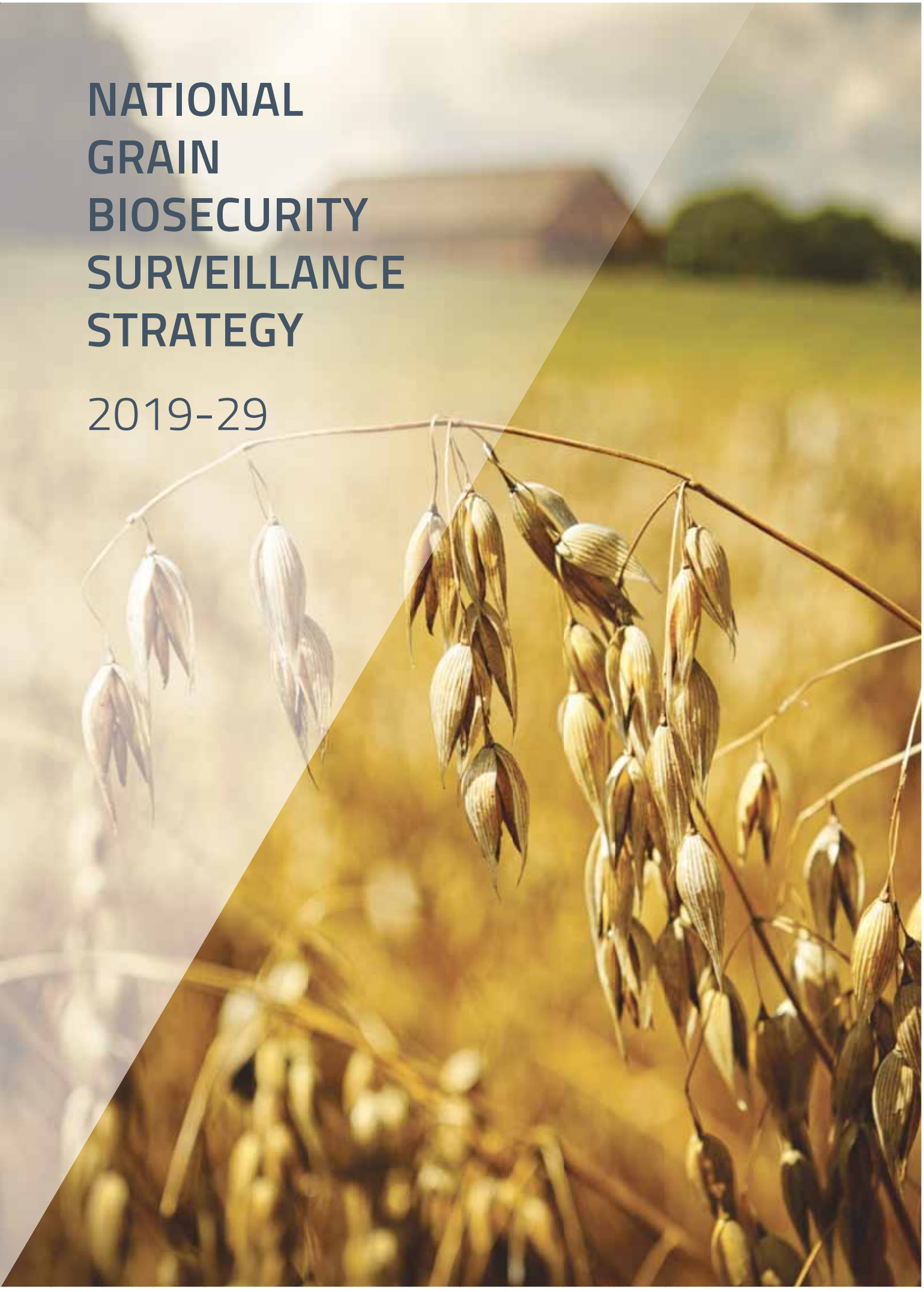
NATIONAL GRAIN BIOSECURITY SURVEILLANCE STRATEGY

2019-29



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Executive summary

Australia has a comprehensive biosecurity system that undertakes risk reducing activities through a continuum of pre-border, border and post-border. Surveillance is an essential component of this continuum as it maximises the likelihood of early detection of new and emerging pests and provides data on pest distribution and pest absence to support trade. Despite this effort, protecting the grain industry from exotic pests remains an increasing challenge.

The risks posed by exotic pests and diseases continue to change due to growing international passenger, mail and trade volumes, population expansion, increasing dispersal of pests globally and regional development. At the same time our trading partners are also requiring evidence from formal surveillance programs to support our claims of area freedom from a range of quarantine pests and to ensure that their quarantine requirements are met. Now more than ever, surveillance needs to be undertaken with enough confidence to identify incursions early enough to successfully eradicate them and to defend our pest status claims.

As stated in the National Plant Biosecurity Surveillance Strategy, shared responsibility and strong industry partnerships are central to the national surveillance system, not only in early detection, but also in incursion management. This is in contrast to the current situation in the grain industry where surveillance activities are made up almost entirely of industry programs such as the Grains Farm Biosecurity Program, the Grains Research and Development Corporation (GRDC) funded National Variety Trials (NVT), internal testing within the bulk handling system and the significant amount of crop monitoring and surveillance undertaken by growers, their advisers and commercial agribusiness.

There is no disputing the efforts and achievements of the Australian government in regard to biosecurity. The recent biosecurity investments made under the Agricultural Competitiveness White Paper's fifth key priority area 'Accessing premium markets' will improve our ability to stop unwanted pests and diseases from arriving in Australia, detecting and rapidly eradicating them if they do arrive, or if they become established, minimising their impact by using long-term management strategies.

Our biosecurity system works in a dynamic environment where challenges are rapidly growing and rapidly evolving. A National Grain Biosecurity Surveillance Strategy (NGBSS) has been developed, recognising that the operating environment affecting early detection and market access surveillance in the grain industry today is different to that of the past and is unlikely to be the same in the future.

The strategy has been developed in conjunction with industry to ensure it is effective and robust, yet flexible enough to adapt to emerging technologies and industry structures outside that of government, and is underpinned by core biosecurity capacity.

The strategy will guide the implementation of national leadership, management and coordination of surveillance activities for high priority grain pests and pests of market access concern for the grain industry. The strategy outlines specific actions and tasks that will improve pre-border and border pest risk and pathway assessment by better understanding pest risk profiles and pathways and targeting surveillance efforts. For post-border surveillance, it describes an enhanced partnership approach between Grain Producers Australia (GPA), Plant Health Australia (PHA), GRDC, Grain Growers Limited (GGL), bulk handlers, traders and Australian governments through a national surveillance program. This program is supported by enhanced diagnostic networks, practical training and reporting services to enable surveillance efforts to be captured, monitored and improved.

The strategy is comprised of four goals and ten actions which will form the basis of an implementation plan. These actions are interconnected, with the overall delivery of the strategy aiming to create a world class, innovative, science-based surveillance system that maximises the early detection of exotic grain pests and improves our international competitiveness through freedom from their impacts.

Goal 1 – Ensure that surveillance activities are more responsive to the ever-changing grain biosecurity situation	
Action 1.1	Establish mechanisms for the management, coordination and integration of grain biosecurity surveillance
Action 1.2	Establish an integrated information framework to better understand industry value and biosecurity risks
Action 1.3	Identify and prioritise the high priority pests of the Australian grain industry
Goal 2 – Increase confidence in the early detection of high priority grain pests	
Action 2.1	Establish effective reporting arrangements for pest interception data and pathway status to assist industry in determining the highest pest risk and pathways
Action 2.2	Establish a nationally coordinated grain biosecurity surveillance system for early detection of high priority grain pests
Goal 3 – Strengthen engagement and partnerships across the grain production and supply chains for the early detection of high priority grain pests	
Action 3.1	Develop strategies to protect and enhance market access to continue to grow the industry's international competitiveness
Action 3.2	Establish mechanisms throughout the supply chain for the provision of precompetitive monitoring and surveillance information on stored grain to maintain ongoing access to proof of area freedom
Action 3.3	Strengthen general surveillance within the grain industry for exotic and established pests of concern
Goal 4 – Develop the capacity and support required for early detection of high priority grain pests	
Action 4.1	Enhance diagnostic services across all grain growing regions for reliable, timely and accurate diagnosis and reporting of plant pest and diseases
Action 4.2	Improve surveillance capacity and capability across the grain industry that includes providing necessary surveillance tools and training

Plant biosecurity in Australia

The biosecurity system

Australia has a comprehensive plant biosecurity system comprised of three layers of protection: pre-border activities, those at the border and post-border measures within Australia as shown below in Figure 1.

While some activities are difficult to neatly -categorise into these layers, some generalisations can be made.

- Pre-border activities are those that deal with overseas countries aiming to prevent pests from reaching Australia.
- Border activities aim to intercept and restrict pests entering via international passengers, luggage, mail and imported sea and air cargo.
- Post-border initiatives aim to minimise biosecurity risks within Australia, including surveillance for early detection of any exotic pest incursions, regional and interstate movement restrictions, farm biosecurity, and eradication efforts in response to the detection of exotic plant pests within Australia.

Strengthening plant biosecurity system

Through investment under various initiatives, the governments together with industry support are building the capability and capacity of the Australian plant biosecurity system to protect Australia's plant industries, environment and social amenity from the continual challenges from new and emerging biosecurity risks. Surveillance is an essential component of the plant biosecurity system by maximising the likelihood of early detection of new and emerging plant pests.

One focus of biosecurity management is to establish a stronger surveillance system to prevent the arrival and establishment of exotic plant pests and improve the timeliness and accuracy of surveillance data collection to assess pest status and support trade and market access.

A $200 million package of biosecurity measures provided under the Agricultural Competitiveness White Paper initiative aims to improve biosecurity surveillance and analysis to better target critical biosecurity risks to protect agricultural industries, the environment and the community from the impact of exotic plant pests.

Figure 1. Key components of Australia's plant biosecurity system

PRE-BORDER

Department of Agriculture

- Analysing pest risks associated with proposed imports
- Inspecting, verifying and auditing overseas exporters
- Undertaking pest surveillance overseas
- Developing international standards
- Building capacity overseas
- Anticipating pest threats by gathering global pest intelligence
- Negotiating export market access
- Maintaining the Manual of Importing Country Requirements (MICoR) and Export Documentation System (EXDOC) to facilitate exports

AT THE BORDER

Department of Agriculture

- Inspecting and monitoring arrivals of people, cargo, mail and plant products
- Raising awareness of plant pests and movement restrictions
- Imposing biosecurity measures and enforcing border restrictions at ports
- Encouraging the reporting of suspected new pests by port workers and importers
- Protecting Australia's north from exotic pests with the Northern Australia Quarantine Strategy (NAQS)
- Isolating newly arrived plant material in post-entry quarantine
- Surveillance for National Priority Pests in first ports of entry and their surroundings including importing facilities such as Approved Arrangements

POST-BORDER

Department of Agriculture, state and territory governments, plant industries, Plant Health Australia, growers and community

- Preventing spread of regionalised pests
- Providing early warning of incursions of exotic pests with surveillance
- Prioritising exotic pests to target with preparedness and prevention activities
- Eradicating exotic pests
- Encouraging the reporting of anything unusual
- Managing established pests
- Maintaining the ability to diagnose plant pests
- Maintaining emergency response capacity
- Responding to environmental threats with the National Environmental Biosecurity Response Agreement
- Protecting farms with on-farm biosecurity measures
- Managing pest fruit flies on a national basis
- Managing weeds

Activities under this initiative include:

- Pre-border surveys to provide early warning of risks to Australia, enabling adjustments to risk management measures and national preparedness activities.
- Post-border surveillance including establishing industry surveillance programs to facilitate the early detection of high priority exotic plant pests to better support containment or eradication, and to confirm pest freedom to our trading partners.
- Updating import conditions to ensure that our risk management measures are fit for purpose and stay up-to-date.
- Improving import risk assessment processes and policies to ensure safe trade, improve relations with trading partners and facilitate export market access negotiations.
- Improving analytics capability to give insights into emerging biosecurity risks and determine appropriate biosecurity measures.
- Improving processes for identifying and managing changes in biosecurity risk to ensure that high impact changes are assessed, and mitigation actions are in place.
- Enhancing export market access assistance through the development of standardised treatment packages, domestic and offshore capability building, and the use of surveillance data to demonstrate area freedom during market access negotiations.

While these efforts are working to continually improve the overall biosecurity system, they have largely focused on the government approach to strengthen the system as a whole. There is an increasing amount of surveillance being undertaken by industry, agribusiness and the science and research community that sits outside of governments.

A partnership approach to improve biosecurity

The enormous challenge of protecting Australia from plant pests can only be achieved by stakeholders operating in a coordinated and seamless fashion along the biosecurity continuum, referred to as the plant biosecurity partnership. Major stakeholders such as GRDC, bulk handling and export companies, CSIRO and universities are not formally engaged in undertaking surveillance, its management, coordination or ongoing improvement.

A broader stakeholder partnership approach to surveillance is needed to engage these important grain industry stakeholders to ensure the system remains continuous and effective across the industry.

Previous reviews of Australia's biosecurity arrangements by Nairn[1] and Beale[2] have emphasised the complex nature of biosecurity, the consequent challenges in building a sustainable support structure, and the need for all stakeholders – national, state, industry and others – to work together to achieve better biosecurity outcomes.

The Australian Government and state and territory governments work under the principles set out in the Intergovernmental Agreement on Biosecurity (IGAB) which aims to strengthen partnerships and improve outcomes for biosecurity including national surveillance and diagnostic capacities. The National Plant Biosecurity Strategy (NPBS), National Plant Biosecurity Surveillance Strategy (NPBSS)[3] and National Plant Biosecurity Diagnostic Strategy (NPBDS) have been developed and outline a vision for improvements to the plant biosecurity system and thereby further strengthening of national biosecurity arrangements. The National Grain Biosecurity Surveillance Strategy (NGBSS) will complement these activities with the development and integration of a partnership approach for surveillance for grain pests of market access and production concern. The strategy will form part of wider integration of industry specific strategies into the overarching national plant biosecurity system.

In the event of an exotic pest incursion, government and industry cost-sharing arrangements and responsibilities are outlined in the Emergency Plant Pest Response Deed (EPPRD) and PLANTPLAN. Should the exotic pest pose a significant threat to environmental and amenity values (i.e. not primarily industry), federal and state or territory government arrangements are outlined in the National Environmental Biosecurity Response Agreement (NEBRA).

Australian grain growers, through GPA, were one of the first plant industries to sign up to the cost-sharing arrangements of the EPPRD back in 2004. While the EPPRD has a focus on eradication response arrangements, signatories to the EPPRD also have a commitment to an on-going process of risk mitigation and promotion of improvements to biosecurity measures, including improvements to surveillance.

1. Nairn ME, Allen PG, Inglis AR and Tanner C (1996). Australian quarantine: a shared responsibility. Department of Primary Industries and Energy, Canberra
2. Beale R, Fairbrother J, Inglis A, and Trebeck D (2008). One biosecurity: a working partnership. Commonwealth of Australia, Canberra
3. Plant Health Australia (2013). National Plant Biosecurity Surveillance Strategy 2013-2020. https://www.planthealthaustralia.com.au/biosecurity/surveillance/

National Priority Plant Pests for better biosecurity focus

One of the recent achievements of the Department of Agriculture has been the development of the top 42 National Priority Plant Pests that are exotic to Australia, under eradication or have limited distribution. These pests have been identified in order to focus government investment and action, including the funding through the Agricultural Competitiveness White Paper to improve biosecurity surveillance and analysis.

The National Priority Plant Pests list has been derived from a comparative analysis considering:

- The potential pathways for them to enter Australia.
- Their ability to become established and spread in Australia.
- Their potential to cause significant negative impact on national economy, environment or community.

National plant biosecurity committees provide coordination

While the Australian governments have responsibility for implementing many biosecurity activities within their jurisdictions, a level of coordination is required between them to achieve the required national biosecurity outcomes.

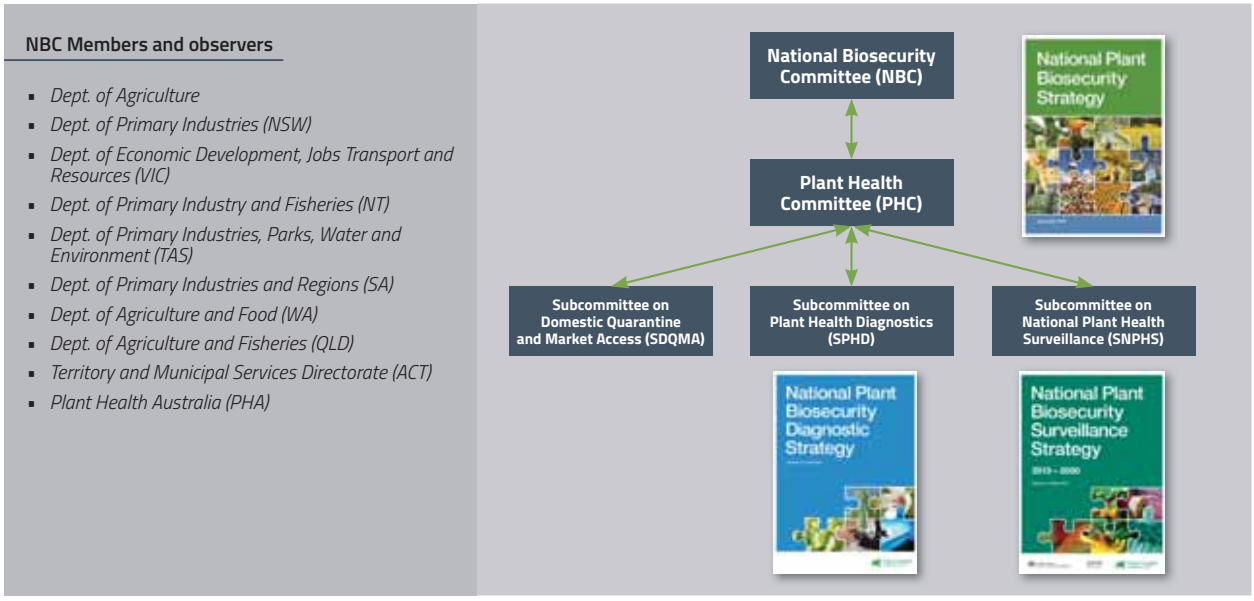
National committees provide a formal mechanism for developing, coordinating and ultimately improving key plant biosecurity policies and procedures that are nationally consistent. As such, Australia's plant biosecurity committee structure, including its various subcommittees, plays a major role in facilitating partnerships between governments.

Figure 2 below shows the structure of Australia's biosecurity committees that are tasked with the national coordination of plant biosecurity.

The National Biosecurity Committee (NBC) is responsible for managing a national, strategic approach to biosecurity issues relating to plant and animal pests and diseases, marine pests and aquatics, and the impact of these on agricultural production, the environment, community wellbeing and social amenity. Its core objective is to promote cooperation, coordination and consistency across and between governments.

The Plant Health Committee (PHC) is the peak government plant biosecurity policy forum. Its role is to improve plant health in Australia in support of the economy, environment and community. It provides strategic policy, technical and regulatory advice, and national leadership on plant biosecurity matters. It has the responsibility to oversee the implementation of government aspects of the NPBS and its substrategies, the NPBDS and the NPBSS.

Figure 2: Australia's biosecurity committees across the various plant industries. A number of strategy documents have been prepared to guide improvements to the biosecurity system.



The Australian grain industry

The grain industry is a substantial contributor to the Australian economy with the production sector directly contributing $18 billion annually, generating more than 170,000 jobs across the country and driving exports worth $13.9 billion[4].

The control of weeds, pests and diseases established in Australia, however, cost Australian grain growers over $5 billion each year. This includes the loses and costs of managing diseases at $1.4 billion, weeds and herbicide resistance over $3.3 billion and invertebrate pests over $360 million[5].

Biosecurity surveillance to prevent the entry, establishment and spread of new grain pests of economic and agronomic significance is therefore vital in supporting the international competitiveness and ultimate profitability of the grain industry.

Grain production in Australia is primarily situated in a narrow crescent running through the mainland states, known as the grain belt. This area stretches from central Queensland, through New South Wales, Victoria, Tasmania and southern South Australia. In Western Australia, the grain belt covers the southwest corner of the state.

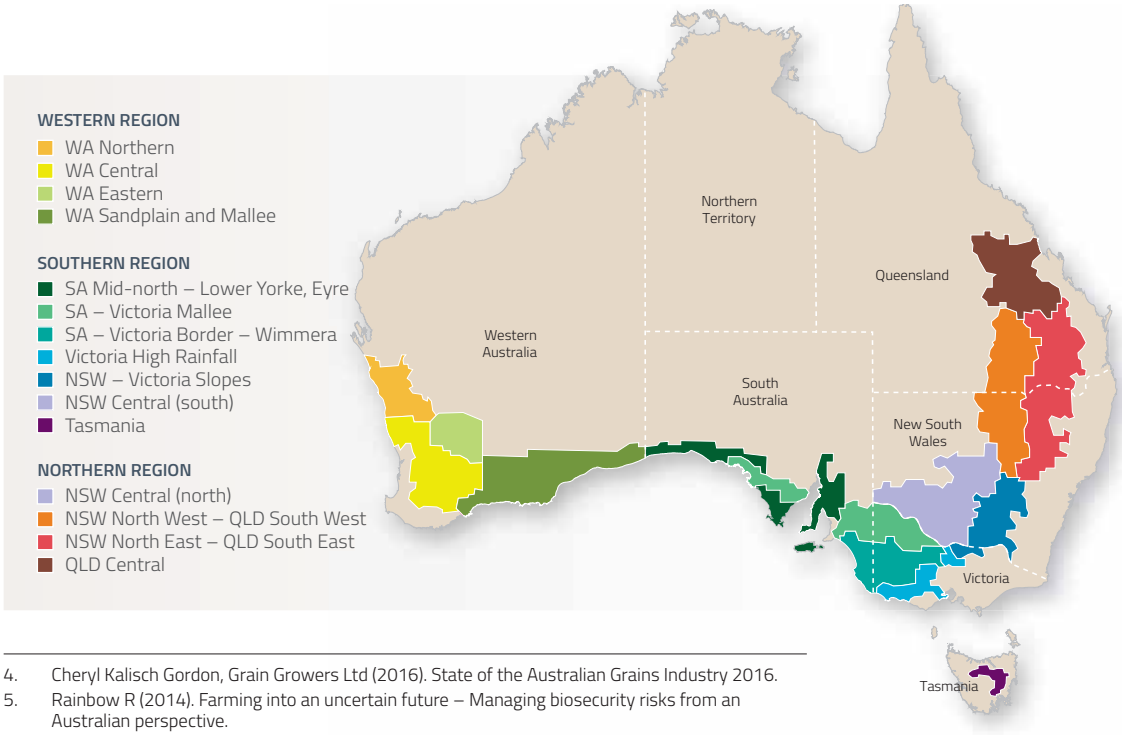
The grain belt comprises 14 different agroecological zones (Figure 3) with distinct climate, cropping and market characteristics. Due to the wide-ranging soil and climatic variability across Australia, farmers grow a range of grain crop species and varieties, each of which has specific pests and diseases that pose a threat to production and can influence access to certain markets (both domestically and overseas).

Australia's grain industry is national but varies by state and region in terms of crops grown and agronomic practices deployed. In any one year a grain farmer may grow a mix of wheat, coarse grains, oilseeds and pulses. The cropping program will be influenced by biophysical factors, market opportunities, including substitution to livestock production, and regulatory constraints.

In 2016–17 there were an estimated 23,000 grain farms in Australia. Around 44 per cent of these farms were in New South Wales and Queensland, 37 per cent in Victoria, South Australia and Tasmania and 18 per cent in Western Australia.

The value chain in the Australian grain industry, spanning the input, production and post farm gate sectors, is diverse, extremely complex and does not have a single coordinating, reporting or representative body across the entire chain. Whilst there has been some consolidation, over the past 15 years the number of organisations involved in the grain industry has continued to grow.

Figure 3: Australia's grain production regions[6]



4. Cheryl Kalisch Gordon, Grain Growers Ltd (2016). State of the Australian Grains Industry 2016.
5. Rainbow R (2014). Farming into an uncertain future – Managing biosecurity risks from an Australian perspective.
6. Australian Export Grains Innovation Centre (2016). Australian grain production – a snapshot. https://aegic.org.au/australian-grain-production-a-snapshot

Supply chain

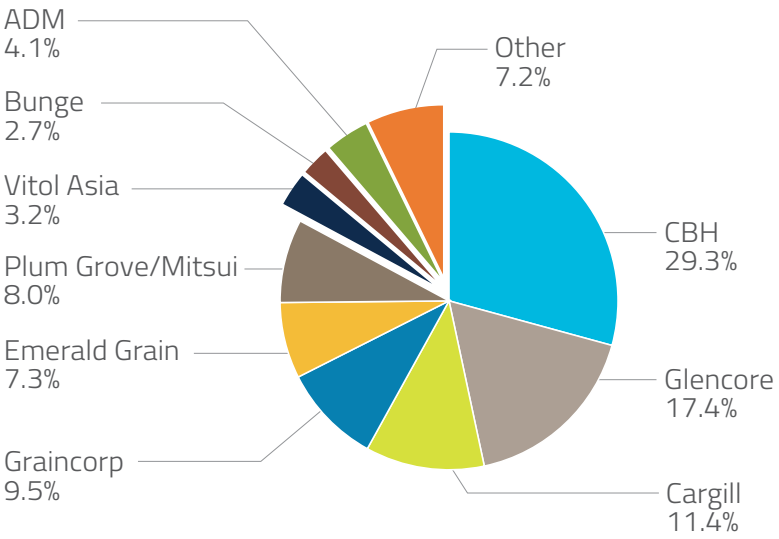
Grain Trade Australia (GTA), is the national association of grain traders and marketers representing over 270 member organisations. 190 of these are bulk handlers and/or grain traders highlighting the fact that 'grain storage' is now a significant industry in its own right. Of these 190, the top six companies are responsible for about 80 per cent of the wheat exports from Australia as shown in Figure 4. Co-Operative Bulk Handling Ltd (CBH) is the largest, exporting about 30 per cent of Australia's wheat, followed by Glencore with a 17 per cent share.

Since the deregulation of wheat marketing in 2008, Australia's major bulk handlers are now all commercial agribusiness companies offering integrated marketing and grain handling services. The dominant wheat exporters are also integrated marketing and bulk handling companies.

Additionally, four of the six major integrated marketing and grain handling companies (representing nearly 60 per cent of total wheat exports) are now foreign-owned. Foreign investment is one mechanism for ensuring the industry can build economies of scale and can access and leverage global knowledge, technologies and innovations, ensuring confidence in the quality, safety and phytosanitary status of grain leaving Australia. The integrity of our exporters, whether they are foreign- or Australian-owned, will continue to be increasingly paramount.

Stewardship of grain quality, food safety and grain biosecurity are important considerations for the industry as the range of marketers, exporters, grain storage options and pathways to markets increase. The industry needs to consider how to best ensure that stewardship obligations, chemical residues and pest freedom claims are understood, accepted and maintained throughout the industry.

Figure 4: Main Australian wheat exporters, 2013–14 to 2015–16[7]



7. Australian Export Grains Innovation Centre (2018). Australia's grain supply chains. Costs, risks and opportunities. https://www.aegic.org.au/wp-content/uploads/2018/11/FULL-REPORT-Australias-grain-supply-chains-DIGITAL.pdf

Grain Producers Australia

Grain Producers Australia (GPA) represents the biosecurity interests of grain producers and the industry. It is a member of Plant Health Australia and a signatory to the EPPRD, providing protection for Australia's grain growers in the event of an exotic plant pest incursion.

Its responsibilities include:

- biosecurity planning and implementation at the national and farm levels
- liaising with federal and state governments on trade issues
- funding and supporting biosecurity initiatives
- participating in national committees and response efforts in an emergency.

Grain Industry Market Access Forum

Within the grain marketing and trade sector of the supply chain, a Grain Industry Market Access Forum (GIMAF) was established in mid-2011 to represent the grain, seed and fodder members and work with government to develop and implement effective market access plans.

The establishment of GIMAF was a result of a review during the Grain Ministerial Task Force (GMTF) on Export Certification Reform. GIMAF oversees and directs market access activities under the Grains Industry Market Access Strategic Plan. It provides a conduit between government and industry that is designed to ensure market access decisions are informed and prioritised in line with overall industry benefit.

While GIMAF core activities are focused on direct marketplace issues, it has also recently played a supporting role in providing input to the wider trade policy agenda.

Grain and Plant Product Export Industry Consultative Committee

Grain and Plant Product Export Industry Consultative Committee (GPPEICC) is the principal forum for the Department of Agriculture to consult with grain, fodder, nut, seed and timber industries on export inspection and certification, export market access ,and other relevant issues that the department has statutory responsibility for under the Export Control Act 1982 and its subordinate legislation.

GPPEICC members include representatives from the Australian Fodder Industry Association, Australian Forest Products Association, the Australian Grain Exporters' Association, the Australian Mungbean Association, Australian Nut Industry Council, Australian Oilseed Federation, Australian Seed Federation, Pulse Australia, Ricegrowers' Association of Australia, Grain Growers Ltd, GPA, Grain Trade Australia, eastern bulk handlers and port operators, southern bulk handlers and port operators and western bulk handlers and port operators.

Image courtesy of Barry Large

Grain biosecurity surveillance in Australia

Biosecurity surveillance is an essential component of the Australian grain biosecurity system.

Biosecurity surveillance involves activities designed to:

- reveal the presence of pests (for early detection)
- demonstrate the absence of pests (for market access)
- determine the distribution of pests (in response to an incursion or for ongoing management)
- identify high-risk pathways and areas for pests (to focus surveillance efforts).

It also includes collection, collation, analysis, interpretation and timely dissemination of information on plant pests and the hosts that they affect. Biosecurity surveillance supports a wide range of biosecurity activities and can be used to monitor the effectiveness of the grain biosecurity system.

Biosecurity surveillance in grain production areas is important, as some of the high priority grain pests may not be able to be constrained at the national, state or territory borders. Currently, there are a few existing surveillance programs that are delivered by the governments and industry targeting high priority grain pests. But these are ad hoc, not well coordinated and inconsistent in approach.

Hence there is a need to facilitate a nationally coordinated grain biosecurity surveillance program across the grain industry in Australia to achieve some degree of national consistency or compatibility between the approaches used for grain biosecurity surveillance.

High priority pests of the Australian grain industry

To prioritise mitigation activities and focus on the most damaging pests of the grain industry, a pest risk assessment (PRA) has been undertaken on each of the 600 identified Emergency Plant Pests (EPPs) detailed in the Biosecurity Plan for the Grains Industry[8]. A PRA considers a range of factors such as the potential for the pest to gain entry into Australia (risk pathways); how easily it could become established and spread throughout the cropping areas and; the potential economic consequences of the pest to the industry (arising from yield loss, management costs, loss of market access or downgrading of product). From the PRA process, 54 EPPs have been identified as high priority, meaning they pose a high to extreme risk of causing significant impact to the grain industry if they were to become established in Australia[9].

Despite Australia's geographical isolation and strong quarantine systems, the threat from EPPs has never been higher with the increasing levels of travel and trade, emphasising the need for improving our efforts in prevention, preparedness and surveillance for EPPs.

By identifying these key pests a pre-emptive approach can now be taken to implement risk management and preparedness practices in the grain industry. Identification of these high-risk pests also assists in the implementation of effective community awareness campaigns, targeted biosecurity education, training and surveillance programs for industry stakeholders, the development of emergency use chemical permits, pre-emptive breeding for resistance in crop varieties and the development of pest-specific incursion response plans. Table 1 (opposite page), lists the 54 top ranked pest threats to the Australian grain industry, in order of the severity of their overall risk and their potential to become established and spread. The primary hosts and impact categorisation are also included.

Of the 54 top ranked pests, 11 grain pests have been included in the National Priority Plant Pests list.

8. Plant Health Australia(2015). Grains Industry Biosecurity Plan Version 3.0
9. Plant Health Australia(2015). Grains Industry Biosecurity Plan Version 3.0

Table 1. Grain industry high priority plant pest threat list

High priority pest	Primary host(s)	Entry potential	Establishment potential	Spread potential	Economic impact	Overall risk	Trade or yield impact
Karnal bunt (*Tilletia indica*)	Wheat, durum, triticale	Medium	High	High	Extreme	Extreme	Trade and quality impacts
Wheat stem rust (*Puccinia graminis* f. sp. *tritici* (exotic pathogenic races e.g. Ug99))	Wheat, barley	High	High	High	High	High	Yield impacts
Khapra beetle (*Trogoderma granarium*)	Stored products including: peanut, oat, chickpea, soybean, buck wheat, sunflower, barley, lentil, flax, lucerne, rice, millet, common bean, field pea, rye, sesame, sorghum, wheat, faba bean, cowpea, triticale, maize	High	High	High	High	High	Trade and quality impacts
Downy mildew (*Plasmopara halstedii*)	Sunflower	High	High	High	High	High	Trade and yield impacts
Barley stripe rust (*Puccinia striiformis* f. sp. *hordei*)	Barley	High	High	High	High	High	Yield impacts
Ascochyta blight (*Ascochyta rabiei* (MAT1-1 mating type is exotic, MAT 1-2 is endemic))	Chickpea	High	High	High	High	High	Trade and yield impacts

Table 1. Grain industry high priority plant pest threat list (continued)

High priority pest	Primary host(s)	Entry potential	Establishment potential	Spread potential	Economic impact	Overall risk	Trade or yield impact
Hessian fly (*Mayetiola destructor*)	Wheat	High	High	High	High	High	Trade and yield impacts
Sorghum downy mildew (*Peronosclerospora sorghi*)	Sorghum, maize, Sudan grass	High	High	High	High	High	Trade and yield impacts
Philippine downy mildew of maize (*Peronosclerospora philippinensis*)	Maize	High	High	High	High	High	Trade and yield impacts
Late wilt, slow wilt (*Harpophora maydis* (syn. *Cephalosporium maydis, Acremonium maydis*))	Maize, cotton, lupin	High	High	High	High	High	Trade and yield impacts
Wheat stem sawfly (*Cephus cinctus*)	Barley, triticale, rye and wheat. Wild hosts include: *Agropyron* spp. (wheatgrass), *Elymus* spp. (wildrye) and *Phleum* spp. (timothies)	Medium	High	High	High	High	Trade and yield impacts
European wheat stem sawfly (*Cephus pygmeus*)	Oats, wheat, rye, barley, triticale, wild oats, brome grasses, timothies, etc.	Medium	High	High	High	High	Yield impacts
Stem canker (*Diaporthe helianthi* (Ana. *Phomopsis helianthi*))	Sunflower	Medium	High	High	High	High	Trade and yield impacts

Table 1. Grain industry high priority plant pest threat list (continued)

High priority pest	Primary host(s)	Entry potential	Establishment potential	Spread potential	Economic impact	Overall risk	Trade or yield impact
Fusarium wilt of chickpea; Chickpea wilt (*Fusarium oxysporum* f. sp. *ciceris*)	Chickpea	Medium	High	High	High	High	Yield impacts
Fusarium wilt (*Fusarium oxysporum* f. sp. *lupini*)	Lupin	Medium	High	High	High	High	Yield impacts
Lentil anthracnose (*Colletotrichum truncatum*)	*Lens* spp. and *Vicia* spp. including: lentil and faba bean	Medium	High	High	High	High	Yield impacts
Groundnut bud necrosis virus (*Groundnut bud necrosis virus* (*Tospovirus*))	Peanut, field pea, cowpea, mungbean, soybean	Medium	High	High	High	High	Yield impacts
Barley stem gall midge (*Mayetiola hordei*)	Barley	Medium	High	High	High	High	Yield impacts
Russian wheat aphid (*Diuraphis noxia*)	Barley, wheat, durum, Bromus spp., Elymus spp., Jointed goat grass	Medium	High	High	High	High	Yield impacts
Pod sucking bug (*Riptortus dentipes*)	Fabaceae including: cowpea, mung bean, black gram, common bean, soybean, pigeon pea (cowpea is the most preferred host)	Medium	High	High	High	High	Trade and yield impacts
Bean common mosaic virus, peanut stripe strain (*Potyvirus*)	Peanuts, soybean, cowpea	Medium	High	High	High	High	Trade and yield impacts

Table 1. Grain industry high priority plant pest threat list (continued)

High priority pest	Primary host(s)	Entry potential	Establishment potential	Spread potential	Economic impact	Overall risk	Trade or yield impact
False codling moth (*Thaumatotibia leucotreta* (syn. *Cryptophlebia leucotreta*))	Feeds on more than 50 species of plants in over 30 plant families including: cotton, lima bean, common bean, sorghum, maize, cowpea	High	Medium	High	High	High	Trade and yield impacts
Banded leaf and sheath spot (*Rhizoctonia solani* f. sp. *sasakii* (AG1) [49])	Maize	High	Medium	High	High	High	There are restrictions relating to *Rhizoctonia solani* however not specifically to the strain that causes banded leaf and sheath blight. There are also yield impacts
Sunflower moth (*Homoeosoma electellum*)	Sunflower	Low	High	High	High	Medium	Yield impacts
Groundnut ringspot virus (*Groundnut ringspot virus* (*Tospovirus*))	Peanut, soybean, tomato, capsicum, tomatillo, coriander	Low	High	High	High	Medium	Yield impacts

Image courtesy of GRDC

Table 1. Grain industry high priority plant pest threat list (continued)

High priority pest	Primary host(s)	Entry potential	Establishment potential	Spread potential	Economic impact	Overall risk	Trade or yield impact
Legume yellow mosaic viruses (syn. legume infecting *Begomoviruses*) (*Mungbean yellow mosaic virus; Mungbean yellow mosaic India virus; Dolichos yellow mosaic virus; Horsegram yellow mosaic virus* (*Begomovirus*))	Lima bean, mung bean, cowpea, black gram, pigeon pea, common bean, lablab, soybean	Low	High	High	High	Medium	Yield impacts
Chickpea chlorotic dwarf (*Chickpea chlorotic dwarf virus* (*Mastrevirus*) (syn. *Chickpea chlorotic dwarf virus* (*Geminivirus*)))	Chickpea, faba bean, field pea, lentil, tobacco, tomato, sugar beet	Low	High	High	High	Medium	Yield impacts
Chickpea chlorotic stunt virus (*Chickpea chlorotic stunt virus* (*Polerovirus*))	Chickpea, faba bean, field pea, lentil, vetch, medics and some other legumes	Low	High	High	High	Medium	Yield impacts
Wheat blast (*Magnaporthe grisea* (*Triticum* pathotype))	Wheat, barley	Medium	Medium	High	High	Medium	Yield impacts
Peanut clump virus; Indian peanut clump virus (*Peanut clump virus* (*Pecluvirus*))	Peanut, foxtail millet, finger millet, pearl millet, wheat, sugar cane, barley, sorghum	Medium	Medium	High	High	Medium	Trade and yield impacts

Table 1. Grain industry high priority plant pest threat list (continued)

High priority pest	Primary host(s)	Entry potential	Establishment potential	Spread potential	Economic impact	Overall risk	Trade or yield impact
Spotted stalk borer, pink borer (*Chilo partellus*)	Sorghum, maize, Johnson grass, sugarcane, foxtail millet, finger millet, pearl millet, rice	Low	Medium	High	High	Medium	Yield impacts
Cabbage seed weevil (*Ceutorhynchus assimilis* (syn. *Ceutorhynchus obstrictus*))	*Brassica* spp.	Medium	High	Medium	High	Medium	Yield impacts
Rape stem weevil (*Ceutorhynchus napi*)	*Brassica* spp.	Medium	High	Medium	High	Medium	Yield impacts
Cabbage stem weevil (*Ceutorhynchus pallidactylus*)	Brassicaceae	Medium	High	Medium	High	Medium	Yield impacts
Chickpea cyst nematode (*Heterodera ciceri*)	Chickpea, lentil	Medium	High	Medium	High	Medium	Yield impacts
Sunflower stem weevil (*Cylindrocopturus adspersus*)	Sunflower	Low	High	Medium	High	Medium	Yield impacts
Fusarium wilt of soybean (*Fusarium oxysporum* f. sp. *glycines*)	Soybean	Low-medium	High	Medium	High	Medium	Yield impacts
Sudden death syndrome (*Fusarium virguliforme* (syn. *Fusarium solani* f. sp. *glycines*))	Soybean	Low-medium	High	Medium	High	Medium	Yield impacts

Table 1. Grain industry high priority plant pest threat list (continued)

High priority pest	Primary host(s)	Entry potential	Establishment potential	Spread potential	Economic impact	Overall risk	Trade or yield impact
Wheat bug (*Nysius huttoni*)	Wheat	Low-medium	High	Medium	High	Medium	Yield impacts
Coastal stalk borer (*Chilo orichalco-ciliellus*)	Maize, sorghum, millet and sugarcane	Medium	Medium	Medium	High	Medium	Yield impacts
Sunn pest (*Eurygaster integriceps*)	Wheat, durum, barley, oat, rye, triticale, sorghum	Medium	Medium	Medium	High	Medium	Trade and yield impacts
Cereal cyst nematode (*Heterodera filipjevi*)	Wheat, barley	Medium	Medium	Medium	High	Medium	Yield impacts
Northern corn rootworm (*Diabrotica barberi*)	Host range includes maize, wheat, sunflower, soybean	Medium	Medium	Medium	High	Medium	Yield impacts
Soybean cyst nematode (*Heterodera glycines*)	Soybean	Medium	Medium	Medium	High	Medium	Trade and yield impacts
Larger grain borer (*Prostepha-nus trunca-tus*)	Stored grain including: maize and cassava. Maize is the most affected host	Medium	Medium	Medium	High	Medium	Trade and yield impacts
Southern corn rootworm; spotted cucumber beetle (*Diabrotica undecim-punctata*)	Wide host range including: Cucurbitace-ae, peanuts, soybean, common bean, maize, sweet potato, sunflower	Medium	Medium	Medium	High	Medium	Yield impacts
Western corn rootworm (*Diabrotica virgifera*)	Maize	Medium	Medium	Medium	High	Medium	Trade and yield impacts

Table 1. Grain industry high priority plant pest threat list (continued)

High priority pest	Primary host(s)	Entry potential	Establishment potential	Spread potential	Economic impact	Overall risk	Trade or yield impact
Mediterranean cereal cyst nematode (*Heterodera latipons*)	Oats, wheat, barley, rye	Medium	Medium	Medium	High	Medium	Yield impacts
Sorghum cyst nematode (*Heterodera sorghi*)	Sorghum, maize	Medium	Medium	Medium	High	Medium	Yield impacts
Zea mosaic virus (*Zea mosaic virus* (*Potyvirus*))	Maize, sorghum, Johnston grass	Low	Medium	Medium	High	Medium	Yield impacts
Barley mild mosaic virus (*Barley mild mosaic virus* (*Baymovirus*))	Barley	Low	Medium	Medium	High	Medium	Trade and yield impacts
Stewart's disease; Bacterial wilt (*Pantoea stewartii* (syn. *Erwinia stewartii*))	Maize	Low	Medium	Medium	High	Medium	Trade and yield impacts
Greenbug; Wheat aphid; Spring green aphid (*Schizaphis graminum*)	Oats, barley, ryegrass, millet, rye, sorghum, maize, wheat, triticale, rice, canary grass	Low	Medium	Medium	High	Medium	Yield impacts
Soil-borne wheat mosaic (*Soil-borne wheat mosaic virus* (*Furovirus*))	Wheat	Medium-high	Medium	Medium	High	Medium	Yield impacts

Pre-border and border activities to support grain biosecurity surveillance

The Australian Government, through the Department of Agriculture, is responsible for identifying global risks and pathways for the entry of identified exotic pest threats of the grain industry into Australia, and working with trading partners to mitigate risks posed by the movement of goods and passengers entering Australia. Activities aimed at reducing the risk of the entry of pests include engagement in bilateral and multilateral forums, assessing import risks and applications, and auditing and inspecting offshore treatments and certifications to ensure that exporting countries meet Australia's biosecurity requirements.

These pre-border and at-the-border measures provide early warning of new and emerging or imminent pest threats to Australian grain production and are an important part of identifying and prioritising targets for surveillance post-border.

The Department of Agriculture has primary responsibility for border biosecurity activities such as screening and inspection of cargo, passengers, mail, plants and plant products for quarantine risk materials. Information relating to successful interceptions is generally not shared with industry. The department does, however, issue media releases and newsletters from time-to-time that contain some aggregated information on biosecurity interceptions.

Post-border surveillance

Government surveillance programs

The National Plant Health Surveillance Program is coordinated by the Department of Agriculture and delivered by state and territory jurisdictions targeting many exotic plant pests across the nation, including high priority grain pests. Target pests for this program are selected from the National Priority Plant Pests list.

State and territory jurisdictions have the ability to conduct their own independent surveillance programs specific to their regions targeting exotic or established grain pests. Surveillance to reconfirm freedom from lupin anthracnose in New South Wales is a recent example of this.

Australian governments also provide expertise in diagnostic services such as Plant Health Diagnostics, Cropsafe and MyPestGuide Reporter to support monitoring and identification of pests and diseases of grain. The range of services that are provided, however, are variable and are not conducted in a coordinated or consistent manner.

Industry surveillance and crop monitoring programs

Growers, advisers, agribusiness, research staff and bulk handlers all undertake a significant amount of general surveillance such as crop monitoring, paddock inspections and stored grain testing through their day-to-day activities in crop management, research and development, and the management of stored grain. However, despite this breadth, it is not conducted in a consistent or coordinated manner which would allow analysis for the purposes of early detection or market access. Recent efforts within the industry have focused on encouraging stakeholders within the industry to call the Exotic Plant Pest Hotline if they find anything unusual.

Formal industry initiatives such as the Grains Farm Biosecurity Program supported by PHA and GPA, and the National Variety Trials supported by GRDC, make up a large proportion of the specific (targeted) surveillance of exotic and economically important established pests and diseases being carried out by industry. The Grains Farm Biosecurity Program not only facilitates the supply of volunteered data from the private and not for profit sectors into the plant pest surveillance virtual coordination center, AUSPestCheck, but also helps equip the industry when responding to exotic pest threats. The program raises awareness of pest threats among growers and other industry players through its five Grains Biosecurity Officers based in each grain growing state (Western Australia, South Australia, Victoria, New South Wales and Queensland).

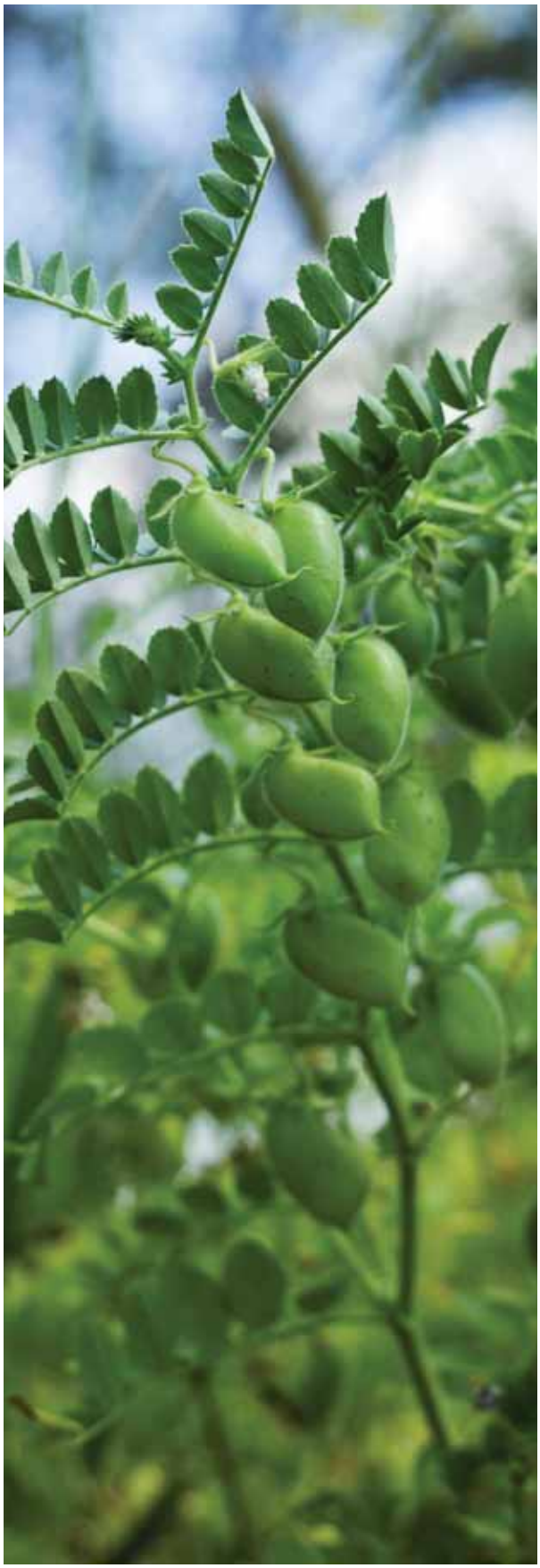
Why is a National Grain Biosecurity Surveillance Strategy needed?

Given not only the significant number of grain pest threats and increasing volume of trade and tourism, but also the frequency and diversity of grain crops grown, the large number of stakeholders involved and the potential for spill over benefits to other plant industries, Australia simply cannot afford to not have an innovative, coordinated, and responsive long-term national grain surveillance program that is guided and directed by a relevant strategy.

Australia has a robust, dynamic and evolving plant biosecurity system. Nonetheless, increasing international trade and travel, identified capacity and capability gaps and the increasing global spread of exotic grain pests pose significant challenges to Australia's grain biosecurity.

The recent industry Stocktake and Gap Analysis identified the following areas of focus for grain biosecurity:

- Industry value and biosecurity risks throughout the production and supply chains are not well understood in order to focus surveillance efforts.
- Likely economic impact and establishment potential of high priority pests are not specifically described to objectively inform pest prioritisation.
- Industry strategies to enhance market access to continue to protect and grow the industry's international competitiveness are inadequate.
- There is little coordination or integration of monitoring and testing throughout the supply chain to ensure it is efficient and effective and allow the ongoing access to proof of area freedom.
- Surveillance activities undertaken within industry funded programs are not coordinated, integrated or nationally consistent.
- Risk pathways are not consistently identified, prioritised, mapped or monitored to maximise confidence in early detection.
- Surveillance protocols are not being utilised to ensure consistency and confidence of early detection.
- Growers, agribusiness and the supply chain are undertaking significant crop monitoring, paddock inspections and stored grain testing activities for both exotic and established pests, but these activities are not consistent or coordinated.
- Current diagnostic services are not offered or conducted consistently for the reliable, timely and accurate diagnosis and reporting of plant pests and diseases.



National Grain Biosecurity Surveillance Strategy

The National Grain Biosecurity Surveillance Strategy will guide the coordination and integration of surveillance efforts in a partnership approach between industry, the science and research community and Australian governments to maximise the efficiency and effectiveness of surveillance efforts.

Implementing the strategy, as described in Figure 5 (page 28), is expected to deliver the following national outcomes:

1. **People**
   Strong national leadership, partnerships and coordination to optimise surveillance efforts on the grain pests that pose the highest risk, and the activities that will deliver the greatest return.

2. **Processes**
   A continuous, integrated, risk-based surveillance system operating across the grain production and supply chains that creates enduring confidence in the early detection of exotic pests and provides evidence of pest free status to support trade and market access.

3. **Products**
   Improved knowledge, ability and technology to detect priority pests along the biosecurity continuum.

Scope of the National Grain Biosecurity Surveillance Strategy

The National Grain Biosecurity Surveillance Strategy aims to strengthen Australia's ability to detect priority pests of concern to the grain industry and increase responsiveness to new and emerging grain biosecurity issues. This will be achieved through the establishment of national leadership, management and coordination arrangements to implement a national grain biosecurity surveillance program and through improved pest and pathway analysis and enhanced field surveillance.

The strategy has been developed to be robust yet flexible enough to adapt to emerging technologies and industry structures outside that of government, and will be underpinned by core diagnostic capacity.

The following five fundamental actions were identified as essential underlying requirements of a national grain biosecurity surveillance program:

- prioritising target pests and pathways following detailed economic analysis
- developing surveillance protocols to ensure consistency and statistical rigor
- implementing data standards and reporting protocols to allow for the accurate and consistent collection of data to inform decisions
- continuing industry's general surveillance
- delivering training and awareness activities.

Purpose

The overarching purpose of the strategy, as described in Figure 5 (page 28), is to improve the international competitiveness of the Australian grain industry through freedom from the impacts of exotic pests and demonstrated pest status claims in support of ongoing market access. This will be achieved through the development of a world class, innovative, science-based grain biosecurity surveillance system that maximises the early detection of high priority grain pests and defends our pest status claims.

Goals

The goals of National Grain Biosecurity Surveillance Strategy are to:

1. ensure that surveillance activities are more responsive to the ever-changing grain biosecurity situation
2. increase confidence in the early detection of high priority grain pests
3. strengthen engagement and partnerships across the grain production and supply chains in the early detection of high priority grain pests
4. develop the capacity and support required for early detection of high priority grain pests.

The future state of grain surveillance

The future grain biosecurity surveillance system, as described in Figure 5 (page 28) will be underpinned by this strategy and its vision, goals and implementation.

Goal 1 will establish an overarching framework to strengthen national leadership, management and coordination of activities. Goal 2 describes an approach to profiling risk pathways and interceptions and the development of targeted protocols for early detection with confidence. Goal 3 outlines the engagement and partnerships required between government, industry and the supply chain, while Goal 4 defines the national approach for enhancing the capacity and support needed to detect and accurately diagnose early detections.

The implementation of each goal and action within the strategy will complement and address recommendations in the National Plant Biosecurity Surveillance Strategy, as outlined below in Table 2.

Activities will be delivered and monitored through tasks described in an implementation plan that supports this strategy.

Table 2. Alignment between the National Grain Biosecurity Surveillance Strategy and the National Plant Biosecurity Surveillance Strategy

National Grain Biosecurity Surveillance Strategy Goals	National Grain Biosecurity Surveillance Strategy Actions	National Plant Biosecurity Surveillance Strategy
Goal 1 - Ensure that surveillance activities are more responsive to the ever-changing grain biosecurity situation	Establish mechanisms for the coordination and integration of organisations undertaking grain pest surveillance including their programs, projects and datasets to capture the full benefits, increasing confidence of early detection and reducing inefficiencies	Recommendation S1 - Provide mechanisms for coordinating and establishing a nationally integrated and consistent plant biosecurity surveillance system and network that underpins Australia's biosecurity system.
	Establish an integrated information framework to better understand industry value and biosecurity risks throughout the production and supply chains including farming system impacts, spatial and temporal variations, interaction with cost and profit drivers and inform import risk assessments	Recommendation S2 - Establish a national surveillance information framework including the development of nationally agreed surveillance standards and protocols in order to optimise the collection, analysis and reporting of surveillance data.
	Identify and prioritise the high priority pests of the Australian grain industry	Recommendation S2 - Establish a national surveillance information framework including the development of nationally agreed surveillance standards and protocols in order to optimise the collection, analysis and reporting of surveillance data.

Table 2. Alignment between the National Grain Biosecurity Surveillance Strategy and the National Plant Biosecurity Surveillance Strategy (continued)

National Grain Biosecurity Surveillance Strategy Goals	National Grain Biosecurity Surveillance Strategy Actions	National Plant Biosecurity Surveillance Strategy
Goal 2 - Increase confidence in the early detection of high priority grain pests	Establish effective reporting arrangements for pest interception data and pathway status to assist industry in determining the highest risk pests and pathways.	Recommendation S2 - Establish a national surveillance information framework including the development of nationally agreed surveillance standards and protocols in order to optimise the collection, analysis and reporting of surveillance data.
	Develop surveillance protocols for the highest priority pests to ensure consistency and increase confidence of early detection.	Recommendation S2 - Establish a national surveillance information framework including the development of nationally agreed surveillance standards and protocols in order to optimise the collection, analysis and reporting of surveillance data.
Goal 3 - Strengthen engagement and partnerships across the grain production and supply chains in the early detection of high priority grain pests	Develop strategies to protect and enhance market access to continue to grow the industry's international competitiveness	Strengthen general surveillance within the grain industry for exotic and established pests of concern
	Establish mechanisms throughout the supply chain for the provision of precompetitive monitoring and surveillance information on stored grain to achieve the confidence required, optimise value, ensure efficient and effective monitoring and testing and maintain ongoing access to proof of area freedom	Recommendation S3 - Establish mechanisms to engage industry, regions and communities to ensure broader recognition of the importance of surveillance and collection of surveillance information
	Strengthen general surveillance within the grain industry for exotic and established pests of concern	Recommendation S3 - Establish mechanisms to engage industry, regions and communities to ensure broader recognition of the importance of surveillance and collection of surveillance information
Goal 4 - Develop the capacity and support required for early detection of high priority grain pests	Enhance diagnostic services across all grain growing regions for the reliable, timely and accurate diagnosis and reporting of plant pest and diseases	Recommendation S4 - Enhance national capacity and capability to undertake plant pest surveillance underpinned by targeted research, development and extension.
	Improve surveillance capacity and capability across the grain industry that includes providing necessary surveillance tools and training	Recommendation S4 - Enhance national capacity and capability to undertake plant pest surveillance underpinned by targeted research, development and extension.

Figure 5. Program logic for the National Grain Biosecurity Surveillance Strategy

VISION

Enhanced productivity and improved international competitiveness of the Australian grain industry through the freedom from the impacts of exotic pests and demonstrated pest status claims in support of ongoing market access.

World class, innovative, science and risk based surveillance system that maximises the early detection of high priority grain pests and increases the confidence in area freedom statements.

OUTCOMES

PEOPLE
Strong national leadership, partnerships and coordination to optimise surveillance effort on detecting the grain pests that pose the highest risk and delivering the greatest return.

PROCESSES
A continuous, integrated, risk based surveillance system operating across the grain production and supply chains that creates confidence in the early detection of exotic pests and provides evidence of pest status to support area freedom.

PRODUCTS
Improved knowledge, ability and technology to detect priority pests along the biosecurity continuum and increased confidence in pest status claims.

GOAL 1

Goal 1: Ensure that surveillance activities are more responsive to the ever-changing grain biosecurity situation

Actions	Tasks
Establish management, coordination and integration mechanisms	▪ Develop ongoing management arrangements ▪ Increase awareness of roles and responsibilities ▪ Broaden participation to allow other organisations to be involved ▪ Establish national leadership ▪ Develop sustainable funding mechanism
Establish an integrated information framework to better understand industry value and biosecurity risks	▪ Compile industry statistics and datasets ▪ Develop regional biosecurity profiles ▪ Establish harvest receival reporting
Identify and prioritise the high priority pests	▪ Undertake economic analyses on HPP ▪ Conduct benefit cost analyses on surveillance activities ▪ Develop new methodology for biosecurity planning

GOAL 2

Goal 2: Increase confidence in the early detection of high priority grain pests

Actions	Tasks
Establish effective reporting arrangements for pest interceptions and pathway status	▪ Identify and map high-risk pathways ▪ Develop formal reporting arrangements for interception data ▪ Updated interceptions and pathways regularly
Establish a nationally coordinated grain biosecurity surveillance system for early detection of high priority grain pests	▪ Develop surveillance protocols ▪ Develop and deploy targeted surveillance program ▪ Develop framework to report on economically important pests ▪ Encourage investment in autonomous systems and sensor technologies for use in surveillance

GOAL 3

Goal 3: Strengthen engagement and partnerships across the grain production and supply chains for the early detection of high priority grain pests	
Actions	**Tasks**
Develop strategies to protect and enhance market access	▪ Quantify the costs of phytosanitary requirements ▪ Develop contingency plans with exporters ▪ Explore opportunities to share costs/activities and with other plant industries ▪ Develop pilot cost share agreement for market access surveillance
Establish mechanisms throughout the supply chain for the provision of monitoring and surveillance data of stored grain	▪ Investigate precompetitive options for collaboration ▪ Develop coordination arrangements ▪ Develop consultation and engagement strategy between government and industry
Strengthen general surveillance within the grain industry for exotic and established pests of concern	▪ Align surveillance activities within state agencies ▪ Encourage investment in grower surveillance tools and technologies ▪ Develop on-farm protocols ▪ Pest ID training for growers and advisers ▪ Encourage digitisation of farm record keeping

GOAL 4

Goal 4: Develop the capacity and support for the early detection of high priority grain pests	
Actions	**Tasks**
Enhance diagnostic services across all grain growing regions for reliable, timely and accurate diagnosis and reporting of plant pests and diseases	▪ Work with state agencies and universities to offer coordinated diagnostic services ▪ Identify diagnostic capacity and capability required ▪ Use diagnostic services as a training program for new industry personnel
Improve surveillance capacity and capability across the grain industry that includes providing necessary surveillance tools and training	▪ Establish training opportunities for the identification of high priority grain pests ▪ Deliver practical training for surveillance personnel ▪ Align reporting functions with national pest and disease information services

FOUNDATIONAL TASKS

- Project administration and contract management
- Interim implementation task force appointed to establish ongoing management, coordination and integration mechanisms
- Development of proposed, long-term funding model
- Ongoing engagement between DA, PHA, GPA, GGL and GRDC
- Monitoring and evaluation for continual improvement and impact assessment

Strategy components

Goal 1:
Ensure that surveillance activities are more responsive to the ever-changing grain biosecurity situation

The establishment of national leadership, management and coordination arrangements are key components in the implementation of activities as described within this National Grain Biosecurity Surveillance Strategy. These arrangements will ensure that surveillance is responsive to the dynamic pest risk environment in the grain industry and is undertaken in a consistent and effective manner, that activities are integrated with other industries and provide confidence in its measurable performance in supporting market access and early detection.

National leadership will develop, facilitate and sustain the increasingly important partnership between government and industry, including the broader participation from the supply chain and the science and research community, to participate in the program across areas of highest risk.

Opportunities will be created to allow other broadacre industries, industries that share similar pests or geographic areas and the broader community to participate, thereby increasing the overall efficiency and effectiveness of the program.

Coordination of these activities will facilitate data collection from the different participants along the production and supply chain to get better use of existing data. The overarching coordination of capacity building and communication will also ensure that consistent information is delivered within the program and that surveillance activities undertaken by industry, government and the supply chain are continually improved.

While estimates on the value of current and potential losses from established pests and diseases for the major grain crops in Australia have been documented at a point in time, there is not the same level of information available on exotic pests. Industry decisions are becoming increasingly difficult and complex in relation to pest prioritisation, surveillance activities and integration between industries and across pests in the absence of this information. Through this strategy, data will be collected and compiled to ensure that strategic decision making is responsive to the dynamic pest risk environment in the grain industry.

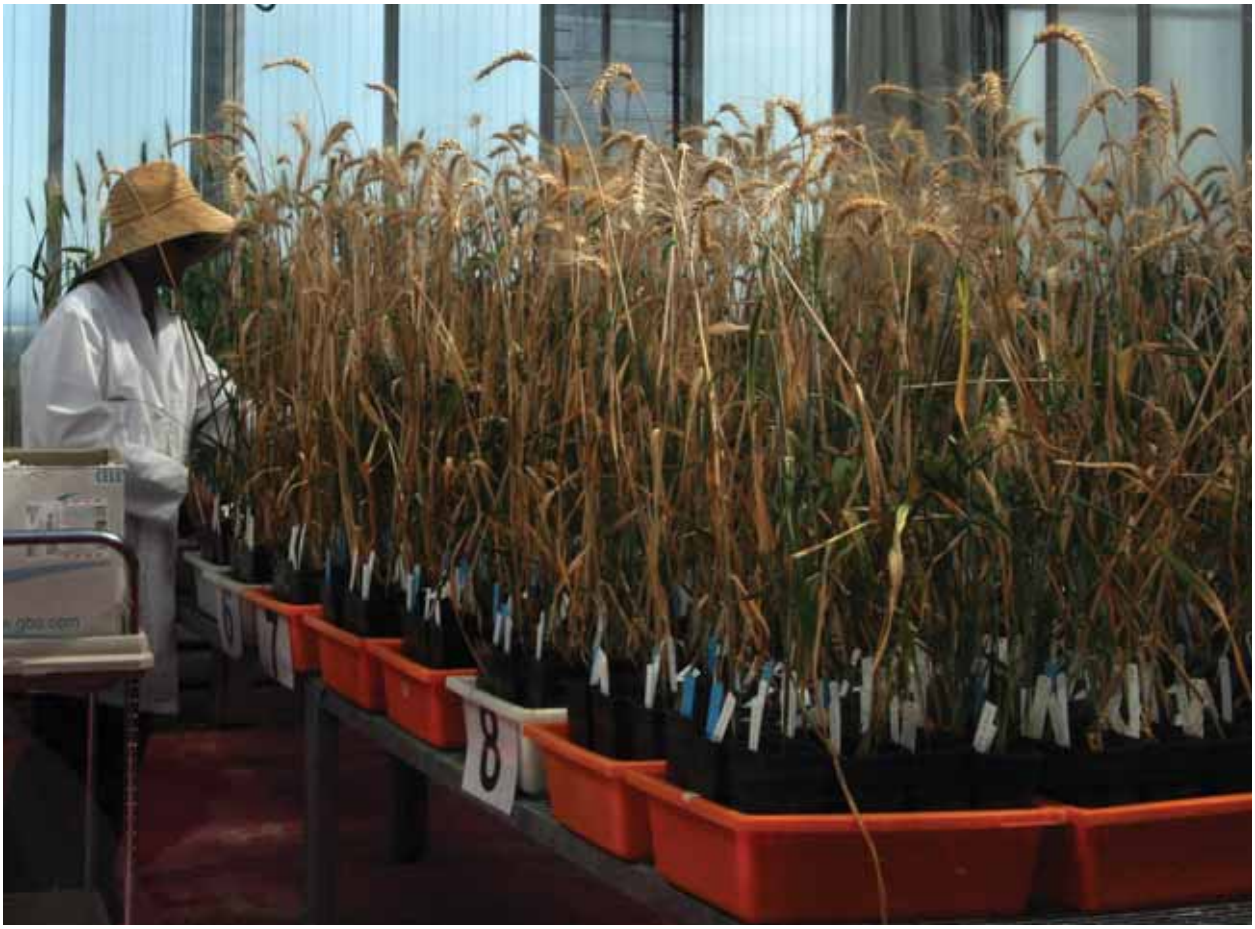
Under this strategy a reporting framework will be developed to collate information from grain receivals throughout Australia. This will not only help to prioritise and plan stored grain surveillance, but will also ensure traceability and inform import risk assessments relating to whole grain, hay or stockfeed and any follow up surveillance that may be required.

Actions to deliver Goal 1

Action 1.1	Tasks
Establish mechanisms for the management, coordination and integration of grain biosecurity surveillance	1.1.1 Develop arrangements between industry and governments for the ongoing management of the surveillance strategy and the reporting and coordination of surveillance activities and the data it collects. These arrangements will include governance of the strategy, the need to identify the personnel and resources required, supervision and management and metrics to support continual improvement decisions.
	1.1.2 Develop clear roles and responsibilities of individuals and organisations operating in surveillance and increase awareness of these throughout the production and supply chains.
	1.1.3 Broaden participation in the Australian plant biosecurity system to allow universities, CSIRO and the private and not for profit sectors to participate in the conduct of surveillance and biosecurity risk mitigation activities.
	1.1.4 Establish national grain biosecurity leadership involving major grain stakeholders (including DA) to support effective decision making in responding to the ever changing grain biosecurity situation.
	1.1.5 Develop sustainable funding mechanisms for surveillance that are equitable for all grain stakeholders.
	Outcomes
	▪ Strong national leadership, partnerships and coordination to optimise surveillance efforts on the grain pests that pose the highest risk and the activities that will deliver the greatest return. ▪ A continuous, integrated, risk-based surveillance system operating across the grain production and supply chains that creates enduring confidence in the early detection of exotic pests and provides evidence of pest status to support area freedom.

Action 1.2	Tasks
Establish an integrated information framework to better understand industry value and biosecurity risks	1.2.1 Identify and compile industry statistics and datasets required to make better surveillance decisions.
	1.2.2 Develop regional biosecurity risk profiles for each port zone within each state specific to the grain industry that includes regional differences in crops, environment, markets and entry pathways. (Linked to 2.1.1)
	1.2.3 Develop a nationally consistent reporting system for collating information from harvest receival that will inform grain surveillance decisions, market access and import risk assessments.
	Outcomes
	▪ Strong national leadership, partnerships and coordination to optimise surveillance efforts on the grain pests that pose the highest risk and the activities that will deliver the greatest return. ▪ A continuous, integrated, risk-based surveillance system operating across the grain production and supply chains that creates enduring confidence in the early detection of exotic pests and provides evidence of pest status to support area freedom. ▪ Improved knowledge, ability and technology to detect priority pests along the biosecurity continuum.

Action 1.3	Tasks
Identify and prioritise the high priority pests of the Australian grain industry	1.3.1 Undertake economic analyses on the impact of high priority plant pests of the grain industry in order to prioritise them on their impact from a loss of market, reduction in price, loss of yield and increase cost of control viewpoint.
	1.3.2 Conduct cost–benefit and other surveillance analyses to determine the usefulness of conducting specific surveillance activities and identify where in the production and supply chain they are best focused.
	1.3.3 Develop new methodologies to continually review and revise the grain industry biosecurity plan and update surveillance priorities, in light of changing risk profiles, interception intelligence and new knowledge/evidence on high priority pests.
	Outcomes
	▪ Strong national leadership, partnerships and coordination to optimise surveillance efforts on the grain pests that pose the highest risk and the activities that will deliver the greatest return. ▪ A continuous, integrated, risk-based surveillance system operating across the grain production and supply chains that creates enduring confidence in the early detection of exotic pests and provides evidence of pest status to support area freedom.



Goal 2:
Increase confidence in the early detection of high priority grain pests

The risk potential posed by the entry and establishment of high priority pests in the different grain production areas of Australia (or on pathways into these areas) requires specific identification, mapping and analysis to prioritise regions, pathways and seasons to target surveillance activities.

The rising threat associated with sea container imports and 'hitchhiker' pest movements are of major concern to the industry as the volume and frequency of sea and air cargo continues to increase.

Ports of entry remain high priority locations to detect exotic pest incursions, as they are generally the first manageable point of the entry pathway. It may also be critical to undertake surveillance at other points, as detection may be more likely further along the pathway.

The use of autonomous systems and sensor technologies may make it easier to maintain surveillance activities in high-risk areas such as ports of entry and encourage reporting of new pests or symptoms.

While remote areas such as the Ord, Central Queensland and Tasmania, for example, have limited grain production, they are used for commercial seed production for certain crops. A risk assessment on the potential for these regions to be an additional entry pathway into larger production areas is also required.

While grain crops are not normally grown within urban or peri-urban environments in Australia, there are exceptions. These include the planting of cereals as a soil stabilising crop following earthworks for new roads and highways, and their use as a cover crop between rows in vineyards.

Whilst not substantial in area they do provide opportunities for the establishment and spread of exotic pests should they enter through major ports or other high-risk pathways. The increasing use of imported cut flowers at weddings in vineyards where cereals have been used as a cover crop may be more than just a passing Instagram fad and may need to be one of a number of new scenarios assessed in terms of potential risk.

Grain-based food and feed products are commonly stored in most Australian households with many other pantry items. They are also extensively stored, used and distributed throughout Australia's elaborate network of food and feed manufacturers, wholesalers, distributors and retailers. Engaging the community and these businesses through 'pantry blitz' style activities will be important in undertaking surveillance for stored grain pests such as khapra beetle within these areas as a potential source or sink of high priority stored grain pests.

Within urban and peri-urban communities, the industry's closely related vegetable crops such as sweet corn, green peas and broad beans, for example, are expected to be surveyed within vegetable surveillance programs. Likewise, grasses such as those used in turf and lawns as well as ornamental grasses such as Mondo and Fountain grass will be expected to be surveyed within their industry programs. The enhanced diagnostic services that are proposed under the grain surveillance strategy, however, would be established as a mechanism to create and maintain a focal point for broader surveillance activities and could be utilised by these communities and industries.

The relatively sparse population throughout the grain belt also provides challenges for surveillance for grain pests as a result of their remoteness and the distances to be covered.

As new and innovative technologies will not be developed overnight, investment in research and development to establish a pipeline of innovative surveillance tools and technologies is urgently needed to assist surveillance activities in these remote locations. The establishment of diagnostic services and the support technologies they require as outlined under Goal 4 will improve the capacity and capability for surveillance and rapid diagnosis of exotic pests in these areas in the short-term.

Surveillance protocols specific to priority pests, pathways, regions and high risk areas will be developed using statistically robust, risk-based approaches. These protocols will ensure the consistent interpretation of surveillance efforts between regions, and will be an important tool in ensuring resources are targeted effectively, the performance of the strategy can be continually improved, and its outcomes described and measured.

Actions to deliver Goal 2

Action 2.1	Tasks
Establish effective reporting arrangements for pest interception data and pathway status to assist industry in determining the highest risk pests and pathways	2.1.1 Identify and map high-risk pathways for pests and diseases of concern to the grain industry.
	2.1.2 Develop formal reporting arrangements for interception data and pathway status to assist industry in determining the highest risk pests and pathways.
	2.1.3 Develop risk maps based on pathway risk analysis to focus the surveillance effort on high risk locations to enhance efficient use of resources.
	Outcomes
	▪ Strong national leadership, partnerships and coordination to optimise surveillance efforts on the grain pests that pose the highest risk and the activities that will deliver the greatest return. ▪ Improved knowledge, ability and technology to detect priority pests along the biosecurity continuum. ▪ Enhanced surveillance efficiency in detecting and managing high priority grain pests to protect the industry from their impacts.

Action 2.2	Tasks
Establish a nationally coordinated grain biosecurity surveillance system for early detection of high priority grain pests	2.2.1 Develop nationally agreed biosecurity surveillance protocols, including those used in 'pantry blitz' style activities, with statistically valid procedures to increase the confidence of early detection across all grain growing regions.
	2.2.2 Develop and deploy a specific surveillance program, including 'pantry blitz' style activities at high risk sites for high priority grain pest establishment, that utilises new technologies.
	2.2.3 Develop a framework to report on the current status of economically important pests of grain (i.e. established or exotic) based on surveillance outcomes and pest interception data.
	2.2.4 Encourage investment in the development and deployment of autonomous systems and sensor technologies for use in specific and general surveillance to increase surveillance capacity and capability.
	Outcomes
	▪ A continuous, integrated, risk-based surveillance system operating across the grain production and supply chains that creates enduring confidence in the early detection of exotic pests and provides evidence of pest status to support area freedom. ▪ Improved knowledge, ability and technology to detect priority pests along the biosecurity continuum.

Goal 3:
Strengthen engagement and partnerships across the grain production and supply chains for the early detection of high priority grain pests

Strong and open engagement between grain industry stakeholders including supply chain participants is essential to improve the biosecurity system as a whole. It will require the development and implementation of an engagement plan between government and industry across the biosecurity continuum to promote and facilitate partnerships along the supply chain to bring together 'one' biosecurity.

Any increased surveillance activities will need to attract new funding from either governments or industry, neither of which will be easily achieved. It is therefore important that the partnership developed under this strategy utilises current monitoring and surveillance activities, and any new initiatives add value to these activities rather than creating any duplication.

The grain industry will also no doubt be subject to increasing government regulation and ethical stipulations as seen in recent discussions on live animal trade, GM canola, glyphosate use and the growing of irrigated cotton. As the grain industry continues to grow and enter the public eye, compliance and its management will become a vital part of risk management. Having effective compliance will be critical to the ongoing working relationship between government and industry and provide a competitive edge for Australia in the evolving global marketplace.

The supply chain in the grain industry is diverse, extremely complex and is without a single coordinating or representative body across both the production and supply chains. Recent industry efforts in developing 'Growing Australian Grain' and the documentation of a range of industry 'codes of practice' have created a solid platform for industry to tackle future challenges such as Non-Tariff-Measures.

Collation of data currently being collected throughout the supply chain will provide industry with information on the evolving pest status in specific parts of the chain to support market access and give confidence in the effectiveness of surveillance for the early detection of exotic pests. It will also allow industry to undertake gap analyses of surveillance efforts and the ongoing evaluation of the strategy.

Development of practical, easy-to-use crop monitoring tools and protocols will be needed to ensure surveillance data, already being captured by growers and their advisers, is collected consistently and can be integrated into a national system for data analysis. For the collection of surveillance data from crop monitoring in commercial production, it is anticipated that data capture tools will ideally align with existing business practices to reduce disincentives for personnel to undertake additional surveillance and provide additional data. Growers and advisers are currently using a range of platforms to record data from surveillance activities. These include, AgWorld, PAM, Phoenix and Fulcrum.

Given the vast area that is sown with grain crops each year in Australia, investment in the development and deployment of innovative technologies, and tools such as smart traps and sensors to record the presence or absence of certain pests, will assist growers and advisers improve their efficiency of surveillance efforts and increase their likelihood of early detection of exotic pests.

Opportunities will be created to pilot new surveillance tools and technologies within the grain surveillance program. Not only will this give a broader cross section of industry experience with some of the latest technology, but it will also allow the program to measure the performance of the tools and their effectiveness in real-time practical trials.

Actions to deliver Goal 3

Action 3.1	Tasks
Develop strategies to protect and enhance market access to continue to grow the industry's international competitiveness	3.1.1 Quantify the costs associated with phytosanitary import requirements to better inform future Free Trade Agreements with our major trading partners.
	3.1.2 Develop contingency plans that include the roles and responsibilities of trade and market access renegotiations, for the priority pests of both market access and early detection concern to lessen the impacts of incursions on domestic and international market access.
	3.1.3 Explore opportunities to share the cost of undertaking surveillance between industries where a pest will affect the viability and trade opportunities for more than one commodity.
	3.1.4 Develop a pilot cost-sharing agreement for specific surveillance activities between industry and government similar to the EPPRD that delivers benefits to government and industry for major categorised pests of market access concern. This agreement should seek to ensure veracity of the data, proper compliance and authorisation and reduce any perceived liability or conflicts of interest.
	Outcomes
	▪ Strong national leadership, partnerships and coordination to optimise surveillance efforts on the grain pests that pose the highest risk and the activities that will deliver the greatest return. ▪ A continuous, integrated, risk-based surveillance system operating across the grain production and supply chains that creates enduring confidence in the early detection of exotic pests and provides evidence of pest status to support area freedom.

Action 3.2	Tasks
Establish mechanisms throughout the supply chain for the collation of monitoring and surveillance information on stored grain to maintain ongoing access to proof of area freedom	3.2.1 Investigate precompetitive collaboration as a way of including grain consignment testing and surveillance with other industry functions.
	3.2.2 Develop efficient and effective coordination and possible data sharing arrangements.
	3.2.3 Develop a strategic consultation and engagement strategy that supports the ongoing working relationship between government and the supply chain participants on the issues that will have the biggest impact on the industry's competitiveness.
	Outcomes
	▪ Strong national leadership, partnerships and coordination to optimise surveillance efforts on the grain pests that pose the highest risk and the activities that will deliver the greatest return. ▪ A continuous, integrated, risk-based surveillance system operating across the grain production and supply chains that creates enduring confidence in the early detection of exotic pests and provides evidence of pest status to support area freedom.

Action 3.3	Tasks
Strengthen general surveillance within the grain industry for exotic and established pests of concern	3.3.1 Align the surveillance activities undertaken across both exotic and established pests and diseases within the different divisions of state agencies and universities to avoid duplication and fragmentation.
	3.3.2 Encourage investment in the development of tools and technologies (including drone and trapping applications) to assist in on-farm or in-crop surveillance.
	3.3.3 Develop practical surveillance protocols for use on-farm by growers and agronomists.
	3.3.4 Establish training opportunities for growers, agronomists and others on the identification of high priority exotic pests of regional concern. (Linked to 4.2.1)
	3.3.5 Further encourage the monitoring and recording of pests and disease in farm record systems.
	Outcomes
	▪ A continuous, integrated, risk-based surveillance system operating across the grain production and supply chains that creates enduring confidence in the early detection of exotic pests and provides evidence of pest status to support area freedom. ▪ Improved knowledge, ability and technology to detect priority pests along the biosecurity continuum.

Goal 4:
Develop the capacity and support required for early detection of high priority grain pests

Improving biosecurity capability and capacity for the grain industry is a key component of this strategy that aims to increase the efficiency of accurately diagnosing early detections.

The establishment of designated diagnostic services at strategic locations across the grain belt will be a key component of enhancing capability and capacity amongst surveillance stakeholders. These services will act as focal points for growers and advisers to interact with grain pest experts within a production area. Other plant-based broadacre industries operating in similar geographic areas, the science and research community, supply chain participants and community groups situated along high-risk pathways will also benefit from these services.

Diagnostic capabilities would be broadened and leveraged to include state agricultural agencies and some universities to accurately identify and report exotic grain pests. Improving communication between agencies and extension networks on pests of biosecurity concern would improve user experience, engagement with industry and ultimately increase the number of samples submitted.

Enhanced diagnostic services will provide timely and informative feedback to industry to ensure industry add value to the system and provide an ongoing supply of samples. Partnerships with the National Plant Biosecurity Diagnostic Network and other science and research networks will be built, and an ongoing investment model will be developed to provide funding and capacity to diagnose samples of suspected exotic pests submitted as a result of surveillance activities.

Actions to deliver Goal 4

Action 4.1	Tasks
Enhance diagnostic services across all grain growing regions for the reliable, timely and accurate diagnosis and reporting of plant pest and diseases	4.1.1 Work with state agencies and universities to develop low cost diagnostic services for all grain growing regions.
	4.1.2 Identify the diagnostic capacity and capabilities required to service a higher throughput of samples received from industry.
	4.1.3 Use the diagnostic services established under the strategy as a source of 'on the job' training for new personnel within the grain industry to recognise and compare symptoms of established and exotic pests from samples submitted.
	Outcomes
	▪ A continuous, integrated, risk-based surveillance system operating across the grain production and supply chains that creates enduring confidence in the early detection of exotic pests and provides evidence of pest status to support area freedom. ▪ Improved knowledge, ability and technology to detect priority pests along the biosecurity continuum.

Action 4.2	Tasks
Improve surveillance capacity and capability across the grain industry that includes providing necessary surveillance tools and training	4.2.1 Establish training opportunities for growers, agronomists and others on the identification of high priority exotic pests of regional concern.
	4.2.2 Deliver practical training for surveillance personnel including government staff, researchers and their technical officers, agronomists, supply chain staff and growers to ensure that they are better able to recognise and report exotic pests and diseases.
	4.2.3 Align reporting functions with a national pest and disease information service that provides comprehensive, timely and accurate information on pest and disease occurrence, dispersion, threshold limits and frequency.
	Outcomes
	▪ A continuous, integrated, risk-based surveillance system operating across the grain production and supply chains that creates enduring confidence in the early detection of exotic pests and provides evidence of pest status to support area freedom. ▪ Improved knowledge, ability and technology to detect priority pests along the biosecurity continuum.

Strategy implementation

The implementation of the Actions and Tasks presented in the NGBSS will require strong stakeholder partnerships, robust governance and a sustainable and equitable funding model. An accompanying Implementation Plan 2019–22 will be prepared that addresses these issues. It will provide further details of the Actions and Tasks necessary to achieve the Objectives, Outcomes and Goals set out in this strategy.

Implementation of the NGBSS will result in an improved plant biosecurity system that provides sustainable protection for Australia's grain industry and its various stakeholders, while maintaining market access for the grain and grain products it produces.

Acronyms and abbreviations

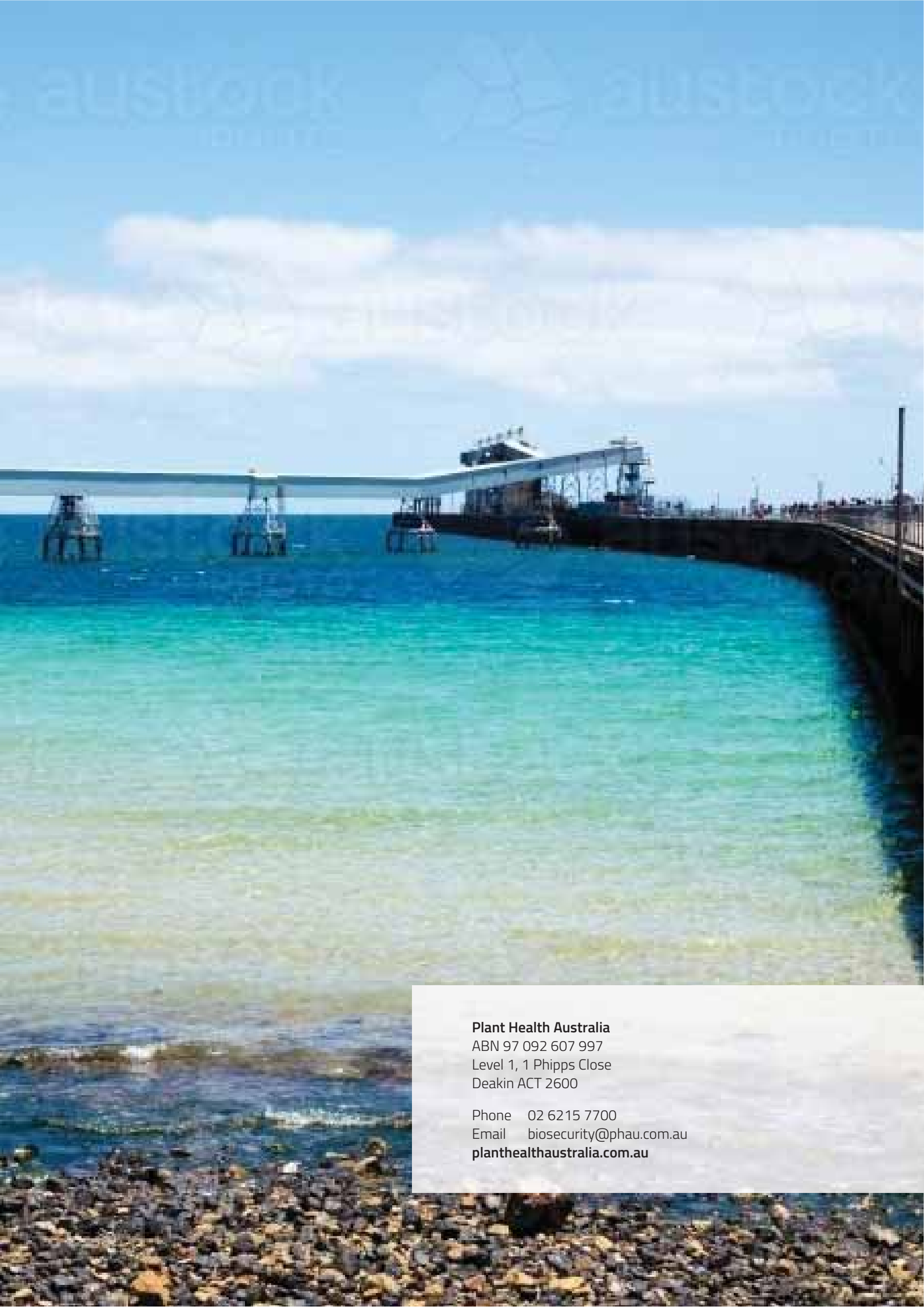
AgForce	AgForce Queensland
AGIDG	Australian Grains Industry Discussion Group
AWB	AWB Ltd (formerly Australian Wheat Board)
CBH	Co-Operative Bulk Handling Ltd
DA	Department of Agriculture
Emerald	Emerald Grain, a wholly owned subsidiary of Sumitomo
EPP	Emergency Plant Pest
EPPR	Emergency Plant Pest Response
EPPRD	Emergency Plant Pest Response Deed
GrainCorp	GrainCorp Ltd
GGL	Grain Growers Limited
GIMAF	Grains Industry Market Access Forum
GPA	Grain Producers Australia
GPSA	Grain Producers South Australia
GRDC	Grains Research and Development Corporation
GTA	Grain Trade Australia
HPP	high priority pest
IGAB	Inter-governmental Agreement on Biosecurity
MICoR	Manual of Importing Country Requirements
NGBSS	National Grain Biosecurity Surveillance Strategy
NPBDN	National Plant Biosecurity Diagnostic Network
NPBDS	National Plant Biosecurity Diagnostic Strategy
NPBS	National Plant Biosecurity Strategy
NPHSP	National Plant Health Surveillance Program
NPBSS	National Plant Biosecurity Surveillance Strategy 2013-2020
NPPO	National Plant Protection Organisation
NSW	New South Wales
NSW Farmers	NSW Farmers Association
NAQS	Northern Australia Quarantine Strategy
PGA	Pastoralist and Graziers Association of Western Australia
PHA	Plant Health Australia
Qld	Queensland
SA	South Australia
SNPHS	Subcommittee on National Plant Health Surveillance
Tas	Tasmania
TFGA	Tasmanian Farmers and Graziers Association
VFF	Victorian Farmers Federation
Vic	Victoria
Vittera	Vittera Australia, a Glencore Agriculture Company
WA	Western Australia

Definitions

Area freedom	Absence of a specific pest in a specified location (which may include pest free areas, pest free places of production or pest free production sites.
Biosecurity activities	Activities undertaken to manage biosecurity risks.
Biosecurity continuum	Describes the range of locations where biosecurity risks may arise and where biosecurity activities take place – pre-border, at the border and post-border.
Border	In relation to the biosecurity continuum: airports, seaports and land borders that represent the potential point of entry for a pest into Australia.
Diagnostics	Processes and standards associated with the accurate identification of a pest.
Domestic quarantine	Activities designed to prevent the movement and spread of pests within Australia.
Emergency Plant Pest	A pest that is included in Schedule 13 (of the EPPRD) or which is determined by the Categorisation Group to meet one or more of the following criteria: ▪ It is a known exotic Plant Pest the economic consequences of an occurrence of which would be economically or otherwise harmful for Australia, and for which it is considered to be in the regional and national interest to be free of the Plant Pest. ▪ It is a variant form of an established Plant Pest which can be distinguished by appropriate investigative and diagnostic methods and which, if established in Australia, would have a regional and national impact. ▪ It is a serious Plant Pest of unknown or uncertain origin which may, on the evidence available at the time, be an entirely new Plant Pest or one not listed in Schedule 13 and which if established in Australia is considered likely to have an adverse economic impact regionally and nationally. ▪ It is a Plant Pest of potential economic importance to the area endangered thereby and not yet present there or widely distributed and being officially controlled, but is occurring in such a fulminant outbreak form, that an emergency response is required to ensure that there is not either a large scale epidemic of regional and national significance or serious loss of market access.
Emergency Plant Pest Response Deed	A pre-agreed cost sharing and response framework for dealing with an incursion of an EPP.
Established pests	A pest that is perpetuated, for the foreseeable future, within any area and where it is not feasible (whether in terms of technical feasibility or a benefit–cost analysis) to eradicate.

Exotic pests	Plant pests that do not normally occur in Australia.
General surveillance	A range of crop monitoring activities outside of specific surveys that can be used to detect the presence or absence of pests, including the presence of new or unusual pests or symptoms. Examples of general surveillance activities in include crop inspections to inform crop management decisions and inspections of harvested grain for quality defects.
High Priority Pest	An exotic pest that has been identified to have one of the highest potential impacts to a particular plant industry as identified through the industry biosecurity planning process or listed in Schedule 13 of the EPPRD.
Pest	Any species, strain or biotype of invertebrate pest or pathogen injurious to plants, plant products or bees or impacting social amenity or the environment.
Plant biosecurity	Plant biosecurity is a set of measures which protect the economy, environment and community from the negative impacts of plant pests. A fully functional and effective biosecurity system is a vital part of the future profitability, productivity and sustainability of Australia's plant production industries and necessary to preserve the Australian environment and way of life.
Plant industries	Covers the industry sectors of agriculture, horticulture, forestry and the environment and amenity plants.
Plant pest	This strategy covers all plant pest organisms, including insects, mites, snails, nematodes and pathogens, that are harmful, injurious or damaging to plants, plant products or bees (this strategy does not cover weeds or parasitic plants).
Precompetitive collaboration	Collaboration that occurs during the stage prior to the consigning or sale of a product, when grain handling , marketing and/or exporting companies collaborate rather than compete.
Specific survey/ surveillance	A surveillance activity conducted over a defined period of time that records the detection of, or confirms the absence of, specific pests.
Surveillance protocol	Technical instructions for site specific methodology for surveillance including purpose, scope, pest target(s), timing, area or site selection, statistical design, data collection and sample handling.

Notes



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