is consistent with Australia's international obligations and is globally recognised as one of the best systems to determine the potential of plant species to become weeds of the environment and/or agriculture. From 1997 to July 2014, over 5500 plant species have been assessed; with 69 per cent accepted for importation into Australia and 31 per cent prohibited entry due to their potential to become invasive.

Assessments are also made under the Quarantine Act for the safe import and release of biological control agents into the Australian environment, which are used to primarily target environmental plant pests such as weeds and arthropods. Prior to introduction for host specificity testing under quarantine conditions, the agent must have undergone preliminary trials overseas or have proven useful for biological control overseas. Host specificity testing is a process whereby species of plants or arthropods considered to be related to the biological control target are exposed to the biological control agent. If the biological control agent does not successfully reproduce on any species other than the target, then the agent is deemed to be acceptably host specific to be

considered for release into the Australian environment (where it is expected that it will permanently establish).

Upon completion of host specificity testing an application is submitted to the Department of Agriculture to release the biological control agent from quarantine. A risk analysis is completed, primarily based on the results of the host specificity testing (including the methodology and the range of test organisms used) to ensure the biological control agent is safe for release. Draft risk analysis documents are released to Plant Health Committee and the general public for stakeholder consultation. The outcome of the risk analysis is either a recommendation to release or not release the agent. The Department of the Environment also has an assessment and approval process under the EPBC Act for inclusion of the agent on the live import list. Under Section 303EE (4) of the EPBC Act, a final risk analysis report produced by the Department of Agriculture may be used by the responsible Minister in making a determination to include the item on the live import list.

As part of its commitment to Stronger Biosecurity and Quarantine, the Australian Government is examining the import risk analysis process to consider transparency and consultation; the use of external scientific and economic expertise; and the consideration of regional differences in animal and plant health status. Further information on the examination of the import risk analysis process is available at: www.daff.gov.au/ba/ira/iraexamination.

4.2. Risk return resource allocation

An important component of the move from mandatory targets is risk-based intervention intended to direct investment in biosecurity control measures to achieve the greatest risk reduction. To support this approach, the Department of Agriculture has recently completed development of the Risk Return Resource Allocation model to help understand how a change in its biosecurity control strategies affects biosecurity risk—with the aim to support sound investment decisions.

The model produces outputs based on documented data inputs drawn from departmental datasets on trade and operational compliance, scientific research and expert knowledge. Where data is not readily available from conventional sources, it has been elicited from departmental staff with specialised knowledge, using a structured ‘data elicitation process’ developed by the Centre of Excellence for Biosecurity Risk Analysis (CEBRA).

It is anticipated that model outputs will be able to be used to communicate the value of the department’s investment in the management of biosecurity risk, in terms of reduction of risk per dollar spent. The model provides a comprehensive description of the Australian biosecurity system and allows exploration of the effect of alternative biosecurity control scenarios, with their associated costs, on the management of biosecurity risk.

The model works by calculating risks and costs of investment for specified biosecurity control scenarios. Control scenarios can be constructed to represent risk-based intervention strategies such as profiling, targeting, rewards and penalties. It describes a comprehensive, non-overlapping set of organisms of biosecurity concern. In this context, the term organism can refer to an individual species of pest or disease (such as Asian gypsy moth) or a group of species (such as weeds), with approximately 60 organisms currently described in the model.

The model describes approximately 60 entry pathways by which the organisms of biosecurity concern can enter Australia and over 130 pathway specific biosecurity controls. Examples of controls include border inspection, pre-export certification, stakeholder engagement, and surveillance. Switchable settings in the model determine which controls are operating.

Risk is calculated as the combination of consequence and the likelihood of entry, establishment and spread of organisms of biosecurity concern across all pathways. Separate calculations of risk are generated for the environment; primary industries (agriculture, fisheries and forestry); domesticated and companion animals; infrastructure and produced goods; human health; and social impacts.

The calculation of risk for each category, including risk to the environment, utilises an estimate of consequence for each of the organisms. Currently, the estimates of consequences are based on work by ABARES, with primary industry consequences expressed in dollars while the other categories are expressed using non-monetary scales.

As an example of the use of the model, weed seeds could enter Australia via many pathways including as contaminants of imported seed for sowing and machinery, intentionally in mail or passengers, or by natural processes (wind or water). The model enables a comparison of the relative importance of these pathways' contribution to the risk of new weeds establishing and the effectiveness of controls, such as inspection and influencing behaviour, in reducing the risk.

Data inputs and the reliability of model outputs continue to be refined by an analysis of sensitivity and uncertainty. The model does not attempt to compare economic and environmental risks but, within each category, can show the relative contribution of different entry pathways to overall risk and the effectiveness of control measures in reducing that risk.

4.3. Research and intelligence

In addition to contributing to the research activities identified previously, the Department of Agriculture maintains a strong scientific capability, with many officers having tertiary science qualifications, to underpin evidence-based policy development, decision-making and service delivery across all areas of the department. ABARES, a research bureau within the department also provides biophysical, economic and social research, modelling and analysis across the animal, plant and marine spectrum. The department's Science Strategy provides a strategic blueprint for this capability over the next five years to 2018. The strategy is available at: www.daff.gov.au/about/publications/daff-science-strategy-2013.

External scientific advice and research is sought to complement existing technical capacity. CEBRA is a key initiative in the Australian Government's response to biosecurity risks and provides tools, methods, guidelines and protocols to improve biosecurity risk analysis. CEBRA, and its predecessor, the Australian Centre of Excellence for Risk Analysis have provided practical solutions and advice on assessing and managing biosecurity risks since 2006.

Advice from CEBRA on ballast water risks is an example of how it has contributed to the Department of Agriculture's risk management processes. A system implemented by the department automates risk advice to ships planning to discharge ballast water in various ports around Australia by assessing the risk of transferring established invasive pests from an infected port to a clean port based on monitoring data, species temperature tolerance ranges and the conditions in the receiving port at the time of discharge. A recent CEBRA project has improved

this assessment by refining the way in which temperatures are determined for all ports in Australia and improving pest life cycle simulation methods and thresholds for pest establishment. Agreement from the state and Northern Territory governments is being sought to introduce the improved methodologies to current systems.

Further examples of how CEBRA research is used are provided through the submission, and information on CEBRA is available at: www.cebra.unimelb.edu.au.

The identification of biosecurity risks are informed through various types of intelligence. Intelligence is a value-adding product derived from the identification, collection and analysis of relevant information which supports decision-making. Intelligence can be differentiated from data, information and knowledge in that it is analysed information that is produced to inform decision makers. In the biosecurity context, the intelligence process involves the analysis of biosecurity-related data and information to inform biosecurity risk analysis and management and support timely and responsive decision-making. Examples of the use of intelligence include immediate feedback to frontline operations to target specific consignments that may pose a risk, in addition to analysis that supports longer term strategic planning and allocation of resources.

To assist the Department of Agriculture build its intelligence capability, CEBRA has developed a web search tool that provides real-time intelligence on emerging pests, diseases and pathogens. The department also has significant capabilities in foresighting and environmental scanning and maintains links with external networks, for example the Australasian Joint Agencies Scanning Network and the 'Shaping Tomorrow' platform. This foresighting capacity enables the department to better anticipate new and emerging pests and diseases that could threaten Australia's unique and valuable environment and production assets.

Modelling is also an important tool to assist biosecurity decision-making. ABARES has developed Climatch, a web-based application for comparing climate characteristics between regions. This programme 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 ecological/landscape factors.

5. KEY ELEMENTS OF THE BIOSECURITY SYSTEM RELEVANT TO THE TERMS OF REFERENCE

The following section outlines key elements of the biosecurity system relevant to the Committee's term of reference to provide an overview of Australia's state of preparedness for pests and diseases impacting on the environment. Environmental considerations are integral to all these elements and associated biosecurity decision-making processes; and while there is always room for improvement, risks to the environment and production are effectively managed.

5.1. Prioritisation

5.1.1. Prioritisation of risks

The management of a particular biosecurity risk may include a combination of different options at a number of points along the continuum. For example, it is appropriate to inspect passengers at the border at their point of entry to Australia noting that offshore information and analysis contribute to managing biosecurity risks through this pathway. The point along the continuum at which risks are managed will in part be driven by an understanding and prioritisation of risks across the continuum, relevant national and international obligations and historical, operational and feasibility considerations. The Department of Agriculture, state and territory governments and industries maintain a range of pest and disease lists for a variety of purposes, for example notifiable pests or diseases to meet domestic or international reporting obligations or to prioritise action, such as surveillance, diagnostic or intervention effort. The use of target lists by the Northern Australia Quarantine Strategy is an example of how the department prioritises surveillance effort in northern Australia (Box 4).

Under the IPPC and OIE, Australia's obligations include the international notification of exotic pests and diseases. For animal and aquatic animal diseases, the OIE maintains a list of diseases that must be notified to ensure transparency in the global animal disease situation. Notifiable lists which identify animal and aquatic animal diseases of importance to Australia have been endorsed nationally through the Animal Health Committee, and are also used to inform priorities for surveillance and diagnosis. For plant pests, the IPPC has similar reporting requirements. However, due to the large number of pests affecting plant health it is not practical to generate a list against which parties must report. Despite this, all pests detected at the border are considered actionable until an assessment of their quarantine status has been completed.

In the marine environment, biosecurity threats come from the accumulation of marine pests on vessel hulls and submerged surfaces (biofouling) and through water carried in a vessel to maintain its stability (ballast water). The Department of Agriculture has identified high risk marine species and also the pathways through which they could be introduced; and manages the risk of introduction via ballast water through the Quarantine Act. An approach to manage the risk of introduction via biofouling is being developed for consideration by government. CEBRA is investigating high risk pathways for the entry and establishment of marine pests through biofouling on ships, based on compatibility between Australian ports, species' temperature tolerance and distribution, and the last ports visited by international vessels. The research, when complete, will recommend suitable tools to identify high risk shipping routes.

In addition, the Marine Pest Sectoral Committee is currently developing criteria for the Australian Priority Marine Pests List which will include species assessed as having a nationally significant impact if they were to become established in the Australian marine environment. This assessment will consider the outcomes of a review of the Consultative Committee on Introduced Marine Pests'

Trigger List against the national significance criteria set out in the National Environmental Biosecurity Response Agreement, which was commissioned by the department and undertaken by CSIRO.

A National Categorisation System for Invasive Species has been developed by the former Australian Weeds Committee and the Vertebrate Pests Committee to guide priorities for invasive species management. Assignment to categories is an ongoing and dynamic process requiring regular review. Responsibility for assigning taxa to Categories 1 (national surveillance), 2 (national eradication) and 4 (national restrictions on keeping, sale and trade) will lie with the new Invasive Pests Committee, while Category 3 (established invasive species of national significance) will also lie with the same committee, with formal assignment achieved by ministerial endorsement of the nomination. Further information is available at: www.feral.org.au/national-categorisation-system-for-invasive-species.

The Country Action List is an example of how the Department of Agriculture targets a range of high risk pests and other contaminants (such as soil) on imported sea containers and non-containerised (breakbulk) cargo at the border. This initiative is part of a joint programme with New Zealand to manage cargo arriving from ports at risk of introducing pests such as the giant African snail, Asian black-spined toad, exotic bees and ants. All containers and break bulk from countries on the action list require full six sided inspection of external surfaces and the internal surfaces of empty containers, when discharged at Australian ports. Further information on the Country Action List and the Sea Container Hygiene System is available at: www.daff.gov.au/biosecurity/import/cargo/pests/cal.

5.1.2. Prioritisation of import risk assessments

When assessing priorities for risk assessments, the following factors are considered:

- whether a risk assessment is required to manage existing biosecurity risks to an acceptable level
- whether the risk assessment will increase organisational efficiency to enable more focus on higher risk products, or to decrease regulatory burden
- trade implications, including whether there is a nexus between the import request and Australian export market access objectives
- practicality, including staff availability and workload.

When an invasive freshwater algae, didymo (commonly known as rock snot) was discovered in New Zealand in 2004, a risk assessment was prioritised to examine the potential for didymo to establish and spread if introduced into Australia and to identify the main risk pathways and suitable treatment options. As a result, new import conditions, inspection instructions and awareness material were developed and implemented in consultation with stakeholders.

The Department of Agriculture is reviewing the way in which workloads and risk assessments are prioritised, and as noted previously, the Australian Government is examining the import risk analysis process.

5.2. Preparedness and contingency planning

A key component of Australia's biosecurity system is building and maintaining capacity to respond to exotic pest and disease incursions. It is recognised as a priority area of reform under IGAB and fundamental to the work of Animal Health Australia and Plant Health Australia. Parties to the agreements outlined in Section 5.4 have an obligation to maintain an effective level of preparedness and response capability and capacity to adequately respond to incursions, irrespective of whether a pest or disease has environmental impacts. The current national standstill exercise—Exercise Odysseus—is an example of how jurisdictions, industry and other parties can test and improve their capacity to respond to a major incursion, in this case foot and mouth disease.

Contingency planning is a way in which preparedness activities can focus on a particular pest or disease, specific industry or pathway. For animal and aquatic diseases, a series of disease strategies have been developed which are generally equally applicable to a disease in an animal of production or wildlife. In addition, a Wild Animal Response Strategy provides guidance on management strategies and overall control procedures for wild terrestrial animals. For plant pests, contingency plans tend to focus on high priority pests such as Asian gypsy moth and giant African snail; those affecting a limited number of industries such as Haunglongbing; or a number of similar pests affecting a certain industry such as leaf miners affecting the nursery industry. Contingency planning around potential pathways of introduction, such as ballast water or biofouling are used in the marine sector. Any contingency planning would be equally applicable to a pest or disease also impacting the environment. State and territory governments and industries may also develop contingency plans specific to their requirements.

As part of its commitment to Stronger Biosecurity and Quarantine, the Australian Government is enhancing rapid response capability to address urgent biosecurity issues. This 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 state and territory governments, at their request, to contain an incursion in the early stages to reduce adverse impacts, including to the environment. The rapid response component does not replace existing activities undertaken by state and territory governments but complements their efforts in the initial stage of a response, and only when the combat state or territory agrees for the Australian Government to provide assistance. The commitment includes a range of preparedness activities to build national capability and provide long term benefits beyond the completion of this initiative. The allocation of resources between response and preparedness activities is flexible and will vary depending on the number and scale of incursions requiring a response.

The Department of Agriculture also contributes to the Biosecurity Emergency Preparedness Working Group, under the National Biosecurity Committee to enhance Australia's biosecurity emergency preparedness, response and initial recovery arrangements. Further information is available at: www.daff.gov.au/animal-plant-health/pihc/bepwg.

5.3. National surveillance and diagnostic capability

Enhancing the national surveillance and diagnostic system for the early detection and diagnosis of pests and diseases is a priority area of reform under IGAB, with a national framework recently agreed and being implemented. The first step is the review of existing sector-based strategies and business plans or development of new strategies/plans where none exist, to identify priorities for each sector to increase capacity for early detection and response, and actions to ensure objectives are realised. Sectoral committees under the National Biosecurity Committee will undertake this work in consultation with industry and relevant stakeholders, including environment and community sectors.

The Department of Agriculture works closely with state and territory governments and stakeholders to improve national surveillance and diagnostic capability, including through implementation of sector specific strategies, such as the National Plant Biosecurity Surveillance Strategy and National Plant Biosecurity Diagnostic Strategy.

As noted previously, the Department of Agriculture is responsible for monitoring Australia's pest and disease status to meet international obligations, with much of this information collected through programmes undertaken by the state and territory governments. The department also has direct involvement in surveillance for exotic pests and diseases, for example through its National Cargo Surveillance Strategy, the Northern Australia Quarantine Strategy (Box 4), and regional animal and plant health programmes. Regional activities aim to identify potential biosecurity risks to Australia and build capacity in our regional neighbours to manage these risks.

Box 4: Managing biosecurity risks to northern Australia

Since 1989, the Department of Agriculture has delivered the Northern Australia Quarantine Strategy (NAQS) to provide an early warning system for exotic pests, diseases and weeds and to help address the biosecurity challenges facing Australia's northern coastline, stretching from Cairns to Broome and including the Torres Strait. The northern Australia region is vast and sparsely populated, and the primary risk is the close proximity of Indonesia, Timor Leste and especially Papua New Guinea to the mainland. These countries have many plant pests, animal diseases and weeds not present in Australia which have the potential to arrive through human activities or natural dispersal.

NAQS focuses on early detection of such pests which improves the chances of successful eradication before pests become established further south. State and territory biosecurity agencies retain responsibility for investigating and responding to detections within their jurisdiction. NAQS also regulates the biosecurity aspects of the southwards movement of people, vessels, aircraft and goods through the Torres Strait to the mainland, and undertakes public awareness activities and capacity building.

Target lists for plant pests, animal diseases and weeds are used to prioritise surveillance effort. Species included on the target lists have a considerable likelihood of entry, establishment and spread in northern Australia, and a potentially to significantly impact the environment, agriculture or the Australian public. Target species are reviewed annually, which assists in determining operational priorities.

A key to the success of NAQS has been the ongoing cooperation and goodwill of the indigenous people who live in northern Australia, including active involvement of local ranger groups in survey activities, and working in close cooperation with state and territory governments.

NAQS activities are delivered via a network of scientific and operational staff based in Broome, Darwin, Nhulunbuy (Gove), Weipa, Bamaga, Cairns and throughout Torres Strait. NAQS officers maintain close links with the national diagnostic networks and the department's regional animal and plant health programmes to ensure significant pests and diseases detected in our regional neighbours are targeted. Target lists also include priority pests identified through industry biosecurity planning processes, where relevant.

Further information is available at: www.daff.gov.au/biosecurity/quarantine/naqs/naqs-target-lists.

5.3.1. Surveillance

Nationally coordinated surveillance programmes are in place for early detection of exotic pests and diseases, for example the Animal Disease Surveillance Programme; the National Plant Pest Surveillance Programme; the National Bee Pest Surveillance Programme; the Aquatic Animal Health Programme; the Marine Pest National Monitoring Strategy; and a range of wildlife surveillance activities coordinated through Wildlife Health Australia. For vertebrate pests and weeds, state and territory governments maintain surveillance and reporting capacity. These programmes complement, and are informed by the Department of Agriculture's risk assessment, inspection and surveillance activities offshore and at the border and surveys undertaken by the states and territories.

For example, a key element of the National System for the Prevention and Management of Marine Pest Incursions is the establishment of the National Monitoring Strategy, an ongoing national programme of targeted monitoring for marine pests to agreed minimum principles and standards. These principles and standards are set out in the *Australian marine pest monitoring guidelines* and the *Australian marine pest monitoring manual* to ensure the data is collected using rigorous, consistent methods and is of a suitable quality for scientifically-sound decision-making. This monitoring programme provides early detection of exotic marine pests and is used to routinely update assessments of the risk status of vectors to prevent marine pest introductions into and within Australia. Under the strategy, biennial monitoring is to be undertaken at 18 high risk ports around Australia; however there is uneven implementation of the programme across all jurisdictions. Further information on the national system is available at: www.marinepests.gov.au.

Funding arrangements for surveillance programmes vary, and may include contributions from Australian, state and territory governments, industry and/or private organisations, for example bee surveillance (Box 1). In some cases, industries may have in place their own surveillance programmes to monitor for exotic and established pests and diseases affecting their industry, for example the grains and banana industries. Processes for prioritisation of surveillance targets also varies across sectors, but in determining priorities, consideration is given to the likelihood of entry, establishment and spread in Australia, risk pathways and potential impact on the economy, the environment and the community.

Surveillance activities and targets are also informed by research. A current CEBRA project on tools and approaches for pest distribution modelling will develop a spatial model of hot spots for entry and establishment of exotic plant pests to help identify possible entry pathways and priority areas for surveillance.

In relation to the Department of Agriculture's surveillance capability, a project is underway to develop a comprehensive and modern data management system to prioritise, collect, share, analyse and report on surveillance data consistently to support biosecurity decision-making. The project will leverage other initiatives being progressed externally to the department, for example building of a Surveillance Virtual Coordination Centre by Plant Health Australia through a $1 million National Landcare Programme grant. In a related project under IGAB, national minimum data standards for emergency response and surveillance are being developed to enable interconnectivity with external data sources.

5.3.2. Diagnosis

National networks established through the sectoral committees provide coordination of diagnostic capability, development of diagnostic protocols and procedures for priority pests and delivery of diagnostic training. These networks facilitate the sharing and specialisation of expertise, for example the southern states have diagnostic capability for abalone diseases, and are essential for the maintenance of core capability to diagnose priority pests and diseases. The PaDIL (the Pest and Disease Image Library) is widely used as a reference source and image library to assist with the rapid identification of exotic terrestrial and marine pests and diseases.

In the animal and aquatic sector, the CSIRO Australian Animal Health Laboratory with contribution from the Australian, state and territory governments maintains the national capacity for all diseases included on the national notifiable lists, including exotic diseases. In addition, the networks include a number of accredited state or territory government, private and university laboratories.

The Department of Agriculture has operational procedures and protocols for the inspection, indexing and/or molecular screening of imported material for the purposes of detecting high priority environmental pests, such as sudden oak death, Dutch elm disease and Asian gypsy moth. In addition to these procedures and protocols, a national process is in place for the development of National Diagnostic Protocols. These are protocols, endorsed by all jurisdictions, for the taxonomic identification of a priority plant pest. To complement this work, the Department of Agriculture has commenced a project for the development of national protocols to harmonise surveillance effort and standardise the collection of surveillance information.

Integration of risk assessment, surveillance and diagnostic effort to manage the risk of Asian gypsy moth is an example of such an endeavour (Box 5). National Diagnostic Protocols are publically available at: www.plantbiosecuritydiagnostics.net.au.

Box 5: Asian gypsy moth—integrating risk assessment, surveillance and diagnostic capacity

Asian gypsy moth (*Lymantaria dispar asiatica*) and related exotic gypsy moth species are a significant biosecurity threat to Australia due to their extensive host range (over 650 species) and potential for rapid establishment and spread. They have the potential to reduce the aesthetic, recreational, watershed and biodiversity values of parks, rangelands and wilderness areas through severe defoliation by larval feeding.

It is possible that gypsy moth could be introduced to Australia through the high volume of shipping containers arriving in Australia. There have been numerous instances of moths and viable egg masses on vessels, and considerable effort at the border has successfully excluded this pest from Australia.

Understanding the biology of a pest and its potential pathway of entry to Australia is vital to preventing its introduction. Gypsy moth will most likely enter Australia in the egg form as these species spend a significant proportion (75 per cent) of their life cycle in this stage, and because of the tolerance of the eggs to extreme environments. Recent studies conducted by the Department of Agriculture have shown that about 90 per cent of egg masses arriving on vessels can hatch under Australian conditions. The most likely period when viable eggs could enter Australia is between the flight season (July-September) and hatching time (April-May). Once hatched, gypsy moth poses a greater threat of establishment and spread since larvae can travel at least 5-10 km via wind (ballooning) and adult females can fly up to 40 km.

The department conducted risk assessments for various ports throughout Asia and Eastern Russia ranking the likelihood of exports from these ports of origin containing gypsy moth. Risk ports were identified by their proximity to known habitat, volume of trade and number of passengers originating from those ports. Enhanced inspections of maritime cargo vessels is undertaken during the flight season based on number of risk factors such as the overseas port risk, the pre-arrival reporting and destination port in Australia. Masters

of all vessels arriving from targeted risk ports are required to submit an additional pre-arrival information specific to gypsy moths to either mitigate the risk offshore or alternatively implement timely surveillance and treatment arrangement within Australia. Awareness programmes are also conducted throughout the flight season.

Areas south of the Tropic of Capricorn have been identified as a suitable habitat for gypsy moth, with New South Wales, the Australian Capital Territory, Victoria, Tasmania and south Western Australia identified as the regions of greatest risk. Because of this risk, the department has implemented a national port of entry surveillance programme since 1996 to ensure early detection of exotic gypsy moth species. State and territory governments also include gypsy moth as a priority pest for surveillance. To enhance diagnostic capability for these species, a National Diagnostic Protocol is also currently being developed.

5.4. Response to incursions

A national capacity and capability to respond to exotic pest and disease incursions is in place across all sectors. These arrangements align with contemporary emergency response practices and are underpinned by the Biosecurity Incident Management System. This system complements sector specific and jurisdictional response arrangements, for example the Australian Government's Crisis Management Framework and Agricultural Incident Plan. Further information on BIMS is available at: www.daff.gov.au/animal-plant-health/pihc/bepwg.

Communication during an incursion is facilitated by the Biosecurity National Communication Network, which will include representatives from relevant industries and stakeholder groups depending on the nature of the incursion, in addition to its core membership.

A summary of recent incursions and current responses is provided in Section 6.

5.4.1. Agreements and arrangements

The Australian Government is signatory to three formal agreements which set out 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. On the ground response activities are the responsibility of, and managed by state and territory governments in consultation with industry, while the Australian Government's role is to provide national coordination. These agreements, outlined below, provide the framework for rapid response and robust decision-making.

- **National Environmental Biosecurity Response Agreement** (NEBRA) is an agreement between the Australian, state and territory governments setting out emergency response arrangements, including cost-sharing arrangements, for responding to pests and diseases that primarily impact the environment and/or social amenity and where the response is for the public good. Work is in progress to develop supporting guidance material for this agreement. Available at: www.coag.gov.au/node/74.
- **Emergency Animal Disease Response Agreement** (EADRA) is an agreement between the Australian, state and territory governments, livestock industry signatories (currently 14) and Animal Health Australia covering the management and funding of responses to emergency animal diseases. The EADRA is guided by a nationally agreed technical plan, the AUSVETPLAN (Australian Veterinary Emergency Plan). Available at: www.animalhealthaustralia.com.au/programmes/emergency-animal-disease-preparedness/ead-response-agreement.

- **Emergency Plant Pest Response Deed** (EPPRD) is an agreement between the Australian, state and territory governments, plant industry body signatories (currently 29) and Plant Health Australia covering the management and funding of responses to emergency plant pests. The EPPRD is guided by a nationally agreed technical plan, PLANTPLAN (Australian Emergency Plant Pest Response Plan). Available at: www.planthealthaustralia.com.au/biosecurity/emergency-plant-pest-response-deed.

The NEBRA was developed to address the gaps which existed in relation to responses to pests and diseases with primarily environmental and social amenity impacts, for example weeds and marine pests. The recent incursion of red imported fire ant in Yarwun, Queensland is the first eradication response to be managed under the agreement. Through the National Biosecurity Committee, the Australian, state and territory governments have recently completed self assessments of their capacity to implement NEBRA. This benchmarking has shown that all jurisdictions have sufficient capacity to meet their obligations; however there are some potential gaps and room for improvement which will be validated through a peer review process.

Marine pest incursions are generally managed in accordance with the NEBRA. The Department of Agriculture is currently finalising a series of five rapid response manuals which will provide technical information to guide response activities in the event of a marine pest incursion. These manuals will replace the existing EMPPlan (Australian Emergency Marine Pest Plan).

While there is currently no formal industry-government agreement covering responses to aquatic animal disease incursions, the Aquatic Consultative Committee on Emergency Animal Disease coordinates the national technical response. The response is guided by the AQUAVETPLAN (Australian Aquatic Veterinary Emergency Plan), a series of manuals that outline technical response and control strategies that may be used. The disease strategy manuals cover many diseases of environmental significance including: crayfish plague, viral haemorrhagic septicaemia (of fish), and white spot disease (of crustaceans). Emergency aquatic animal disease responses may be implemented under the NEBRA where they primarily impact the environment and/or social amenity.

Emergency plant pests and animal diseases which have the potential to have both production and significant environmental, human health or amenity flora impacts, such as sudden oak death and rabies will continue to be considered under the EPPRD and EADRA, respectively. It is important to note that eradication may be pursued outside of these arrangements. For example the response to the 2013 incursion of browsing ant at Perth Airport was funded by the Department of Agriculture and managed by the Department of Agriculture and Food, Western Australia.

5.4.2. Governance of a response

While these arrangements facilitate rapid decision-making, a key consideration in undertaking any response to an exotic pest or disease is the technical and economic feasibility of eradication. For example, an animal disease in poultry within a confined production facility will be technically easier to eradicate than if the disease was also present in free living wildlife where it may be difficult to effectively apply any form of disease control. The 2010 response to myrtle rust demonstrates the difficulties that can be faced when trying to contain and respond to a pathogen that has a high reproductive capacity and is wind dispersed in an open environment with numerous hosts.

These considerations are the responsibility of the governance groups established under the above arrangements. The relevant Consultative Committees, such as the Tramp Ant Consultative Committee and the Consultative Committee on Exotic Plant Incursions are responsible for the technical coordination of a response to an incursion; while the National Management Groups are the key decision-making bodies.

Membership of a Consultative Committee under the EADRA and EPPRD includes representatives from the Australian, state and territory governments, affected industries and Animal Health Australia or Plant Health Australia, respectively. National Management Groups comprise representatives from these same parties, with those affected by the pest or disease sharing the costs of any eradication response. A Consultative Committee convened under NEBRA will include a representative from CSIRO with relevant expertise; and all agreements provide for advisors with relevant expertise to participate in decision-making processes as observers. Affected industries and other parties may be invited to participate in decision-making processes under NEBRA, where applicable.

All agreements set out the roles and responsibilities of those involved in a response, for example the requirement on all parties to report an exotic pest or disease with potential impacts within 24 hours. They also undergo continual improvement and regular formal review.

5.4.3. Potential gaps

It should be noted existing response arrangements (NEBRA, EPPRD and EADRA) do not address biosecurity risks to all sectors. There is currently no agreed mechanism for a national response for weeds primarily impacting on agricultural production (such as red witch weed), aquatic diseases primarily impacting on aquaculture industries and pests and diseases impacting on pastures of production. To address these gaps, the Department of Agriculture has funded the placement of a project officer in Animal Health Australia to progress development of a government-industry cost-sharing arrangement for aquatic animal diseases; and preliminary discussions are under way through Plant Health Australia and its members on the inclusion of weeds in the EPPRD.

The response arrangements also do not include a clear path for decision-making and cost-sharing arrangements once a pest or disease is found to be not eradicable, but it remains in the national interest to act, as was the case for myrtle rust and Asian honey bees. For these pests, transition programmes were piloted to undertake activities to allow industry and/or the community to adapt to living with the particular pest.

A draft National Transition Programme Policy Framework, incorporating learnings from the pilot programmes, has been developed by an IGAB working group for consultation with signatories to the animal and plant response deeds. Signatories of the plant response deed have agreed in principle to including a transition phase in the EPPRD, and consultations are continuing with signatories to EADRA.

5.5. Compliance and enforcement

The successful management of biosecurity risks relies on key stakeholders and the general public, supported by a strong regime to ensure compliance with the Quarantine Act and broader biosecurity requirements. The Department of Agriculture's regulatory approach is to encourage stakeholders to voluntarily comply with biosecurity requirements and to deal with non-compliance appropriately (Figure 3). The department has introduced changes to the way it investigates non-compliance in order to maximise the effectiveness of detecting deliberate criminal breaches. Investigations are prioritised and initiated through enhanced data analysis and intelligence sharing with national programmes to focus on the highest areas of compliance risks, identified by implementing a risk-based approach. This approach is reflected in the Biosecurity Compliance Strategy, which is available at: www.daff.gov.au/biosecurity/about/biosecurity-compliance-strategy.

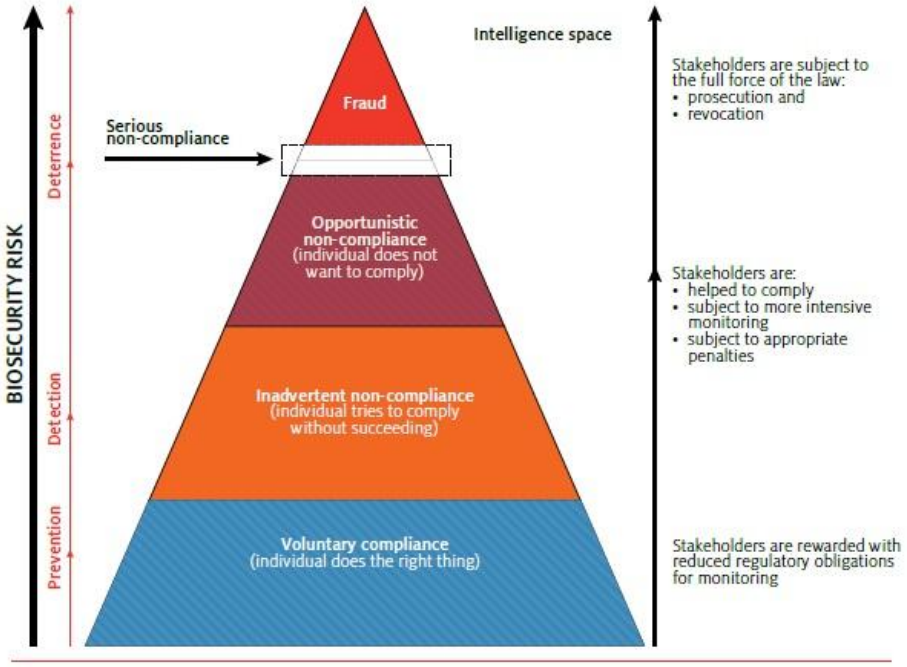

Figure 3: Biosecurity compliance responsive regulatory model (adapted from Braithwaite)

Recognising ecommerce as a growing industry, the Department of Agriculture liaised with eBay Australia to establish a 'pop up' that alerts buyers purchasing biosecurity risk material of the need to ensure applicable biosecurity regulations are met before purchasing the item. More recently, the department initiated discussions with eBay Australia in relation to a plant and seed selling policy to enable breaches of the policy to be reported to eBay for action. Plant and seed selling policies are found on a range of eBay sites (such as United States, United Kingdom and Canada); however until now there has not been one on eBay Australia. The department continues to view the importer as having responsibility under the Quarantine Act; however the eBay policy now binds the exporter and importer together as part of the transaction. The policy is available at: pages.ebay.com.au/help/policies/plantsandseeds.html.

Over the past three financial years, more than 6500 seizure and caution notices were issued at Australia's international border checkpoints for the import of suspected CITES specimens without appropriate permission. The Department of the Environment, in conjunction with Customs and

Border Protection Service and the Department of Agriculture, enforces Part 13A of the EPBC Act, which regulates the International movement of wildlife specimens and allows for the department to implement its obligations under CITES and the Convention on Biological Diversity .

The recent conviction of a passenger for the illegal importation of eggs from an endangered parakeet demonstrates collaboration across a number of agencies to manage biosecurity risks and threats to global diversity. In this case, compliance action was led by the Australian Customs and Border Protection Service, in collaboration with the Department of Agriculture, the Department of the Environment and the Department of Immigration and Border Protection, and the Australian Museum.

Since 1 January 2009, the Department of Agriculture has pursued 24 successful convictions for illegal importation, including relating to plant cuttings, live eggs, aquarium fish, live insects (such as fire ants) and live animals (such as tortoises, chinchillas and arowana) which have potential environmental impacts. A number of active investigations are currently underway, some involving multiple agencies in Australia and overseas.

5.6. Review and continual improvement

Regular review of any system is needed to ensure that processes are effective, efficient and delivering the desired outcome. In biosecurity, reviews are undertaken to assess the effectiveness of measures and controls to prevent the entry of pests and disease into Australia and in the event of an incursion, to assess all aspects of the response to inform future improvements. External review and recommendations for improvement are also provided by the Australian National Audit Office and other parties, as required.

Following the incursion of myrtle rust in 2010, the Department of Agriculture sought advice from experts who agreed there was a high risk to the environment and industry if further strains of this fungus entered and established in Australia. As a result, the department maintained restrictions and conditions for entry of products derived from myrtaceous species from countries where the fungus is present. All myrtaceous hosts are required to be held and grown in post entry quarantine for at least two years before release to provide sufficient time for detection of any infected material. In 2013, prohibition of myrtaceous timber from countries with the pathogen was removed following an evaluation of this pathway and through consultation with stakeholders. Tracing of the 2010 incursion did not reveal the pathway through which this pathogen entered. While the department is able to regulate the above pathways, there may also be pathways of spread for some exotic pathogens which are not possible or difficult to regulate. For example, it is not practical to regulate spread by contamination on certain pathways such as clothing, and the spread of pathogens can occur through natural means such as movement of infective propagules through air currents. A further example of internal review processes in relation to red imported fire ant is provided in Box 6.

Box 6: Continual improvement—red imported fire ant

An incursion in Australia of red imported fire ant in Brisbane in 2001 triggered a national cost-shared eradication programme led by then Queensland Department of Primary Industries. The red imported fire ant has the capacity to form 'super colonies' with multiple queens that can provide the ability to spread rapidly and develop extensive colonies. Fire ants are opportunistic feeders that are omnivorous and prey on invertebrates, vertebrates, and plants, and destroy seeds, harvest honeydew from specialised invertebrates and also scavenge. This can affect the whole ecosystem through reducing plant populations and competing with native herbivores and insects for food. They are also known to have significant human health and social amenity impacts.

The national cost-shared eradication programme is still under way at a cost of $411 (in real 2012 dollars) million to date, which continues to suppress the ant population and achieve localised eradication. However, there is an ongoing risk of new incursions as shown by the recent detection of red imported fire ant at Yarwun, Queensland.

The Department of Agriculture has taken a number of steps to minimise the risk of further incursions, particularly via import of new mining equipment. For example, departmental officers have been working closely with a company that contracts major infrastructure projects, like new mine sites and gas plants, to develop biosecurity Management Plans to manage risks associated with imports for gas processing projects. Restrictive movement orders have been put in place for the control of 'high risk' material like soil and gravel to and from sites and plants. Awareness training is also run for 300 employees to encourage reporting.

In addition to this, import pathways are reviewed to ensure border controls are as effective as possible. Following the recent detection at Yarwun and as a first step, break bulk and containerised consignments arriving from Florida and Texas have been reviewed. A detailed report on break bulk locations, type of equipment, importers and biosecurity risk factors more generally is also being developed. The department is also continuing to examine the possibility of adjusting border controls for the import pathway to prevent further occurrences of red imported fire ant.

To address environmental impacts from this incursion, the red imported fire ant has been listed as a key threatening process under the EPBC Act and the Department of the Environment has developed a threat abatement plan to reduce the impact of tramp ants, including red imported fire ant, on biodiversity in Australia and its territories. The Plan is available at: www.environment.gov.au/biodiversity/invasive-species/insects-and-other-invertebrates/tramp-ants/red-imported-fire.

Review of an eradication response is a routine process to drive improvements. For example, following the detection of black striped mussels in Darwin Harbour in 1999, a national workshop was held to evaluate the response and how it was handled. This led to the establishment of the national system which is being implemented to protect the Australian marine environment and industries.

As part of its commitment to a Competitive and Sustainable Fisheries Sector, the Australian Government provided $5 million for a review and strategic analysis into marine invasive species. A four year project examining Australia's marine pest biosecurity commenced on 1 July 2014. In the first year, the Department of Agriculture will undertake a review of the existing national marine pest biosecurity arrangements to identify priorities areas for improvement. In the subsequent three years of the project, the department will address the review recommendations for improvement.

6. INTERCEPTIONS AND INCURSIONS

As noted previously, the Australian Government has progressively moved from mandatory IQI targets to a risk-based approach for biosecurity commencing from January 2009. As such, a comparison of data collected under the IQI targets and current policies is not relevant. The data provided in the following section covers the period 1 January 2009 to the present, with the exception of incursion data for vertebrate pests which is from 1 January 2010. The data is exclusive of Australia's external territories.

6.1. Interception of exotic pests and diseases at the border

Interception data provided in the following tables summarises the number of identifications of exotic pests and diseases per year by mode of arrival (Table 1), by detection point (Table 2) and by Kingdom (Table 3), irrespective of whether they are known or have the potential to impact the environment. Identifications are made by the Department of Agriculture's Operational Science Support drawing on external expertise as necessary, following interception of a pest, disease or biosecurity risk material during inspection or compliance activities.

It is important to note that the Department of Agricultures' databases and reporting requirements traditionally were not built with the intention of building a picture of what pests and diseases arrive on a certain pathway. Recording of interceptions was primarily driven by a need to record the evidence on the basis of which goods were treated, exported or destroyed. With a move to risk-based intervention, there is need to understand the biosecurity risks of certain pathways and the pests and diseases on those pathways. As such, retrospective interrogation of the databases does not necessarily give a complete and representative view of pests and diseases entering Australia on all pathways.

In some situations, interceptions are not identified or are not recorded, for example, biosecurity risk material may be seized from a passenger but no further investigations may be undertaken to see if any pests or diseases are present. There are also inherent difficulties in detecting and identifying some pests and diseases, for example viruses and viroids, which may be dependent on recognition of symptoms and may not result in identification of a pest or disease. On average, for every report of non-compliance, two identifications are made, for example a consignment of imported produce may contain two thrips species or a number of specimens are collected, for example bees from a swarm.

All data in the following tables relate to exotic pests or diseases intercepted during inspection of an imported good, vessel, passenger or mail offshore or at the border (quarantine intervention point); or in imported goods that are not under biosecurity control but the pest or disease remains within the imported good. This would include a vertebrate pest, for example, that hitchhiked in a container and was found in an importer's warehouse, such as a quarantine approved premises. It also includes post quarantine detections, such as a wood borer that has been reported by a member of the public but is found to be contained within the imported furniture; as well as interceptions as part of compliance activities or leakage surveys.

Seizure rather than interception data are recorded by NAQS when undertaking border related activities in Torres Strait. The majority of items seized relate to fresh fruit, vegetables, wooden articles, meat and meat products, and other items prohibited from moving south through the defined quarantine zones in Torres Strait. In the period July 2013 to February 2014, 552 items of biosecurity concern were seized.

Where a pest or disease has moved beyond the 'border', it would initiate the response arrangements set out in Section 5.4 and would be considered an incursion.

Table 1: Number of identifications of exotic pests and disease by mode of arrival

Arrival mode	2009	2010	2011	2012	2013	2014 YTD
Air	8,859	10,475	11,215	10,198	11,321	7,094
Mail	533	775	636	558	750	459
Sea	7,455	7,317	6,313	5,272	6,196	3,513
Unknown	69	165	132	102	126	85
TOTAL	**16,916**	**18,732**	**18,296**	**16,130**	**18,393**	**11,151**

Note, unknown includes imports of live animals and plants where the arrival mode is not specified.

Table 2: Number of identifications of exotic pests and disease by detection point

Detection point	2009	2010	2011	2012	2013	2014 YTD
Compliance activity	60	337	292	146	288	105
Offshore inspection	19	210	111	106	89	24
Post entry quarantine	24	32	32	24	35	14
Post quarantine detection	1,321	1,615	2,078	1,397	1,636	891
Quarantine intervention point	15,481	16,529	15,777	14,454	16,340	10,115
Vessel hull inspection	11	9	6	3	5	2
TOTAL	**16,916**	**18,732**	**18,296**	**16,130**	**18,393**	**11,151**

Table 3: Number of identifications of exotic pests and disease by Kingdom

Kingdom	2009	2010	2011	2012	2013	2014 YTD
Algae	5	7	6	3	39	9
Animals	13,959	15,307	14,600	12,976	14,211	8,813
Bacteria	279	354	814	605	587	307
Fungi	2,057	2,592	2,189	1,518	1,906	938
Plants	532	410	578	857	1,504	1,039
Viruses	82	64	107	171	144	45
Unspecified	2	7	2	0	2	0
TOTAL	**16,916**	**18,732**	**18,296**	**16,130**	**18,393**	**11,151**

Detailed data of high priority pests that have been intercepted and are known or have potential to have environmental impacts are provided in Table 4.

Goods which are imported without a valid import permit, or which cannot meet Australian import permit conditions, must be re-exported or destroyed (or euthanised) at the importer's expense. For passengers carrying goods of biosecurity concern, an option of treating the goods (at their cost) may be given.

Table 4: Number of interceptions of exotic pests and disease with potential environmental impact

Class	Family	Species	Common name	2009	2010	2011	2012	2013	2014 YTD
ANIMALS									
Amphibia	Bufonidae	*Amiotophrynus gutturalis*	African common toad				1	3	
		Bufo melanosticus	Asian black-spined toad	13	6	6	13	2	3
		Bufo rangeri	African raucous toad		1				
	Microhylidae	*Kaloula pulchra*	Chubby frog	6	1	1	2		2
Arachnida	Ixodidae	unidentified	Hard ticks	1	3	5	1	1	1
		Amblyomma americanum	Lone star tick	1				1	1
		Boophilus	Cattle ticks					1	1
		Dermacentor albipictus	Winter tick	1					
		Dermacentor andersoni	Rocky Mountain wood tick	1					
		Dermacentor occidentalis	Pacific Coast tick		2	2			
		Dermacentor variabilis	American dog tick			1		1	
		Haemaphysalis sp.	Tick			1			
		Haemaphysalis longicornis	New Zealand cattle tick			1			
		Ixodes sp.	Tick	1	1	1			
		Ixodes hexagonus	Hedgehog tick		1		2		
		Ixodes ricinus	Castor bean tick	5	4	7	2	4	
		Ixodes scapularis	Deer tick	2				1	
		Rhipicephalus	tick	1	2	1	1	1	
		Rhipicephalus sanguineus	Brown dog tick	28	71	31	40	33	28
	Theridiidae	*Lactrodectus*	Widow spider	12	11	19	23	11	6
		Lactrodectus atritus	Black katipo			1			
		Lactrodectus geometricus	Brown widow	28	21	20	16	27	17
		Lactrodectus hesperus	Western black widow spider	3			2	3	1
		Lactrodectus mactans	Southern black widow spider	2	15	5	8	26	2
	Varroidae	*Varroa*	Varroa mite						1
		Varroa destructor	Varroa mite					1	
		Varroa jacobsoni	Varroa mite			1	2		
Bivalvia	Mytilidae	*Perna canaliculus*	Green-lipped mussel				1		2
		Perna viridis	Asian green mussel	10	6	6	2	5	2
Crustacae	Portunidae	*Charybdis japonica*	Asian paddle crab	1					
Gastropoda	Achatinidae	*Achatina*		6	1		1		1
		Achatina achatina	Giant African snail				1		
		Achatina fulica	Giant East African snail	30	43	34	28	40	32
	Helicidae	*Eobania vermiculata*	Chocolate-banded snail	9	13	13	7	21	1

Class	Family	Species	Common name	2009	2010	2011	2012	2013	2014 YTD
Insecta	Apidae	*Apis*	Honey bee		8		4	6	2
		Apis cerana	Asiatic honey bee	8	8	14	28	14	16
		Apis dorsata	Giant honey bee	4	6	10	8	4	6
		Apis florea	Dwarf honey bee			12	10		
		Apis mellifera	European honey bee[2]	82	62	46	102	78	54
	Cerambycidae	*Anoplophora*	Longhorn beetle				4		2
		Anoplophora glabripennis	Asian longhorn beetle					4	4
		Arhopalus	Longhorn beetle	2	1		2	1	1
		Arhopalus ferus	Burnt pine beetle	9	30	12	17	32	34
		Arhopalus oberthuri			1				
		Arhopalus rusticus		7			1	3	1
	Coccinellidae	*Harmonia*	Ladybeetles	1	1	2			
		Harmonia axyridis	Multicoloured Asian ladybird	4	4	2	9	11	7
		Harmonia conformis	Large spotted ladybird	2		2	1	3	
		Harmonia octomaculata	Eight-spotted ladybird				1		
	Culicidae	*Aedes*		1	2	2	4	1	1
		Aedes aegypti	Yellow fever mosquito	3	6	1	2		9
		Aedes albopictus	Asian tiger mosquito	2	3	4	3	6	1
	Formicidae	*Anoplolepis*	Common pugnacious ant	1		1		1	
		Anoplolepis gracilipes	Yellow crazy ant	10	8	5	7	8	7
		Solenopsis	Fire ant	9	7	4	2	5	1
		Solenopsis aurea	Fire ant				1		
		Solenopsis 42etected group	Fire ant	8	16	4	11	3	3
		Solenopsis invicta	Red imported fire ant	4		3			
		Wasmannia auropunctata	Electric ant	3	2	1	1	2	
	Lymantriidae	*Lymantria*	Gypsy moth	1	1		6	1	2
		Lymantria dispar	Asian gypsy moth	4		9	14	18	5
	Saturniidae	*Hylesia*	Hylesia moth			1			
		Hylesia nigricans	Hylesia moth			3			
	Pentatomidae	*Erthesina*	Stink bug			1			
		Erthesina fullo	Yellow-spotted stink bug	9	13	12	7	21	1
		Halyomorpha	Stink bug	1	2	3	1	1	
		Halyomorpha halys	Brown marmorated stink bug	2	4	11	6	25	14
	Rhinotermitidae	*Coptotermes*	Subterranean termites	14	36	18	12	8	6
		Coptotermes formosanus	Formosan subterranean termite	2	20	4	6	2	

[2] Interceptions of European honey bee may include swarms from Australia that are found in port areas.

Class	Family	Species	Common name	2009	2010	2011	2012	2013	2014 YTD
		Coptotermes gestroi	Asian subterranean termite		16	6	8	18	4
		Cryptotermes	Drywood termite	12	2	24	20	16	24
		Cryptotermes brevis	West Indian drywood termite	42	8	12	14	18	4
		Cryptotermes cynocephalus	Indo-Malaysian drywood termite	2			2		
		Cryptotermes dudleyi	Drywood termite	2	10	4	10	2	2
		Cryptotermes secundus	Basal termite					2	
	Vespidae	*Polistes*	Paper wasp	6	9	5	2	2	6
		Polistes aurifer	Golden paper wasp				1		
		Polistes carolina	Red paper wasp		1				
		Polistes chinensis	Chinese paper wasp	2	2	3	1	2	1
		Polistes dominula	European paper wasp			3	3	3	
		Polistes dominicus	Carribean paper wasp	5	4	2		1	2
		Polistes fuscatus	Northern paper wasp	2	2				
		Polistes japonicus	Japanese paper wasp		1				
		Polistes nimphus					1	1	
		Polistes olivaceus	Common paper wasp				2	2	
		Polistes tenebricosus				1			
		Vespa	Hornet		1			1	
		Vespa affinis	Lesser banded hornet	1	2				
		Vespa tropica	Greater banded hornet		1			1	
Reptilia	Gekkonidae	unidentified	Geckoes	41	26	16	10	9	2
		Cosymbotus platyrus	Frill-tailed gecko	2	3	5	5	3	4
		Gehyra	Web-toed gecko		7	3	1	3	3
		Gehyra mutilata	Pacific gecko	1	6	3	2	4	
		Gehyra oceanica	Big tree gecko		1				
		Gekko gecko	Tokay gecko	2		1			1
		Gekko monarchus	Spotted house gecko		1		2	1	
		Gekko vittatus	Lined gecko				1		
		Hemidactylus	House gecko	14	6	15	14	4	3
		Hemidactylus bowringii	Oriental leaf-toed gecko						1
		Hemidactylus flaviviridis	Yellow-bellied gecko						1
		Hemidactylus frenatus	Common house gecko	25	36	35	21	31	35
		Hemidactylus platyurus	Flat-tailed house gecko						2
		Hemidactylus turcicus	Mediterranean house gecko		1				
		Lepidodactylus	Scaly-toed gecko	5	1				
		Phyllodactylus	Leaf-toed gecko				1		

Class	Family	Species	Common name	2009	2010	2011	2012	2013	2014 YTD
BACTERIA									
Alpha Proteobacteria	Rhizobiaceae	*Agrobacterium tumefasciens*			1				
Gamma Proteobacteria	Xanthomonadaceae	*Xanthomonas campestris*			1	1		3	1
		Xanthomonas axonopodis/citri pv. citri	Citrus canker	1	1	5	9	23	5
		Xanthomonas fragariae	Strawberry leaf spot		14	8			
FUNGI									
Agarimycetes	Ganodrmataceae	*Ganoderma*	Shelf mushroom					3	
	Hericiaceae	*Hericium erinaceus*	Lion's mane mushroom						1
Oomycetes	Pythiaceae	*Phytophthora*	Dieback			5		2	5
		Phytophthora citriophora			1				
		Phytophthora colocasiae	Taro leaf blight			1			
		Phytophthora palmivora	Palm bud-rot	1					
PLANTS									
Angiospermae	Asteraceae	*Chromolaena odorata*	Siam weed	3	1	0	1	4	5
		Chrysanthemoides monilifera	Boneseed, bitou bush					2	
		Mikania	Mikania vine	2				2	4
		Mikania cordata	Heartleaf hemp vine					1	
		Mikinia micrantha	Bitter vine					1	3
		Parthenium hysterophorus	Parthenium weed	1					1
		Senecio	Fire weed	5			1	7	6
		Senecio madagascariensis	Madagascar Fire weed				1		
	Ericaceae	*Calluna vulgaris*	Common heather			1			
	Fabaceae	*Acacia*	Wattle	4	3	1	1	2	2
		Mimosa	Sensitive plant	1					
		Mimosa pudica	Common sensitive plant					2	
		Prosopis	Mesquite				1	2	1
	Lauraceae	*Cassytha*	Devil's twine					1	
	Malvaceae	*Melochia corchorifolia*	Chocolate weed		1				1
	Poaceae	*Cortaderia*	Pampas grass	5		7	5	56	28
		Cortaderia selloana	Pampas grass				8	10	
	Pontederiaceae	*Eichhornia crassipes*	Water hyacinth	1					
	Salicaceae	*Salix*	Willow						4
	Solanaceae	*Lycium*	Box thorn					1	1
		Lycium ferrocissimum	African box thorn					1	

6.2. Incursions of exotic pests and diseases

Incursion data provided in Table 5 details exotic pests and diseases detected within Australia with the potential to impact the environment, and actions taken to eradicate or mitigate their impact. It is important to note that detection of a pest or disease is dependent on surveillance activities and other factors, and may not necessarily reflect a recent incursion.

Data provided excludes pests and diseases that have developed within Australian and not as a result of an incursion, for example Tasmanian devil facial tumour, Hendra virus and Australian bat lyssavirus; introduced species which have been reported as extensions of host or geographical range; native species which have moved to a new area where they are considered a pest such as the rainbow lorikeet in Western Australia; and live animals that are not permitted for import under the EPBC Act but are known to be present in the Australian environment and are managed under relevant state/territory legislation (such as the red eared slider turtle). It also excludes animal diseases reported in farmed animals that are sub-clinical in reservoir wildlife species such as avian influenza in wild birds. In addition to the plant pests listed in Table 5, a further five pests are currently being considered by the Consultative Committee on Emergency Plant Pests (CCEPP) and are subject to confidentiality provisions under the EPPRD.

For plant pests, on average there are two new pests reported to the Department of Agriculture by the state or territory governments each week, many relating to extensions of geographical or host range or new variants detected through improved diagnostic techniques. Exotic plant pests and other invertebrates are considered in accordance with the EPPRD or NEBRA, and following initial investigations, are often found to be widespread or found to be a previously undescribed native or introduced species. It is estimated that only 30 per cent of Australia's and 20 per cent of the world's insects have been described; and only 5 per cent of the world's viruses (Chapman, 2009). Given the large number of species associated with plants, there is also often a lack of available scientific information available to inform a decision on potential impact to the environment or production.

Information on vertebrate pest detections is not available to the Department of Agriculture on a consistent basis prior to 1 January 2010. The former Vertebrate Pests Committee maintains a list of non-indigenous vertebrate animals (excluding fish) known to be present in Australia. The list is currently being systematically reviewed and revised to include fish and to make it compliant with the relevant provisions of the IGAB. The list is available at: www.feral.org.au/wp-content/uploads/2010/03/VPCListJuly2007.pdf.

In addition, a number of national cost-shared responses are continuing for pests impacting on the environment that were detected prior to 1 January 2009, including:

- Electric ants – *Wasmannia auropunctata*, in Queensland
- Four tropical weeds – *Clidemia hirta, Limnocharis flava, Miconia calvescens, Mikania micrantha,* and two additional species *M. nervosa* and *M. racemosa*, in Queensland
- Red imported fire ant – *Solenopsis invicta*, in Queensland.

Further information on national pest and disease incursions is available at: www.outbreak.gov.au.

Table 5: Incursions of exotic pests and diseases since 1 January 2009[3]

Date of detection	Species	Location	Potential environmental impact	Likely pathway	Response	Date of eradication	Outcome
Aquatic animal diseases							
November 2010	Pacific oyster (*Crassostrea gigas*) mortality syndrome caused by ostreid herpes virus 1 microvariant	Botany Bay, NSW	Unknown; two native oyster species do not appear to be susceptible	Unknown	National containment program	Under containment	Found to be not technically feasible to eradicate. National survey conducted to confirm disease status of major oyster growing areas. Disease subsequently detected in Port Jackson (2011) and Hawkesbury River (2013). Response objective is containment to affected estuaries in NSW, combined with a national program of activities to enhance emergency preparedness, diagnostic capability and research to improve understanding of the disease and enable management. Note Pacific oyster is an exotic species.
Marine pests							
March 2012	*Didemnum pelucidum* Ascidian	Multiple locations, WA	Unknown	Unknown; likely to be vessel biofouling	No national response	Not eradicated	Found to be not technically feasible to eradicate. Positively identified in multiple locations along the WA coastline including Hillarys boat harbour, Cockburn Sound, Garden Island, Dampier port and Barrow Island. Containment of this species is difficult and eradication is not feasible due to the volume of vessel movements from these locations. It is considered that this marine pest is already widespread through WA waters.
October 2012	*Charybdis japonica* Asian paddle crab	Mosman Bay, WA	Competes with native species and poses a potential threat to native communities and may introduce and spread the viral disease white-spot syndrome	Unknown	National response not required	Not applicable	Single specimen only, adult male Asian paddle crab found at Mosman Bay in the Swan River, Perth, WA and euthanised. The Department of Fisheries, WA has ongoing monitoring for this species and no further specimens have been detected.
Bees, ants and other invertebrates							
May 2013	*Lepisiota frauenfeldi* browsing ant	Perth Airport, WA	Scavenger and insect eating species, little know about its biology however likely to have economic, social and environmental impacts	Unknown; possibly via air cargo	Response by the Australian Government	In progress	Under eradication as at August 2014. The Australian Government as combat jurisdiction has implemented an eradication program without cost-sharing owing to small cost of response <$100,000, with technical expertise provided by the TACC.
December 2013	*Solenopsis invicta* red imported fire ant	Yarwun, QLD	Significant economic, social and environmental impacts	Likely to be via sea cargo	National response under NEBRA	In progress	Under eradication as at August 2014.

[3] Data on vertebrate pests is from 1 January 2010

Date of detection	Species	Location	Potential environmental impact	Likely pathway	Response	Date of eradication	Outcome
Plant pests							
February 2009	*Lema bilineata* Tobacco slug beetle	Wagga Wagga, NSW	Unknown; unlikely as preferred host is tobacco with little damage to other solanaceous plants	Unknown	Considered under the EPPRD	Not eradicated	Known exotic but no significant regional or national economic or environmental impact.
April 2009	*Bemisia tabaci* Silverleaf whitefly (Q biotype)	Bowen, QLD	Unknown: potential to have an impact on native solanaceous flora	Unknown	Considered under the EPPRD	Not eradicated	New biotype of pest that has been present in Australia since 1994. Found to be not technically feasible to eradicate.
February 2010	Impatiens Necrotic Spot Virus	Wyee, NSW	Unknown; potential to impact on native plants as known to infect more than 648 species including orchids	Unknown	Considered under the EPPRD	Under management	Subject to a containment and eradication programme by NSW, in collaboration with affected industry.
April 2010	*Puccinia psidii* (syn. *Uredo rangeleii*) myrtle rust	Kulnura, NSW	Significant environmental impacts, known to affect Myrtaceae family including Australian natives such as bottle brush (*Callistemon* spp.), tea tree (*Melaleuca* spp.) and eucalypts (*Eucalyptus* spp.)	Unknown	National response under EPPRD and transition to management programme	Not eradicated	Found to be not technically feasible to eradicate. Australian Government invested $1.5 million from July 2011 to June 2013 to progress a transition from eradication of myrtle rust to management of the disease as it becomes naturalised and establishes itself in various ecological niches across Australia.
September 2010	*Cryphonectria parasitica* Chestnut blight	Eurobin, VIC	Unknown; potential for *Eucalyptus* spp. to be affected	Unknown	National response under EPPRD	In progress	Under eradication as at August 2014.
May 2011	Fig mosaic virus	North Adelaide and Urrbrae, SA	Unknown; may have an impact on native plants	Unknown	Considered under the EPPRD	Not eradicated	Found to be not technically feasible to eradicate as widespread in Australia
June 2011	*Planococcus lilacinus* coffee mealybug	Torres Strait, QLD	Unknown; hosts are predominately production plants; may have an impact on native plants	Natural or human movement from PNG	Considered under the EPPRD	Not eradicated	Found to be not technically feasible to eradicate.
June 2011	*Pseudococcus jackbeardsleyi* Jack Beardsley's mealybug	Torres Strait, QLD	Unknown; hosts are predominately production plants; may have an impact on native plants	Natural or human movement from PNG	Considered under the EPPRD	Not eradicated	Found to be not technically feasible to eradicate.
August 2011	*Cecidophyopsis hendersoni*	Moonah, TAS	Unknown; may have an impact on native plants	Unknown	Considered under the EPPRD	Not eradicated	Found to be not technically feasible to eradicate as widespread in Australia
September 2011	*Cantareus aperta* green garden snail	Cobram, VIC	Unknown; potential to have impact on native plants as polyphagous	Unknown	Considered under the EPPRD	Under management	Also present in Perth, WA. Found to not meet the definition of an emergency plant pest under the EPPRD. VIC is undertaking a management programme to limit its distribution.

Date of detection	Species	Location	Potential environmental impact	Likely pathway	Response	Date of eradication	Outcome
May 2012	*Acraea terpsicore* tawny coaster	Adelaide River, NT	Recorded as causing damage to *Hybanthus* sp. and may compete for this food source with a native *Acraea* sp.	Unknown	Considered under a NEBRA-like arrangement	Not eradicated	Found to be not technically feasible to eradicate as likely to be widespread.
May 2012	*Cannococcus ikshu* Mealybug	Kununurra, WA	Unknown; may have an impact on native plants	Unknown	Considered under the EPPRD	Not eradicated	Found to be not technically feasible to eradicate.
September 2012	*Pythium camurandrum*	Devon Meadows and Clyde, VIC	Unknown; may have an impact on native plants	Unknown	Considered under the EPPRD	Not eradicated	Found to be not technically feasible to eradicate.
September 2012	*Pythium rostratifingens*	Devon Meadows and Clyde, VIC	Unknown; may have an impact on native plants	Unknown	Considered under the EPPRD	Not eradicated	Found to be not technically feasible to eradicate.
November 2012	*Echinothrips americanus* poinsettia thrips	Daintree, QLD	Unknown; may have an impact on native plants	Unknown	Considered under the EPPRD	Not eradicated	Found to be not technically feasible to eradicate.
July 2013	*Phyllosticta cavendishii* Banana Freckle	Howard Springs, NT	Unknown; may impact native *Musa* sp.	Unknown	National response under EPPRD	In progress	Under eradication as at August 2014.
May 2013	*Quadrastichus erythrinae* Erythrina gall wasp	Torres Strait, QLD	Unknown; but expected to also affected native *Erythina* sp.	Natural or human movement from PNG	Considered under the EPPRD and NEBRA	Under containment	Contained within Torres Strait. Found to be not technically feasible to eradicate. Movement restrictions of the inter-island movement of host material implemented.
July 2013	*Microthyriales* Sooty mould	Mareeba, QLD	Unknown; may have an impact on native plants	Unknown	Considered under the EPPRD	Not eradicated	Found to be not technically feasible to eradicate.
November 2013	*Phytophthora alticola*	Ravensthorpe, Tincurrin, Gingin, Perth, WA	Unknown; may have an impact on native plants	Unknown	Considered under the EPPRD	Not eradicated	Found to be not technically feasible to eradicate.
April 2014	*Brevipalpus oncidii*	Hobart, TAS	Unknown; may have an impact on native plants	Unknown	Considered under the EPPRD	Not eradicated	Found to be not technically feasible to eradicate.
Weeds							
August 2013	*Striga asiatica* red witchweed	Mackay, QLD	Parasitic plant on sugarcane, sorghum, maize, rice, and to a lesser extent wheat, barley and millet; and potentially native and introduced pasture grasses	Unknown; herbarium records date back to the 1870s	Response does not fall under any national arrangement	In progress	Queensland developing a cost-sharing arrangement with jurisdictions and affected industries with a view of achieving eradication.

Date of detection	Species	Location	Potential environmental impact	Likely pathway	Response	Date of eradication	Outcome
Vertebrate pests							
May 2010	Unconfirmed *Sturnia malabarica* chestnut-tailed starling	Hornsby, NSW	Unknown; it inhabits open woodland and agricultural land in India and south east Asia. It is omnivorous, eating fruit, nectar and insects	Unknown	National response not required	Not applicable	Single unconfirmed sighting only, reported as observed in the wild at the Hornsby Shopping centre (NSW). The identification could not be corroborated, and the sighting is regarded as unconfirmed by the Birds Australia Rarities Committee.
June 2010	*Kaloula pulchra* Asian banded bullfrog	The Entrance, NSW	Voracious eater, it feeds on small invertebrates, particularly crickets, moths, grasshoppers, earthworms, ants and termites and has the potential to colonise most habitats	Unknown	National response not required	Not applicable	Single specimen only, adult male reported by a member of public collected, identified and euthanised. Site monitored by Wyong council staff and bushcare volunteers and no further specimens have been detected.
June 2011	*Lissotriton vulgaris* smooth newt	Melbourne, VIC	Highly adaptable, likely to compete with native species and poses a threat to predators from skin toxin	Unknown; possible illegal release from a private collection	No national response	Not eradicated	Detection was reported and considered in accordance with NEBRA, and was found not to meet the criteria for triggering a national response. Considered a high risk invasive species and is being managed by the Department of Environment and Primary Industry, Victoria.
March 2014	*Mauremus sinensis* Chinese striped neck turtle	Toowoomba, QLD	Likely to prey on native species and compete for habitat	Unknown; possible illegal release from a private collection	National response not required at this stage	Not applicable	Single specimen only, adult male collected during a routine survey, identified and euthanised; found with other native turtles exotic to the area. Listed as a Class 1 pest species in Queensland and internationally listed as endangered. Follow up sampling failed to locate any further specimens and monitoring will continue in conjunction with routine activities.
April 2014	*Duttaphrynus melanostictus* Asian black-spined toad	Sunbury, VIC	Poisonous, likely to compete with native species and could establish in cooler parts of Australia	Unknown; likely to have hitchhiked	National response not required at this stage	Not applicable	Single specimen only, adult female reported by a member of public collected, identified and euthanised. The immediate area was searched for other specimens, and water/food bait and audio attractants, but no further specimens found. Further surveillance has been suspended with the onset of winter, but will be resumed when the weather warms up.

Key
EPPRD – Emergency Plant Pest Response Deed
NEBRA – National Environment Biosecurity Response Agreement
Aquatic CCEAD – Aquatic Consultative Committee on Emergency Animal Diseases
CCEPP – Consultative Committee on emergency Plant Pests
TACC – Tramp Ant Consultative Committee

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ATTACHMENT A – ACRONYMS AND GLOSSARY

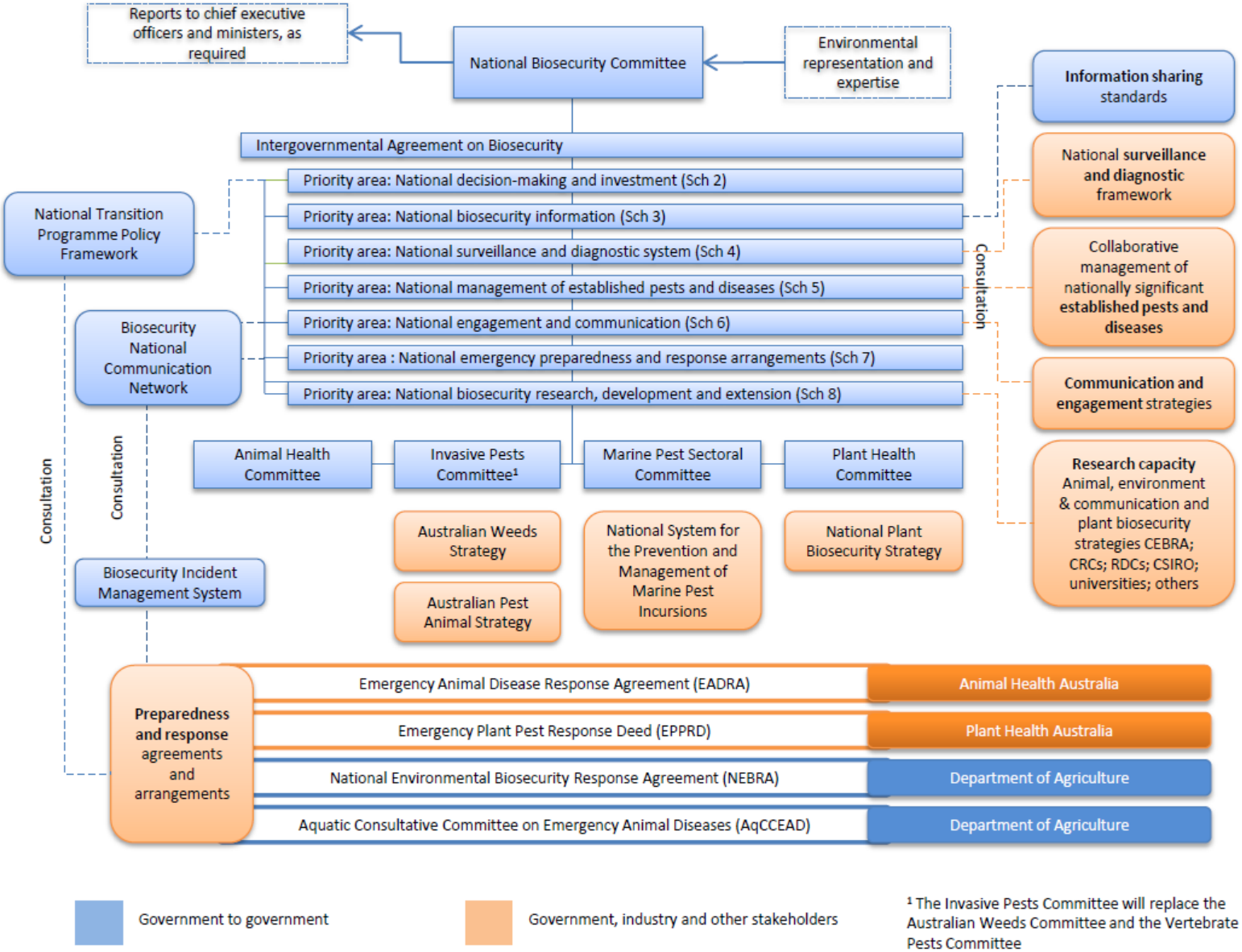
ACRONYMS

Acronym	Meaning
ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
ALOP	Appropriate Level of Protection, also known as the acceptable level of risk
AqCCEAD	Aquatic Consultative Committee on Emergency Animal Diseases
CCEPP	Consultative Committee on Emergency Plant Pests, convened under EPPRD
CEBRA	Centre of Excellence for Biosecurity Risk Analysis
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CRC	Cooperative Research Centres
CSIRO	Commonwealth Scientific and Industrial Research Organisation
EADRA	Emergency Animal Disease Response Agreement
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EPPRD	Emergency Plant Pest Response Deed
IGAB	Intergovernmental Agreement on Biosecurity
IPPC	Food and Agriculture Organization of the United Nations International Plant Protection Convention
NEBRA	National Environmental Biosecurity Response Agreement
NMG	National Management Group, convened under EADRA, EPPRD or NEBRA
OIE	World Organisation for Animal Health, also known as the Office International des Epizooties
RD&E	Research, development and extension
RDCs	Research and Development Corporations and Companies
SPS Agreement	World Trade Organization Agreement on the Application of Sanitary and Phytosanitary Measures
TACC	Tramp Ant Consultative Committee

GLOSSARY

Term	Meaning
Biosecurity	the management of the risks to the economy, the environment, and the community, of pests and diseases entering, emerging, establishing or spreading (source: IGAB)
Biosecurity risks	the potential of a disease or pest entering, emerging, establishing or spreading in Australia; and the disease or pest causing harm to the environment, or economic or community activities (source: IGAB).
Biosecurity continuum	describes the range of locations where biosecurity risks may arise and where biosecurity activities take place – offshore (pre-border), at the border and onshore (within Australia) (source: adapted from IGAB).
Disease	means the presence of a pathogenic agent in a host and/or the clinical manifestation of infection that has had an impact (i.e. significant negative consequences) or poses a likely threat of an impact. It includes micro-organisms, disease agents, infectious agents and parasites (source: IGAB).
Community	includes human health and social amenity (source: IGAB)
Emergency response	the actions taken in anticipation of, during and immediately after, an outbreak to ensure that its impacts are minimised and may include: (a) actions constituting an initial response to an outbreak; and (b) actions that form part of a national biosecurity incident response (source: IGAB).
Environment	includes: (a) ecosystems and their constituent parts, including people and communities; (b) natural and physical resources; (c) the qualities and characteristics of locations, places and areas; and (d) freshwater, estuarine and marine environments (source: IGAB).
Established pest and disease	a pest or disease that is perpetuated, for the foreseeable future, within any area and where it is not feasible (whether in terms of technical feasibility or a cost:benefit analysis) to eradicate the pest or disease (source: IGAB).
Exotic pest and disease	pests and diseases affecting plants or animals (and possibly including humans) that do not normally occur in a particular country (source: IGAB).
Interception	the detection of a pest or disease during inspection of an imported good, vessel, passengers or mail at the border or in imported goods that are not under biosecurity control but the pest or disease remains within the imported good (source: adapted from the International Standard on Phytosanitary Measures (ISPM) 5 – Glossary of terms).
Incursion	an isolated population of a pest or disease recently detected in an area, not known to be established, but expected to survive for the immediate future (source: adapted from the ISPM 5 – Glossary of terms).
Pest	any species, strain or biotype of the Kingdoms Animalia (excluding human beings), Plantae, Fungi, Monera or Protista that has had an impact (i.e. significant negative consequences), or poses a likely threat of having an impact (source: IGAB).
Social amenity	means any tangible or intangible resources developed or provided by humans or nature such as dwellings and parks, or views and outlooks (source: NEBRA)

ATTACHMENT B – ARRANGEMENTS SUPPORTING AUSTRALIA'S BIOSECURITY SYSTEM



ATTACHMENT C – ACTIVITIES SUPPORTING AUSTRALIA'S BIOSECURITY SYSTEM