

NEW SOUTH WALES

STATE OF BIOSECURITY

REPORT 2017



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The Hon. N. M. Blair, MLC.
Minister for Primary Industries,
Minister for Regional Water,
Minister for Trade and Industry
GPO Box 5341
SYDNEY NSW 2001

Dear Minister

I am pleased to present the inaugural NSW State of Biosecurity Report 2017.

The report has been prepared by the Department of Primary Industries on behalf of the NSW Biosecurity Advisory Committee to represent the current status of biosecurity in NSW.

Biosecurity is a major factor for the ongoing wellbeing of the NSW economy, environment and our community. Biosecurity protects our ability to sell our primary industry products and encourages new market access. It protects the jobs, production and quality of the agricultural and food industries. It also protects the biodiversity of our environment and the health of our communities.

The report aims to describe the wide-ranging risks affecting biosecurity and the measures in place to address them, new and emerging risks and the gaps and opportunities to improve management of biosecurity. The report also identifies some critical data sets as a baseline for future reporting.

I commend the report to you.

David Palmer

Chair, NSW Biosecurity Advisory Committee
December 2017



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ABBREVIATIONS

ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences	J-BAS	Johne's market assurance program
AGMIN	Agriculture Ministers' Forum	LCA	Local Control Authority
AGSOC	Agriculture Senior Officials Committee	LGA	Local Government Area
AHA	Animal Health Australia	LHMS	Livestock Health Management System
App.	Application	LLS	Local Land Services
Ausgem	Australian Centre for Genomic Epidemiological Microbiology	LPA	Livestock Production Assurance
BFS	Department of Primary Industries Biosecurity and Food Safety	MERI	Monitoring, Evaluation, Reporting and Improvement
BMAD	Bell Miner Associated Dieback	MLA	Meat and Livestock Association
CA	Certification Assurance	MOU	Memorandum of Understanding
CISS	Centre for Invasive Species Solutions	NATA	National Association of Testing Authorities, Australia
DNA	Deoxyribonucleic acid	NBC	National Biosecurity Committee
EADRA	Emergency Animal Disease Response Agreement	NEBRA	National Environmental Biosecurity Response Agreement
EDM	Ecological Deer Management	NESB	Non-English Speaking Background
EMAI	Elizabeth Macarthur Agricultural Institute	NGO	Non-Government Organisation
EMPLAN	NSW State Emergency Management Plan	NLIS	National Livestock Identification System
EMtrain	NSW Emergency Management Learning and Development Program	NSW DPI	Department of Primary Industries
EPP	Emergency Plant Pest	NSW OEH	NSW Office of Environment and Heritage
EPPRD	Emergency Plant Pest Response Deed	OIE	World Organisation for Animal Health
EUS	Epizootic ulcerative syndrome	PHA	Plant Health Australia
FAO	Food and Agriculture Organisation of the United Nations	PHAC	Plant Health Assurance Certificates
FMD	Foot and Mouth Disease	PHC	Plant Health Certificate
GBD	General Biosecurity Duty	PIC	Property Identification Codes
GDP	Gross Domestic Product	POMS	Pacific Oyster Mortality Syndrome
GIS	Geographic Information System	QX	QX Oyster Disease
IACRC	Invasive Animals Cooperative Research Centre, now Centre for Invasive Species Solutions	R&D	Research and Development
ICA	Interstate Certification Assurance	RDC	Research & Development Corporations
IGAB	Inter-Governmental Agreement on Biosecurity	RHDV	Rabbit Haemorrhagic Disease Virus
ISO	International Standards Organisation	SEMP	State Emergency Management Plan
		SOB	State of Biosecurity
		UTS	University of Technology Sydney
		WRM	Weed Risk Management
		WAP	NSW Weeds Action Program



EXECUTIVE SUMMARY

The inaugural **NSW State of Biosecurity Report 2017** is an assessment of the status of biosecurity in NSW and highlights progress in achieving the objectives of the NSW Biosecurity Strategy (2013-2021). Produced by the NSW Department of Primary Industries on behalf of the NSW Biosecurity Advisory Committee, the report will be released every four years.

Biosecurity is defined as the protection of the economy, environment and the community from the negative impacts associated with pests, diseases and weeds. It is vital for the health, wellbeing and prosperity of everyone in NSW.

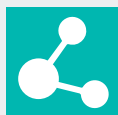
This report uses the NSW Biosecurity Strategy (2013-2021) and its goals as its overarching framework. The strategy guides biosecurity

management in NSW and is regarded as a significant achievement.

This report provides a narrative of the work being conducted in NSW (drawing data from the period 2008 to 2017), reviews future trends and promotes recommendations for ongoing biosecurity performance measurement.

In this first NSW State of Biosecurity Report, the focus is on developing a 'baseline' set of indicators and providing an assessment where data is available and robust. The report identifies areas where adequate data sets are not currently available, but could enhance future reporting. Biosecurity risks (current and future) and mitigation actions are identified throughout the report.

NSW BIOSECURITY STRATEGY (2013-2021)



Goal 1: BIOSECURITY IS A SHARED RESPONSIBILITY

Engagement of all stakeholders (industry, other jurisdictions, and crucially, the wider community) is imperative for good biosecurity outcomes in NSW.



Goal 2: BIOSECURITY CONTRIBUTES TO SUSTAINABLE ECONOMIC GROWTH

AND...



Goal 3: BIOSECURITY PROTECTS THE ENVIRONMENT AND COMMUNITY

Management of biosecurity risks contributes to sustainable economic growth, protecting the environment and improving community wellbeing.



GOAL 4: BIOSECURITY IS UNDERPINNED BY A RESPONSIVE AND CONSISTENT LEGISLATIVE FRAMEWORK

The effectiveness of any biosecurity system is underpinned by the quality of its regulation and compliance programs.

HOW NSW BENEFITS FROM BIOSECURITY

Successful biosecurity is intrinsic in protecting NSW's Gross State Product and supporting businesses, the environment, our biodiversity and the lifestyle and amenity of NSW people. In a snapshot, the NSW biosecurity program protects:

- **46,860** farm businesses
- **876** commercial fishing businesses
- The jobs of **152,684** NSW people directly employed in agriculture and food production
- **\$15.42 billion** worth of primary production annually
- **\$113 billion** value of food production annually
- **\$5.1 billion** worth of food exports annually from NSW
- The NSW tourism industry (valued at **\$37 billion**, with environmental tourism valued at \$7.2 billion in 2015-16)¹
- The **flora and fauna** that make up the NSW environment
- The **social amenity** of public and private spaces for NSW populations
- The **people of NSW** from animal transmitted diseases.

HOW BIOSECURITY IS MANAGED IN NSW

Managing biosecurity in NSW requires a strategic and integrated approach which is led by government. Policy, regulation and the analysis of risk all provide a basis for managing biosecurity through partnerships between government, industry and the community. This partnership is described as 'shared responsibility' – where everyone in NSW has responsibility for supporting surveillance, prevention and responses to biosecurity incidents.

NSW's biosecurity stakeholders

While the NSW Government takes a prominent leadership and coordination role in the management and protection of biosecurity in NSW, the role of industry and the community as partners is crucial to its success.

Biosecurity stakeholders in NSW include:

- Farmers/primary producers
- Land managers – private and public
- Urban, peri-urban and regional community members
- Environmental organisations and community groups
- Ministers and Government agencies
- Food and fibre Industry representative bodies
- Agri-business
- Tourism business
- Livestock saleyard operators
- Abattoirs
- Food industry supply chain.

Stakeholders' needs and interests are varied and sometimes conflicting. Each stakeholder can have quite specific skills, behaviours, knowledge or awareness and these influence the way biosecurity risks are managed.

Recent social research undertaken in NSW (and across Australia) indicates that there is a wide gap in biosecurity awareness and knowledge held by stakeholders. Future State of Biosecurity reports will continue to monitor stakeholder understanding and attitudes and report on the success of programs to influence improvements.

¹ Destination NSW 2017, Economic Contribution of Tourism to NSW 2015-16, accessed 21 August 2017

Elements critical to running an effective biosecurity system

Biosecurity surveillance, diagnostics and traceability

Surveillance is a critical component of an effective biosecurity system. NSW Department of Primary Industries, Commonwealth Department of Agriculture and Water Resources, Local Land Services, Local Government and the NSW Office of Environment and Heritage coordinate, promote and participate in surveillance activities at state and national levels, along with industry and the community as major participants. Active surveillance programs are in place for animal and plant pests and diseases, aquatic pests and diseases, invasive weeds, pests and animals.

The world class analytical and diagnostic facilities in NSW support surveillance outcomes and ensure that diagnosis is rapid and accurate. In 2016-17, over 500,000 diagnostic tests (from 20,000 customers) were delivered, including:

- Over 400,000 animal tests (mostly cattle and sheep)
- Over 6,000 tests to confirm exclusion of notifiable diseases (with a large majority of these tests facilitating Australian export trade for animals and plants)
- A further 27,000 (2015-2017) related to plants (with 150,000 analytical tests undertaken on oils and stockfeed).

To ensure traceability of livestock to manage stock diseases, the Property Identification Code (PIC), National Livestock Identification System (NLIS) national database and the NSW Biosecurity Information System allows tracking of livestock movements in real time. In 2017, there were 107,286 active PICs in NSW.

Passive surveillance by members of the public is also a significant factor in successful biosecurity management and resources are being directed to encourage public awareness and provide mechanisms (such as the NSW Biosecurity Helpline) to facilitate reports of incursions (see **Figure 2**).

Compliance

The new *Biosecurity Act, 2015* and regulations introduced in 2017, clarified the obligations of the NSW population under their General Biosecurity Duty and introduced changes to compliance delivery. Compliance officers (NSW DPI, Local Land Services and Local Control Authorities) undertake regular audits and verification inspections to ensure biosecurity practices are properly implemented ensuring ongoing market access for trade. In 2016-17, 6,650 compliance activities were conducted to protect NSW biosecurity.

Human health and social amenity

Strong biosecurity will help protect the NSW population from zoonotic diseases. These diseases are bacterial, fungal and viral illnesses that can be transferred, either through direct contact or through the environment, from animals to humans. Several of these diseases are endemic to NSW including Q Fever, Hendra, Anthrax and the Australian Bat Lyssavirus. In 2016, there were 225 cases of Q Fever detected in NSW. Annual rates for the disease in the State vary, but have dropped since the early 1990's. NSW also undertakes surveillance work for some zoonotic diseases (such as Bovine spongiform encephalopathy) to facilitate international trade of NSW animal products to international markets. Certifying disease freedom is an important aspect of NSW's biosecurity work.

The amenity of public spaces is also a biosecurity outcome that supports the productivity and social fabric of the people of NSW. Biosecurity threats from pests such as the Red Imported Fire Ant (RIFA) can have a devastating impact on public amenity if left unchecked. In 2014-15, NSW successfully eradicated an incursion of RIFA at Port Botany.

Biosecurity incident response

Between 2008 and 2017 there have been 24 national biosecurity plant and animal disease and pest incident responses costing \$526 million. This cost was shared with the Commonwealth and other states and territories under the national biosecurity deeds. In that time, five of those responses were in NSW. In 2016-17, emergency management and incident response has been a significant focus for NSW DPI and Local Land Services.



Invasive species identification and management

Invasive species are a major biosecurity threat to NSW's economy, environment and the community. Examples of the impact of invasive species include the following:

- The estimated annual cost to the NSW economy from lost production and the associated costs of managing weeds is \$1.8 billion
- The estimated annual economic loss to the NSW economy from the impact of major pest animals in NSW is \$170 million
- Since records began, the number of NSW's native animals estimated to have been driven to extinction by predation and competition from introduced species is 19%
- 90% of the biomass in the Murray-Darling Basin river system is estimated to be European Carp.

The development of indicators to identify the impacts of invasive species and the effectiveness of management practices is a significant component of this inaugural State of Biosecurity Report. Future reports will refine the indicators and report on changes in distribution and population size of invasive species in NSW and the effectiveness of stakeholder and agency driven programs. The need for improvements in surveillance efficacy (particularly in the plant and aquatic domains) has been identified in the 2017 Intergovernmental Agreement on Biosecurity

(IGAB) review, and NSW is currently working with stakeholders to improve surveillance program outcomes.

THE FUTURE

The ongoing management of biosecurity in NSW will be influenced by many factors. Risks to biosecurity are increasing in part as a result of climate change and increasing trade and travel movements. Some factors will reduce risks, such as the availability of new and improved technology for diagnostics and surveillance, and the improvement of policy and legislative instruments. Factors influencing the future of biosecurity management include:

- New legislation and regulations
- Increases in biosecurity risk
- Market access and industry outcomes
- Advancements in science and technology
- Increase in stakeholder knowledge and skills.

Impacts of new legislation and regulations

The NSW Biosecurity Strategy (2013-2021) provides the framework for biosecurity management in NSW. The Strategy aims to raise community awareness of biosecurity issues and outlines how government, industry and the community need to work together to manage biosecurity risks. The implementation of the NSW Biosecurity Strategy is underway and outcomes are being monitored. The second State of Biosecurity Report will outline its effectiveness.

The introduction of the *Biosecurity Act 2015* and the *Biosecurity Regulation 2017* provide controls for the movement, distribution, cultivation and control of species that cause, or may cause harm, to the economy, environment and community of NSW. Under the *Biosecurity Act 2015*, stakeholders have a General Biosecurity Duty – an obligation to manage biosecurity risks. The General Biosecurity Duty reflects the principle of shared responsibility that has been a driving part of biosecurity policy across Australia for over 10 years. A monitoring and evaluation program will determine the impacts of the new legislation and regulations, with findings reported in future State of Biosecurity reports.

Increases in biosecurity risk

The Australian Government is responsible for managing biosecurity matter at Australia's national borders. The NSW government oversees the management of biosecurity matter across NSW borders, including the movement of goods and people into and out of NSW. A major risk focus for NSW is the movement of biosecurity risk material into NSW from other states and territories and from overseas. The Australian Government reported that in 2015-16 there were 138 million items posted into Australia, with 26,000 risk items intercepted². Increasing freight movements and air and sea passenger travel pose significant risks. A second international airport in NSW will introduce additional transport-related biosecurity risks. The Sydney Peri-urban Project is working in this region to maximise stakeholder awareness of biosecurity risks and engagement in risk management practices.

NSW DPI's recent stakeholder surveys indicated that the general public understands the high biosecurity risk of physical travel, as well as the role of airport quarantine regulations. However, there is currently low recognition that the trade of goods via e-trade could produce biosecurity threats. This is a significant area for future engagement and awareness programs in NSW. Ongoing monitoring of stakeholders' understanding and attitude to biosecurity will be used to inform the delivery of targeted programs aimed at minimising risk behaviours. NSW will continue to assess and report against the success of these programs and the relative risks.

Climate change is a significant emerging risk likely to cause changes in natural boundaries for weeds, pests and diseases as new conditions modify spread patterns. Climate change will see habitats for invasive pest species altered, potentially expanding their spread (e.g. cane toads and cattle tick) and increasing their impact. NSW DPI and other agencies are continuing to monitor and model climate change to determine impacts and develop mitigation strategies to reduce risks from changing climatic conditions. Future State of Biosecurity reports will identify potential and real impacts from climate related risks (particularly in relation to disease and invasive species population and distribution changes) and report on the effectiveness of mitigation practices.

Market access and industry outcomes

Market access is a key biosecurity outcome for NSW. Biosecurity is critical for the protection of NSW's \$113 billion food industries, and \$15 billion primary production industries. Biosecurity continues to protect our existing markets and facilitate the expansion of NSW produce into new markets. Widening surveillance programs to meet increasing 'Proof of Freedom' market access requirements have been identified in the IGAB Review and are a priority for NSW DPI. Outcomes will be reported in future State of Biosecurity reports.

In summary, NSW biosecurity systems cover a broad range of activities and protect and support significant economic, environmental and community assets and interests. Future State of Biosecurity reports will continue to build baseline data, monitor change, report on outcomes and make recommendations for improvements to our biosecurity system.

² Department of Agriculture and Water Resources, 2015 accessed 21 August 2017



CHAPTER 1: INTRODUCTION

The inaugural NSW State of Biosecurity Report 2017 is an assessment of the status of biosecurity in NSW and highlights progress in achieving the objectives of the NSW Biosecurity Strategy 2013-2021.

Biosecurity is defined as the protection of the economy, environment and the community from the negative impacts associated with pests, diseases and weeds. It is vital for the health, wellbeing and prosperity of everyone in NSW.

(NSW DPI 2013)

ABOUT THIS REPORT

This report provides the people of NSW with a summary of activities being undertaken to protect the NSW economy, environment and community from biosecurity risks. It:

- Investigates how economic, social, scientific and environmental factors will impact on the delivery of services in the future
- Identifies preparedness, prevention, response and recovery programs delivered by government and non-government sectors that support the NSW biosecurity system
- Provides benchmark data for future reporting
- Examines trends and risks facing NSW biosecurity.

Areas which are important to biosecurity, but not within scope of this report (as they are not managed through biosecurity legislation), include: animal welfare, genetically modified organisms and crops, and chemical contamination of land and the environment.

The NSW State of Biosecurity Report will be submitted to the NSW Parliament every four years. The BAC is an independent chaired body established by the Minister for Primary Industries.

WHY BIOSECURITY IS IMPORTANT

Biosecurity benefits NSW by protecting us from the negative impacts of animal and plant pests, diseases and weeds. A robust biosecurity management system brings with it a range of benefits for NSW, including:

1. Supporting economic growth – through profitable agriculture and tourism
2. Protecting the environment
3. Safeguarding the health and amenity of our community.

NSW works closely with the Australian Government, other jurisdictions, the community and industry to protect the State and Australia from biosecurity risks. Annual agricultural production in Australia is valued at \$59 billion, with an additional \$45 billion generated nationally in agricultural exports (ABARES 2016).

Working with other jurisdictions, industry and the community, NSW also seeks to protect the diverse range of ecosystems in NSW. Biosecurity is an important part of the State's efforts to protect the natural environment, including the 999 species (NSW Environment Protection Agency, 2015) currently listed as threatened in NSW, as well as the State's \$37.1 billion tourism industry (Destination NSW, 2015), which is heavily marketed based on our natural environment.

In summary, biosecurity supports economic growth, protects the environment and helps to safeguard the community.

1. Supporting economic growth

Pests and diseases can have significant effects on the economy through their negative impact on valuable commercial and recreational industries. Disease outbreaks can restrict product movements which can hamper production, trade and jobs and affect animal welfare. They can also add significant cost when control measures or emergency management is required. Flow on effects can also impact transport and tourism activities and have long term negative impacts on market access for NSW products.

PRIMARY INDUSTRIES IN NSW – A SNAPSHOT 2017

46,866

**farm-based
businesses**



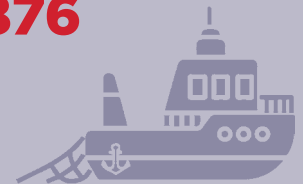
\$5.1 billion

**in food
exports**



876

**fishing
businesses**



\$15.4 billion
**in primary
production
annually**



152,684
**employed in
agriculture and
food sectors**



\$113 billion

**in food
production
annually**



NSW's strong biosecurity status encourages NSW agricultural trade in both national and international markets through disease and pest free status. The primary industries sector in NSW has a gross value exceeding \$15 billion each year and accounts for about 20% of Australian agricultural production, with the extended value estimated to be \$27.9 billion (NSW DPI 2017).

2. Protecting the environment

NSW is home to a diverse range of ecosystems, spread across public and private lands and in our marine waters. These unique ecosystems and environments require strong biosecurity to protect them from introduced pests and diseases. Invasive pests and diseases are among the biggest threats to native biodiversity and the natural environment in NSW. Invasive pests, weeds and diseases are usually hardy and adaptive species with high reproductive capability.

Biosecurity supports food safety across the food industry supply chain – from ocean and paddock to plate.

They negatively impact native species through competition for resources, predation, habitat modification or destruction and disease transmission. Invasive species are thought to impact over 70% of plants, animals and insects listed under the NSW *Threatened Species Act 1995* (Coutts-Smith et al. 2007).

Biosecurity is important to reduce the threat of new species damaging the NSW environment and to help limit the spread and impact of invasive species already present. Many environmental pests have become established in NSW, including

foxes, feral cats, feral goats, rabbits, European carp and numerous weed species that are now beyond eradication or effective containment.

Pests and weeds harmful to the environment often also impact other sectors – such as social amenity, fishing, tourism, cropping, and livestock operations. They can also damage buildings, roads, wharves and other structures. Importantly, failures in biosecurity often bring significant environmental problems with negative impacts on biodiversity through predators, competition and disease.

3. Safeguarding the health and amenity of our community

Biosecurity risks can affect the community by impacting human health, and our social wellbeing by impacting our recreational use of the environment. For example:

- Viral diseases (such as the Hendra virus and Australian Bat Lyssavirus) pose serious human health risks
- Terrestrial and aquatic weeds can create physical impediments affecting activities such as hiking, camping, swimming, fishing or boating, as well as visually impacting the aesthetic values of natural landscapes and waterways
- Freshwater weeds such as Alligator weed and Cabomba can clog waterways, degrade water quality and impact native flora and fauna
- Introduced aggressive insect pests such as the European wasp can cause painful stings and life threatening anaphylactic reactions, while the Red Imported Fire Ant can cause painful bites on people, pets and livestock.

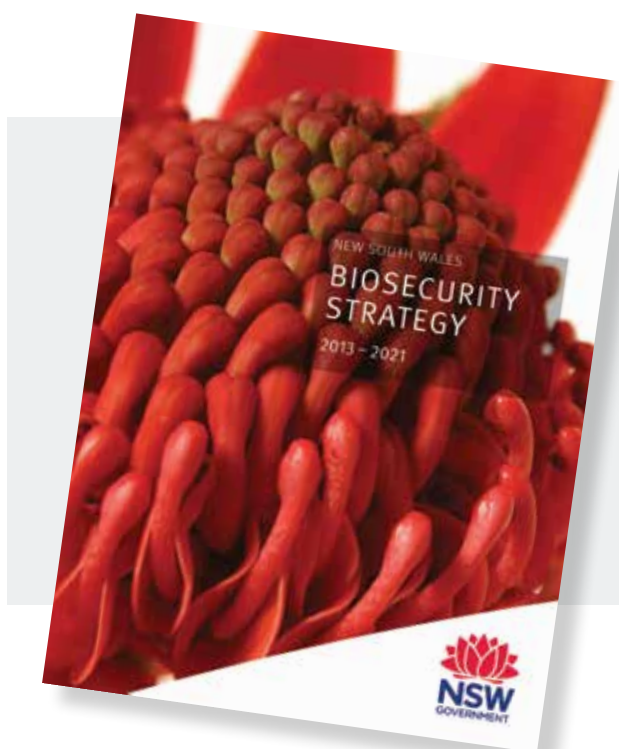
Other risks include zoonoses – animal diseases that can be transferred to humans. Examples include bacterial diseases such as anthrax (which can be transferred from contact with an animal) and salmonella (which can be transferred through contaminated food).

ESTABLISHING AN EFFECTIVE FRAMEWORK FOR BIOSECURITY MANAGEMENT IN NSW

Released in 2013, the NSW Biosecurity Strategy (2013-2021) provides a framework for biosecurity management in NSW.

The Strategy aims to raise community awareness of biosecurity issues and outlines how government, industry and the community need to work together to manage biosecurity risks that affect:

- Animal and plant industries (including agriculture, aquaculture, recreational and commercial fishing and forestry)
- Biodiversity and the natural (terrestrial and aquatic) and built environment
- Human health:
 - ▶ Directly – through food organisms, the transfer of zoonotic diseases between animals and humans or through weed species that can cause asthma and allergic reactions, or
 - ▶ Indirectly – through the ingestion of chemically-contaminated food products arising from pest and disease treatment or pathogen-contaminated food



- Lifestyle, recreation and social amenity
- Infrastructure and service industries – including energy, shipping and water supplies.

The *Biosecurity Act 2015* and the *Biosecurity Regulation 2017*, provide controls for the movement, distribution, cultivation and control of species that cause, or may cause harm, to the economy, environment and community of NSW.

Under the *Biosecurity Act 2015*, stakeholders have a General Biosecurity Duty – an obligation to manage biosecurity risks. General Biosecurity Duty brings to legislation the principle of shared responsibility that has been a driving part of biosecurity policy across Australia over the past 10 years. It is where everyone in NSW has responsibility for supporting surveillance, preparedness, prevention and responses to biosecurity incidents.

Managing biosecurity in NSW requires a strategic and integrated approach. Policy, regulation and the analysis of risk all provide a basis for managing biosecurity through partnerships between government, farmers and industry and the general community. Biosecurity risk creators (people whose activities create biosecurity risks) and the beneficiaries of effective biosecurity must all be active in supporting positive biosecurity outcomes. NSW's approach to managing biosecurity is driven by the NSW Biosecurity Strategy (2013-2021). This is underpinned by regulation, education and compliance programs and a wide range of partnership agreements and plans.

Prior to the *Biosecurity Act 2015*, the former legislative framework failed to recognise and formally acknowledge the important role played by farmers, industry and the community in the management of biosecurity risks. Furthermore, it was highly reliant on government intervention

and enforcement by inspectors and authorised officers and it favoured a significant government responsibility for emergency and ongoing control programs.

This focus has shifted with the introduction of the *Biosecurity Act 2015* and the *Biosecurity Regulation 2017* to one of a shared responsibility and the principle of a General Biosecurity Duty. The General Biosecurity Duty can apply to anyone and provides that any person who deals with biosecurity matter or a carrier, and who knows (or ought reasonably to know) of the biosecurity risk posed (or likely to be posed), has a biosecurity 'duty' to ensure that the risk is prevented, eliminated or minimised – so far as is reasonably practicable.

While the State Government takes a prominent leadership and coordination role in the management and protection of biosecurity in NSW, the role of farmers, industry and the community as partners is crucial to its success.



European carp

CHAPTER 2: BIOSECURITY IS A SHARED RESPONSIBILITY



GOAL 1 BIOSECURITY IS A SHARED RESPONSIBILITY

Prevention, early identification and reporting are critical to containing new biosecurity risks. Effective management of biosecurity risks requires awareness and engagement of all stakeholders. Community members who are recreational users of the environment may be the first to notice something unusual – for example when hiking, gardening or swimming or shopping in garden nurseries or aquarium shops. Industry members, such as producers, can participate in surveillance activities and follow industry codes of practices to minimise risks and promptly report suspected pest and diseases. *Table 6* (at the end of this section), outlines the achievements and future implementation activity against the NSW Biosecurity Strategy outcomes for Goal 1.

OUTCOMES

1 Improved community engagement in biosecurity management

2 Stronger partnerships across the biosecurity spectrum

- During recreational activities (e.g. hiking, biking, fishing, 4WD driving)
- As participants in community projects, and
- By assisting in the early detection of pests and diseases by reporting suspected occurrences.

NSW DPI, Local Land Services and Local Control Authorities work in partnership with farmers, industry and the community to encourage greater understanding of biosecurity and food safety practices and support for innovation. The NSW DPI Biosecurity and Food Safety Branch plays a major role in communicating and promoting best practice. Regional strategies, local management plans and advisory materials also provide guidance on how to discharge the General Biosecurity Duty.

To help raise awareness, NSW DPI will continue to promote biosecurity education and information sharing. Programs such as 'Investigate' in NSW schools and a major initiative 'Backyard Biosecurity Warrior' at the 2017 Royal Easter Show are examples of targeting young stakeholders early.

Understanding stakeholder attitudes: 2016 Biosecurity Attitudinal Research

To contribute to a better understanding of attitudes towards biosecurity across the community and primary producer sectors, NSW

1 COMMUNITY ENGAGEMENT IN BIOSECURITY MANAGEMENT

Critical to the achievement of biosecurity outcomes in NSW is the successful engagement and involvement of farmers, industry and the general community in biosecurity management practices. As well as understanding why biosecurity is important for NSW, at some stage stakeholders will be engaged in activities where they have a biosecurity 'duty' and will therefore need to understand the biosecurity practices relevant to them. An integral part of biosecurity prevention, preparedness, response and recovery is for community members to identify and respond to:

- Biosecurity risks on their own properties or backyards

DPI undertook Biosecurity Attitudinal Research in 2017, surveying over 1,500 rural, regional and urban stakeholders. This and future surveys are planned to provide a baseline to measure changes in attitudes, knowledge, understanding and behaviours of biosecurity risk and management across primary producers, peak organisations, key stakeholders and the community. This data will be used to guide engagement and tailor messaging and education for targeted stakeholder groups.

Research was conducted (between 2016 and 2017) across all major regions of NSW. Quotas were imposed to ensure sufficient respondents in each region and to allow for comparison and analysis. Two cohorts were engaged:

- **General Population** – 1,149 online interviews and eight focus groups, and
- **Primary Producers** – 400 telephone interviews and 42 stakeholder consultations and two focus groups.

Responses from the research underlined a general

belief held by both the community and primary producers that biosecurity relates specifically to threats from outside Australia and that this is the responsibility of government to manage. The outcome of the survey indicates the importance of further education and awareness programs in NSW – to increase community acknowledgement of shared responsibility and the importance of their participation at all points in the biosecurity continuum.

Respondents regard government as having the major responsibility for managing any biosecurity threats, although when prompted, there is a high level of recognition that individuals, industry, government and the community actually share the responsibility.

The Department of Agriculture and Water Resources also surveyed biosecurity stakeholders in 2016 and the biannual Australian Farm Survey sponsored by Animal Health Australia and Plant Health Australia also provided data in 2016. Where data was comparable, differences and

similarities with NSW DPI data is shown in the following tables.

Table 1: NSW DPI Biosecurity Attitudinal Research (2016) – perceptions of biosecurity definitions and importance

Issue	NSW general population 2016	NSW primary producers 2016	2016 AHA/PHA Farm Biosecurity Program Survey (Australian primary producers)	Australian Government Survey of primary producers 2016
Biosecurity is regarded as important	51%	85%	-	88%
Understand biosecurity as a term	50%	81%	60%	78%
Define biosecurity as controlling pests and weeds (unprompted)	13%	46%	56%	53%
Define Biosecurity as controlling diseases (unprompted)	21%	49%	56%	60%

The research found that government is seen to have major responsibility for managing any biosecurity threats, although when prompted, there is a high level of recognition that individuals, industry, government and the community share the responsibility. See **Table 2**.

Table 2: NSW DPI Biosecurity Attitudinal Survey (2016) – taking responsibility for biosecurity in NSW

Issue	NSW general population 2016	NSW primary producers 2016
Individuals are responsible for biosecurity	53%	81%
Government, industry and community responsible for biosecurity	64%	62%

The full report on the outcomes of the 2016 NSW Biosecurity Attitudinal Survey can be accessed at: <http://www.dpi.nsw.gov.au/biosecurity/biosecurity-legislation/attitudinal-research-program>

Primary producer responses

Responses were provided by 400 primary producers across NSW from livestock, cropping, horticulture, forestry and fishing industries in eleven locations. Primary producers are frontline biosecurity stakeholders whose businesses provide them with immediate surveillance opportunities and an incentive to act.

Key research findings:

- 9% of primary producers said they ‘don’t know’ why biosecurity is important
- 67% of respondents regarded biosecurity as a shared responsibility between primary industry and government
- 47% of respondents had a biosecurity plan in place and 32% have a cash reserve to deal with an emergency biosecurity issue
- Compliance requirements were seen as the ‘least likely’ reason to undertake biosecurity measures.

Key messages and issues

According to the survey, primary producers do not identify biosecurity as a common term or set of actions they undertake specifically to address biosecurity risk. The work they conduct that government calls “biosecurity” is considered standard business practice by most property managers. The survey revealed that 9% of NSW primary producers did not understand the importance of biosecurity as it related to their business model or the community. The development and delivery of education and communication programs is essential to ensure that all property managers can identify and understand the importance of biosecurity practices to their business, the environment and community of NSW.

Research found primary producers identified weakness in the identification and prevention of biosecurity risks and that government has a role in ensuring primary producers are aware and are given means to manage any threats. Preferred communication paths of information to primary producers identified in the interviews is through channels that are both trusted and allow for personalised consultation, including from Local Land Services.

The ability to act against biosecurity risks was not motivated by a consideration of biosecurity itself, but because the actions undertaken represented good farming practices and are key to producing good yields etc. Specific biosecurity actions – such as having cash reserves to manage disease or pest incursions or a biosecurity plan in place – were seen as a lower priority or as an example of unnecessary paperwork.

NSW primary producers have shown they have significant understanding about what behaviours can be undertaken to improve biosecurity in NSW, with a stronger focus on eradication and management compared to preparedness and prevention work. The data is similar to the National Farm Biosecurity Survey which found producers referenced control activities more frequently than prevention activities when discussing biosecurity.

Table 3: Top 5 behaviours nominated by primary producers to improve biosecurity in NSW. (NSW DPI Biosecurity Attitudinal Survey, 2016)

NSW primary producers 2016 (DPI)	2016 Farm Biosecurity Survey (Australian primary producers)
Take steps to eradicate known disease, weeds or pests (99%)	Control weeds (30%)
Regularly monitor plants and/or livestock for disease, weeds or pests (98%)	Control livestock pests and diseases (27%)
Investigate and/or report any instances or sightings of unusual disease, weeds or pests (93%)	Control cropping pests and diseases (22%)
Ensure feed / grain / plant matter stored in optimal environment (89%)	Clean machinery entering property (16%)
Routinely consult with experts (85%)	Restrict access to property (16%)

General population responses

Biosecurity awareness and active participation of the community is an essential component of effective biosecurity risk management. Members of the community provide effective “eyes and ears” to detect incursions and support the ongoing management of established pests, diseases and weeds.

Community members who are not primary producers also have opportunities to contribute to NSW’s biosecurity in many ways. For example, prevention and surveillance are areas where home gardeners, travellers, bush walkers and e-traders all have an opportunity (and a General Biosecurity Duty) to contribute. The 2015 Red Imported Fire Ant (RIFA) infestation eradication at Port Botany demonstrated that the general community and emergency service volunteers can contribute significantly in the eradication phase

of a biosecurity incident. During the Port Botany RIFA response NSW DPI received over 700 calls from community members supporting the official surveillance activities and reporting potential RIFA incursions throughout the four response phases.

In 2016-17, there were 2,169 calls and emails to the NSW Biosecurity Hotline reporting biosecurity issues. There were 241,964 web views for biosecurity information in the same period. Facebook is also providing a significant resource for biosecurity information with over 12,500 users and a reach of 177,766 people in 2016-17. This does not include the direct contact by community and industry members with NSW DPI staff, Local Lands Services biosecurity officers, and staff from OEH and National Parks, NSW Health and Local Government.

Key research findings

- 50% of the participants demonstrated no real understanding of what biosecurity is
- 18-39 year olds rated the importance of biosecurity higher and were more confident to act on any potential biosecurity issues compared to those 60+
- Biosecurity is predominantly seen as the responsibility of government, followed by primary producers and related industry groups
- 51% of participants self-assessed that they have sufficient knowledge and ability to prevent, eliminate and minimise biosecurity risks
- Behaviours tend to be the result of perceived enforcement and /or habit, as opposed to being prompted by specific biosecurity concerns.

Key messages and issues

Research from the attitudinal surveys has highlighted the need for a focus on education, training and engagement to increase the general populations understanding of biosecurity.

Table 4: Top 5 biosecurity activities nominated by the general population for managing biosecurity in NSW (NSW DPI Biosecurity Attitudinal Survey, 2016)

NSW general population (2016)
1. Be vigilant about meeting all quarantine requirements at the airport (65%)
2. Dispose of garden weeds through council collections (53%)
3. Keep garden weeds under control to stop spread (39%)
4. Disposing of aquarium fish and weeds appropriately (37%)
5. Wash camping equipment thoroughly after use (35%)



Tilapia (Male)

The data shows the general population is more inclined to adopt good biosecurity practices where minimum effort is required from the individual and where information is provided.

Table 5 combines data from the NSW survey, the Australian Farm Survey (which captures data from primary producers across Australia) and a recent survey of primary producers undertaken by the Australian Government (DAWR).

Table 5a: Comparison of findings from Biosecurity Attitudinal Surveys conducted in 2016-17

Issue	NSW general population 2016	NSW primary producers 2016	2016 Farm Biosecurity Survey (Australian primary producers)	Australian Government Survey of primary producers 2016
Understand biosecurity as a term	50%	81%	60%	78%
Biosecurity is regarded as important	51%	85%	-	88%
Define biosecurity as controlling pests and weeds	13%	46%	56%	53%
Define Biosecurity as controlling diseases	21%	49%	56%	60%
Individuals are responsible for biosecurity	53%	81%		-
Government, industry and community responsible for biosecurity	64%	62%		92%
Believe they have sufficient knowledge to respond biosecurity issue	51%	68%		-
Have a biosecurity Farm Plan	N/A	47%	-	38%

Table 5b: Comparison of findings from Biosecurity Attitudinal surveys conducted in 2016-17

Issue	NSW general population 2016	NSW Primary producers 2016	2016 Farm Biosecurity Survey (Australian Primary Producers)	Australian Government Survey of Primary Producers 2016
Top 5 Behaviours	<ol style="list-style-type: none"> 1. Be vigilant about meeting all quarantine requirements at the airport (65%) 2. Dispose of garden weeds through council collections (53%) 3. Keep garden weeds under control to stop spread (39%) 4. Dispose of aquarium fish and weeds appropriately (37%) 5. Wash camping equipment thoroughly after use (35%) 	<ol style="list-style-type: none"> 1. Take steps to eradicate known disease, weeds or pests (99%) 2. Regularly monitor plants and / or livestock for disease, weeds or pests (98%) 3. Investigate and / or report any instances or sightings of unusual disease, weeds or pests (93%) 4. Ensure feed / grain / plant matter is stored in optimal environment (89%) 5. Routinely consult with experts (85%) 	<ol style="list-style-type: none"> 1. Control weeds (30%) 2. Control livestock pests and diseases (27%) 3. Control cropping pests and diseases (22%) 4. Clean machinery entering property (16%) 5. Restrict access to property (16%) 	<ol style="list-style-type: none"> 1. Monitor crops (38%) 2. Monitor livestock (34%) 3. Consult experts (26%) 4. Control livestock pests and diseases (25%) 5. Spraying (18%)
Drivers of biosecurity importance in priority	<ol style="list-style-type: none"> 1. Food and safety 2. Public health 3. Marine life and waterways 4. Agricultural Industry 5. Native flora and fauna 	<ol style="list-style-type: none"> 1. Business sustainability 2. Protect livelihood 3. Maximising production 4. Maximising quality & prices 5. Reduced incursions from pests, diseases and weeds 	<ol style="list-style-type: none"> 1. Freedom from pests and disease 2. Protect livelihood 3. Maximise production 4. Market access 5. No loss of income 	<ol style="list-style-type: none"> 1. Freedom from / control of diseases, pests, weeds 2. Protection of industry 3. Protection of livelihood 4. Continue to maximize / improve market access 5. Continue to improve / maximise production / yield
Biosecurity strategies to prioritise	<ol style="list-style-type: none"> 1. Increases biosecurity surveillance at international borders 2. Increased focus at state government level 3. Increased focus at federal government level 4. Increased focus among primary industry 5. Increased awareness / understanding among general population as to biosecurity issues / risks 	<ol style="list-style-type: none"> 1. Increases biosecurity surveillance at international borders 2. Increased government support to primary industry in managing biosecurity 3. Increasing agribusinesses awareness / understanding of biosecurity 4. Greater education of best practice biosecurity behaviours 5. Increasing general population awareness / understanding of biosecurity 		

PERI-URBAN PROGRAM TO INCREASE UNDERSTANDING OF PERI-URBAN BIOSECURITY PRACTICES AND RISK

The Greater Sydney region has the highest number of international travellers in NSW and Australia, several major ports and a high density of small farm holdings. A joint NSW DPI and Local Land Services Greater Sydney Peri-urban Program was established in January 2016 to address the increasing biosecurity risks presented by peri-urban areas. Since the program started there have been many projects and activities that have improved biosecurity awareness, improved surveillance and strengthened partnerships in Greater Sydney.

The surveys revealed there was a limited understanding of the new legislation and regulatory instruments that could lead to a reduction in compliance and increased biosecurity risks.

The introduction of new legislation and regulations brings a risk of non-compliance due to poor understanding and lack of awareness. As a component of the new *Biosecurity Act*, the introduction of the General Biosecurity Duty principle has expanded the responsibility of all stakeholders to manage biosecurity risks. The General Biosecurity Duty supports the principle of shared responsibility, and means everyone is doing what is reasonable for them to do to prevent, eliminate or minimise biosecurity risks. A significant engagement and communication program will be delivered in partnership with government, industry and the community to maximise understanding of and engagement with, the new regulatory framework.

BIOSECURITY CHAMPION PROJECTS – PROMOTING INDUSTRY SURVEILLANCE IN PERI-URBAN AREAS

NSW DPI, Greater Sydney Local Land Services and Livestock Biosecurity Network staff are working with the Department of Agriculture & Water Resources to run two pilot projects to test using community or producer champions to facilitate producer-based livestock health surveillance and networks.

The first project is trialling a community champion from a non-English speaking background (NESB) to facilitate engagement and behaviour change with NESB pig owners. Several NESB groups have been identified in the Sydney region and will be involved in the project.

The second project will engage influential producers to help remove some of the barriers to producer detection and reporting of livestock disease. A producer champion that works with small holders in the Sydney region has been identified and will work with the cross-agency project team.

The NSW Biosecurity attitudinal research is recognition that there is significant room for improvement in the understanding of biosecurity, how responsibility is shared across a wide range of stakeholders and the behaviours needed. Programs will need to be delivered that are designed for more targeted and effective approaches that reflect stakeholder perceptions and gaps in understanding of the risks and obligations related to managing biosecurity. NSW DPI and other agency and industry organisations recognise that there is currently a gap in our stakeholders understanding and perceptions of biosecurity in rural and urban communities and this is seen as a priority for future activity.

**2**

STRONGER PARTNERSHIPS ACROSS THE BIOSECURITY SPECTRUM

To deliver biosecurity effectively for NSW, government, farmers and industry and the community need to work together in partnership. The NSW Government collaborates with diverse stakeholders at local, state and national levels. This includes the farming and urban communities, industry, scientific and research organisations, and other jurisdictions. The aim is to enhance biosecurity programs through partnerships – where knowledge and resources are developed and shared. With shared cooperation, research and expertise, partnerships guarantee a better future for the protection of NSW’s valuable assets.

Working collaboratively with industry

Primary producers and their industry associations and professional bodies participate in biosecurity management in NSW and around Australia. These groups (e.g. the Australian Veterinary Association and NSW Farmers) work with the State and Australian governments in the development of industry standards and guidelines, as well as participating in biosecurity response agreements.

Animal Health Australia (AHA) and Plant Health Australia (PHA) work at a national level with government to consult with and lead industry participation in the development and implementation of industry standards and codes of practice. AHA and PHA help implement emergency response arrangements for effective biosecurity outcomes and undertake research and work to improve animal and plant health. This helps to ensure the quality and safety of agricultural products to underwrite market access.

Current partnerships with AHA, PHA and industry bodies strengthen NSW’s ability to be able to respond to biosecurity issues more quickly and effectively. In the future, NSW will place increased emphasis on building partnerships to emphasise the increasing importance of cooperation to deliver successful biosecurity outcomes.

Partnering with community organisations and NGOs

Environmental organisations and NGOs (non-government organisations) such as the Invasive Species Council and the Nature Conservation Council work with government, industry and community groups to prevent and manage invasive species in NSW and throughout Australia.

Community organisations and their members and volunteers (e.g. Landcare, Bushcare and Coastcare) and local environmental groups provide valuable resources through activities including weed, pest and disease education, surveillance and control activities, and helping engage the broader community in pest and disease management. These groups and individuals provide thousands of hours each week assisting in the management of private and public lands through direct invasive species control and monitoring activities. Others work on conserving biodiversity which increases the resilience of our natural environment to pest animals and weeds. Building capacity throughout the community and sharing biosecurity responsibilities is essential.

- A survey of over 800 organisations across Australia conducted by the Invasive Species Council in 2013 found that there are about 20,000 community volunteers in NSW.
- It’s estimated the community provides \$168 million in time and effort through volunteer (\$76 million) and paid (\$91.9 million) work.
- Environmental groups in the community sector invest around \$1.2 billion each year tackling invasive species in Australia.
- Although successful in responding to emergencies, NSW needs to continue to educate and build capacity within our community organisations to help mitigate risks and provide additional surveillance capacity for the state. Development of a community awareness program to improve participation in biosecurity activity and utilisation of monitoring and evaluation to provide continuous improvement is a priority for the next four years.



The American corn snake (*Pantherophis guttatus*) is a non-venomous small to medium-sized, slender snake which originates from the United States of America and Mexico. American corn snakes are considered a serious invasive species, carrying diseases that threaten native species, preying on some native species and also carrying salmonella.

They are listed as prohibited dealings under the *NSW Biosecurity Act 2015*. It is an offence to own or trade American corn snakes unless authorised by NSW DPI. During 2017, several American corn snakes have been detected in the open environment within the Greater Sydney Local Land Services region. During September and October (as seasonal temperatures have increased), reports of American corn snakes have increased.

Establishing long-term research partnerships

Collaborative research with other jurisdictions and the Commonwealth underpins NSW's expertise and capability in managing biosecurity. In the research field there is collaboration with many partners. These include biosecurity-specific research organisations such as Centre for Invasive Species Solutions (CISS) and the Plant Biosecurity CRC; universities; and industry research bodies such as Meat and Livestock Australia, Horticulture Australia and Fisheries Research and Development Corporation.

Science and research are used to analyse the potential impacts of biosecurity risks and support surveillance. Analytics are tools that help to identify the scope and scale of biosecurity threats and the management of outbreaks use agreed response plans where industry, community and government work together to meet these challenges.

Partnerships provide considerable leverage of resources and knowledge that enables improved biosecurity management in NSW. Investment in relationships that support NSW biosecurity partnerships are vital. Without this investment, the scope for the delivery of biosecurity services could also diminish and the risks increase. Similarly, if resources available to partners were reduced, the outcomes from their work would also reduce. The consequences of any reduction in partnership effectiveness would also reduce intelligence available for NSW biosecurity with surveillance, policy development and program design (dependent on the effective engagement with all stakeholders and delivery partners).

Taking a lead role in biosecurity groups and committees

NSW participates, and takes a lead role, in a range of national government organisations and committees. This includes the National Biosecurity Committee (NBC), Animal Health Committee (AHC), Plant Health Committee (PHC), Invasive Plants and Animals Committee (IPAC), Marine Pest Sectorial Committee (MPSC), Agriculture Senior Officers Committee (AgSoc) and Agricultural Ministers forum (AgMIN). The NSW Government is also a supporter and key signatory to a series of agreements on the national management of biosecurity risks – including the Intergovernmental Agreement on

Biosecurity (IGAB), Emergency Animal Disease Response Agreement (EADRA), Emergency Plant Pest Response Deed (EPPRD) and the National Environmental Biosecurity Response Agreement (NEBRA).

Government, industry and community partnerships in NSW are making significant contributions to biosecurity not just in the State, but also in other jurisdictions across Australia. While the contributions of government are monitored and valued (through processes such as the NBC annual investment stocktake), the value of the financial and voluntary contributions from industry and community activity in biosecurity is less understood.

Equally, the work undertaken by community members is not clearly publicised. An effective communication and engagement program aimed at increasing community participation in biosecurity programs would provide the benefits of raising awareness and encourage participation. Any such program would benefit from evaluation of its effectiveness on a regular basis – to inform ongoing improvements. **Table 6** provides a snapshot of achievements by NSW DPI, Local Land Services and OEH in relation to Goal 1 of the NSW Biosecurity Strategy. The table outlines achievements and where activity has been identified for implementation in order to meet the outcomes nominated in the Strategy for Goal 1.





Goal 1: Biosecurity is a Shared Responsibility

Table 6: NSW Government performance and opportunities for Goal 1 of the NSW Biosecurity Strategy 2013-2021

Strategy Goals and Outcomes	Achievements	Future activity
<p>Outcome 1: Improved community engagement in Bio-security management</p>	<p>1.1 Increase the capacity and capability of the community in biosecurity activities by leading and facilitating targeted education and information programs</p>	<ul style="list-style-type: none"> ▶ Engagement Program is to be evaluated. ▶ Contribution to national programs on raising awareness of imperative of reporting prohibited matter. ▶ Peri-urban Project work: Setting up Citizen Science project around Port Botany, training local council officers as part of Spot the Pest project, biosecurity hygiene in natural areas project, live streaming of videos in to schools. ▶ Small landholder workshops-increasing awareness. ▶ General surveillance programs for targeted EPPs, including bees.
	<p>1.2 Provide advice to industries and the general community about how they can meet their biosecurity obligations</p>	<ul style="list-style-type: none"> ▶ Animal biosecurity risk management material to be published online. ▶ Biosecurity <i>hygiene in natural areas</i> project and <i>people using public lands</i> project. ▶ Engage recycled waste industries and agricultural producers applying these products through risk assessment and targeted information.

Strategy Goals and Outcomes	Achievements	Future activity
1.3 Develop programs to actively manage priority established pests, diseases and weeds	<ul style="list-style-type: none"> ▶ Comprehensive information programs are available and delivered by NSW DPI, Local Land Services, OEH, Local Government, industry groups, AHA and PHA, to help stakeholders to actively manage priority established pests, diseases and weeds. ▶ Programs to prove seasonal pest absence for Queensland Fruit Fly (enabling market access advantages to be obtained). ▶ Bee biosecurity engagement with amateur beekeepers to manage diseases. 	<ul style="list-style-type: none"> ▶ Roll out the Australian Government funded project to increase landholder capability to manage established pests and weeds: 2017-19. ▶ Roll out of NSW Weed Action Program (WAP) ▶ Contribution to ongoing EADRA and Ausvetplan reviews. ▶ Port Botany Surveillance Working Group and Spot the Pest Project. ▶ Expanded engagement with amateur beekeeper clubs.
1.4 Develop and promote easy-to-use technologies for the reporting of pests, diseases and weeds	<ul style="list-style-type: none"> ▶ Improved web presence for biosecurity. ▶ Currently 300 high risk weeds on Weedwise App. ▶ Vertebrate Pest Research Unit app and mapping program, National Farm biosecurity app. ▶ Collaborative work with Western Australia on plant pest App. ▶ Participate in national trial of AusPESTCheck for surveillance reporting. ▶ Feral Scan on-line real time public access mapping tool for feral animal surveillance 	<ul style="list-style-type: none"> ▶ Increased uptake of weeds metadata standard reporting protocol. Development of a pest animal surveillance metadata standard. ▶ Participation in national working groups for AusPESTCheck further development and improvement ▶ Explore opportunities for involvement in community based national exotic plant pest surveillance programs such as Brown marmorated stink bug.
1.5 Improve understanding of social factors influencing implementation of biosecurity practices	<ul style="list-style-type: none"> ▶ Biosecurity Attitudinal research completed 1500 rural, regional and urban stakeholders surveyed. ▶ Community based social marketing projects undertaken for specific weeds (e.g. Tropical soda apple). ▶ Peri urban social research project - mapping of stakeholders and landholder's attitudes. 	<ul style="list-style-type: none"> ▶ Framework development underway for using stakeholder responses in biosecurity programs to improve outcomes for training and information ▶ NESB project and pig health producer surveillance project, finalisation of peri-urban social research project. ▶ Implementation of findings from social studies for improving engagement in urban and peri-urban areas.

Strategy Goals and Outcomes	Achievements	Future activity	
Outcome 2: Stronger partnerships across the biosecurity spectrum	2.1 Continue to participate in forums to develop, agree and adopt formal consistent national biosecurity arrangements in all jurisdictions	<ul style="list-style-type: none"> ▶ MOU with ACT; Border Bridge joint cross border emergency exercise be held in 2018 with Queensland. ▶ NEBRA Review with Victoria, NSW and Queensland in 2016. ▶ Ongoing enhancement of interstate market access protocols (e.g. ICA scheme). 	
	2.2 Develop and coordinate risk mitigation strategies for established pests, diseases and weeds	<ul style="list-style-type: none"> ▶ Risk mitigation strategies are collaboratively developed with industry and community and are adequately managed and supported by stakeholders. ▶ Involvement with industry biosecurity plans. ▶ Involvement in Industry codes of practice. 	<ul style="list-style-type: none"> ▶ National jurisdictional level evaluations of Veterinary Services. ▶ Enhance market access. ▶ Agricultural and Veterinary Chemicals Task Group and subordinate working groups. ▶ Improve national surveillance network. ▶ MOUs with Local Land Services and OEH ▶ Review and revitalise MOUs with Queensland, Victoria and South Australia.
	2.3 Develop and implement arrangements for biosecurity prevention, preparedness, response and recovery, including funding arrangements that reflect the shared responsibility for biosecurity	<ul style="list-style-type: none"> ▶ Estimated that 20,000 community members are volunteers in invasive species surveillance. ▶ Exotic Plant Pest Hotline. ▶ Investigate and respond to animal and plant pest and disease incidents including suspected incursions. ▶ NSW DPI staff represented on National Biosecurity Emergency Preparedness Expert Group. 	<ul style="list-style-type: none"> ▶ Increase community involvement in surveillance and reporting. ▶ Utilise shared learning on risk methodology and prioritisation in animal biosecurity with Commonwealth. ▶ Policy development in the cost sharing area to reflect that biosecurity is a shared responsibility. ▶ National Aquatic Deed in place by 2018. ▶ Promote Biosecurity Collections as an identification resource.

NSW Government performance and opportunities for Goal 1 of the NSW Biosecurity Strategy 2013-2021 (cont.)

Strategy Goals and Outcomes	Achievements	Future activity
<p>2.4 Ensure biosecurity is a key feature of Local Land Services</p>	<ul style="list-style-type: none"> ▶ Local Land Services is gaining capability and capacity and increasingly engagement effectiveness with industry. ▶ Developed an MoU with the NSW DPI Invasive Species Unit in DPI for non indigenous animals. ▶ Appointed an emergency management position to improve engagement on key EM activities such as Exercise Border Bridge to better prepare for a biosecurity incident. ▶ Established Regional Pest Animal Committees and Regional Weed Committees to improve collaboration and coordination for pest and weed management. ▶ Conducted Livestock Protection Assurance scheme workshops with Local Land Services staff from across the state reaching over 9,000 landholders: fielding queries, hosting workshops and providing expertise to support industry-led forums, while also taking advantage of the opportunity to stress the new changes in biosecurity responsibility. ▶ Revision through collaborative risk assessment of animal biosecurity policies and procedures. ▶ Worked collaboratively with Local Land Services on various Queensland Fruit Fly seasonal pest absence trials. ▶ Response to pine nematode and lupin anthracnose outbreaks NSW. ▶ Collaborate on appointment and work plan of Greater Sydney Local Land Services Surveillance Officer (plants) and a District Veterinarian. 	<ul style="list-style-type: none"> ▶ Increase integration in plant biosecurity surveillance and response. ▶ Ongoing authorised officer training to implement the new <i>Biosecurity Act</i>. ▶ Communication and engagement program development. ▶ Publication of regional pest animal plans.



CHAPTER 3: HOW BIOSECURITY CONTRIBUTES TO SUSTAINABLE ECONOMIC GROWTH

HOW BIOSECURITY PROTECTS THE ENVIRONMENT AND COMMUNITY



GOAL 2 BIOSECURITY CONTRIBUTES TO SUSTAINABLE ECONOMIC GROWTH

AND...



GOAL 3 BIOSECURITY PROTECTS THE ENVIRONMENT AND COMMUNITY

The management of biosecurity risks contributes to sustainable economic growth (Goal 2, NSW Biosecurity Strategy 2013-2021), and protecting the environment and improving community wellbeing (Goal 3, NSW Biosecurity Strategy 2013-2021) are interdependent, and although similar directions and approaches may be taken to achieve them, each may require different specific strategies for implementation. NSW has made major inroads into the delivery of both these goals with a range of programs and activities in place. *Table 21* (at the end of this section), outlines the achievements and future implementation activity against the NSW Biosecurity Strategy outcomes for Goals 2 and 3.

OUTCOMES

- 3 Biosecurity management actions**
- 4 Improved response to Biosecurity emergencies**
- 5 Reduced impacts from established pests, disease and weeds**
- 6 Strengthened biosecurity science and research capacity and capability**
- 7 Increased numbers of well trained and well-resourced people**

The delivery of an effective biosecurity system is dependent on all stakeholders being able to take responsibility for the areas they are exposed to and to work collaboratively with others. To that end, there have been extensive programs delivered that have improved the capacity of stakeholders to manage biosecurity, particularly relating to the effective surveillance and recognition of risks and the ability to work effectively to prepare, prevent, respond and recover from biosecurity incursions.

To be effective, government, industry and the community all need to work together to deliver the capability that their specialist areas supply. Government has the role to provide for effective legislation, policy, strategy, research and diagnostics. Industry has a role in delivering best practice management, including farm hygiene, surveillance, research collaboration and trade. The community has a role in managing their responsibilities, particularly in relation to the introduction of biosecurity matter through

travel and purchases, as well as surveillance and reporting of suspected incursions. At times all three groups will have overlapping influences and responsibilities. Goals 2 and 3 bring these issues together into management programs that aim to make a strong positive contribution to biosecurity management in NSW.

Working closely with governments across Australia to respond to biosecurity incidents

The NSW government works collaboratively within its agency framework and with other jurisdictions and non-government organisations to deliver biosecurity for NSW. At the government level, NSW DPI is the lead agency in biosecurity management, but works in partnership with Local Land Services and Local Government to provide biosecurity services for landholders. NSW Office of Environment and Heritage (OEH) provide environmental biosecurity expertise and NSW Health provides expertise to control biosecurity related health issues for the community.

The Australian Government has responsibility for managing biosecurity as it relates to the introduction of biosecurity matter across Australia's borders and is the custodian of the national agreement that underpins biosecurity management by all governments in Australia. NSW works with the Australian Government and other jurisdictions to manage biosecurity events within NSW borders and we maintain capability and capacity to assist other jurisdictions in their response activity. NSW also works within the national biosecurity framework to harmonise legislation, policy and strategy. Collaboration with the other jurisdictions delivers critical capability and capacity that would otherwise limit our ability to manage biosecurity incidents.

Cross-jurisdictional collaboration allows for rapid and effective responses to pests and diseases exotic to NSW that would otherwise negatively impact on NSW. NSW will continue to support biosecurity responses in other states as part of NSW's obligations under the national biosecurity agreements, and to improve its readiness for biosecurity events. Most recently these have included Banana Freckle in the Northern Territory, Red Imported Fire Ants in NSW and Queensland and White Spot disease in Queensland.

Inter-Governmental Agreement on Biosecurity (IGAB)

NSW is a signatory to the IGAB, which was endorsed by First Ministers in 2012. The IGAB and its associated deeds were developed to enhance Australia's biosecurity management, response and recovery to new animal, plant and environmental biosecurity incursions.

The IGAB has been successful in building and maintaining effective partnerships using a cross-jurisdictional framework to respond to new biosecurity threats in Australia. 95% of Australia's agricultural production is covered by signatories to the national response deeds (IGAB Review 2017).

In 2016, a formal review of IGAB was undertaken (strongly supported by NSW) which provided 42 recommendations aimed at strengthening the national biosecurity system over the next five years. Recommendations were made in the areas of:

- Risk and capability
- Engagement and communication with biosecurity system participants
- Financial sustainability of the biosecurity system
- Governance
- Government performance and accountability.

There are also national capability building exercises conducted, such as *Operation Odysseus* – a Foot and Mouth Diseases (FMD) response exercise held in 2014-15, that tested Australia's ability to stop the movement of all susceptible livestock (sheep, cattle and pigs) in the event of an FMD outbreak or even strong suspicion of FMD.

Shared Response Arrangements

National response arrangements provide details on the roles and responsibilities of government and industry when responding to emergency animal and plant pest and disease incidents of national importance. They also detail how those responses will be funded through cost sharing arrangements.

NSW is a signatory to three deeds under IGAB. They provide a contractual arrangement to help manage and respond to biosecurity risks in Australia.

1. **National Environmental Biosecurity Response Agreement (NEBRA):** NEBRA is the first deliverable of the Intergovernmental Agreement on Biosecurity (IGAB), and sets out emergency response and cost-sharing arrangements for responding to biosecurity incidents that primarily impact the environment and /or social amenity and where the response is for the public good.

NEBRA's purpose is to "establish national arrangements for responses to nationally significant biosecurity incidents where there are predominantly public benefits". In practice NEBRA is designed to deliver public benefits in relation to the environment, people (including social amenity and human infrastructure) and business activity. This includes incursions of exotic pests and diseases in terrestrial and aquatic environments.

In 2016, an independent review of NEBRA was undertaken to assess the capacity of the national biosecurity system to manage increasing biosecurity risks. The report made 16 recommendations to improve the deed and its implementation around Australia.

2. **Emergency Animal Disease Response Deed (EADRA)** is an agreement between 23 signatories (both governments and industry groups) to collectively reduce the risk of animal disease incursions and manage a response if an outbreak occurs. EADRA covers 66 categorised animal diseases. The EADRA deed is managed by Animal Health Australia (AHA) on behalf of the Commonwealth and seeks to facilitate true cooperation between governments and industry through sharing of cost, management and decision making on matters of biosecurity concern within the animal industry in Australia.

3. **Emergency Plant Pest Response Deed (EPPRD):** Ratified in 2005, the EPPRD has significantly increased Australia's capacity to respond to emergency plant pest incursion by pooling the resources of government and industry. The deed has 43 signatories (both government and industry groups) and has been designed to clearly address cost sharing criteria for managing incursions from plant pests in the following categories:

- Known exotic plant pests
- Variant form of an established plant pest

- Serious plant pests of unknown or uncertain origin
- Plant pests already found in Australia that are likely have a serious impact and require control.

Since 2007-2008, \$574 million has been spent combatting biosecurity incursions in Australia that were dealt with under the national biosecurity response deeds. Of that, NSW has contributed \$47.7 million and the cost sharing component provided by the Commonwealth and other jurisdictions has amounted to over \$526 million dollars. Under the deeds, NSW has received 88% of the total cost of incursions in NSW from cost sharing and contributed to 10% of the cost to incursions in other jurisdictions in the same period. See **Table 7** for a breakdown of the total expenditure.

National Biosecurity Committee (NBC)

NSW is a member of the National Biosecurity Committee (NBC) which was established under the IGAB. NBC is responsible for coordinating national biosecurity arrangements across all state and territory governments.

The NBC provides advice on national biosecurity issues and progress updates on the IGAB to the Agriculture Senior Officials Committee (AGSOC) which reports to the Agriculture Ministers Forum (AGMIN). The NBC is comprised of senior representatives of agricultural and environmental departments from each jurisdiction. AGMIN comprises national, state and territory government ministers and New Zealand government ministers. AGSOC and AGMIN set national biosecurity policies with input from other stakeholders.

The NBC is also supported by the following national sectoral committees:

- Animal Health Committee
- Plant Health Committee
- Marine Pest Sectoral Committee
- Invasive Plants and Animals Committee.

The NBC oversees progress of the sectoral committees and implements national biosecurity projects aligned with the IGAB.

Table 7: NSW financial arrangements for biosecurity responses under cost sharing arrangements 2017-2007

Financial Year	Cost shared responses occurring in NSW with NSW DPI being the lead combat agency		Cost shared responses that have occurred in other states and territories to which NSW made a financial contribution	
	NSW \$	Other \$	NSW \$	Other \$
2017-18	0	0	7,082,562	52,848,830
2016-17	75,826	469,511	3,326,668	32,396,471
2015-16	85,425	528,946	3,663,545	35,776,548
2014-15	628,051	5,135,334	3,166,361	21,095,672
2013-14	111,755	913,778	2,974,388	19,235,064
2012-13	0	0	2,953,162	19,911,509
2011-12	0	0	3,336,047	125,946,726
2010-11	105,000	105,000	3,957,795	26,580,284
2009-10	85,000	85,000	6,269,092	40,265,658
2008-09	0	0	2,892,965	20,161,696
2007-08	3,340,308	100,009,235	3,724,950	25,237,586
TOTAL	4,431,365	107,246,804	43,347,535	419,456,044

Government agencies working together to manage biosecurity

NSW DPI, the NSW Office of Environment and Heritage (OEH), NSW Health, Local Land Services, State Emergency Services and Local Government all partner in the delivery of biosecurity for NSW.

NSW DPI leads biosecurity and food safety activities for the NSW Government, while Local Land Services facilitates biosecurity management at rural and regional levels. Local Land Services directly participates in local and regional incursion response programs, while Local Government is involved in the delivery of State Government managed programs such as the Weed Action Plan.

The NSW DPI - Local Land Services alliance shares responsibility for emergency management and implementing strategies that deliver safe and resilient communities. These cover animal, plant and aquatic pests and diseases, locust plagues, natural disasters and other emergencies which impact on animals, plants or agriculture.

Biosecurity services provided by Local Land Services include:

- Animal pest and disease surveillance and prevention
- Management, control and eradication through their veterinary staff and plant pest and disease prevention
- Management, control and eradication options through services provided by specialist staff such as veterinarians, biosecurity officers and agricultural advisors across animal and plant industries

Local Land Services also support preparedness, response and recovery for animal pest and disease and plant pest and disease emergencies, as well as other emergencies impacting on primary production or animal health. Local Land Services plays a significant role when it comes to the control of invasive species in NSW.

NSW DPI, Local Land Services, other NSW agencies, Local Government, industry and the wider community each have a role to play in effective biosecurity management, sharing responsibility for its outcomes. Local Land Services, NSW OEH and NSW DPI collaborate

on the prevention, eradication, containment and management of emerging and widespread pest animal and weeds in NSW.

NSW OEH has developed the 'Saving our Species' program to protect threatened species from threats such as weeds and pest animals. This includes developing specific strategies for managing Key Threatening Processes listed under the *Biodiversity Conservation Act 2016*, many of which are pest animals or weeds. OEH has also developed Regional Pest Management Strategies to protect native biodiversity and the values of national parks and reserves from the impacts of weeds and pest animals. The aim is to protect native biodiversity and the value of national parks and reserves.

NSW Health and NSW DPI research undertake surveillance for zoonoses – diseases which are transferable from vertebrate animals to humans. It works with 'at risk' groups such as vets, farmers, wildlife carers and the general community to educate them about preventive measures and provide access to safe, effective, affordable vaccines for humans and animals.

Local Government play an important role in delivering coordinated pest control programs for weeds and pest animals in NSW. Local Government has a key role in providing support

Plant Health Australia (PHA) is custodian of the Emergency Plant Pest Response Deed (EPPRD) and oversees any activity generated by the agreement. The EPPRD sets out the roles of stakeholders in the event of a plant pest incursion, and mechanisms for determining who will pay, so that responses can be set in train swiftly, allowing the best chance of success. PHA seeks to foster partnerships that benefit the plant biosecurity system. PHA guides the operation of the EPPRD and assists signatories to meet their commitments under the agreement. PHA assists industry and government efforts to reduce the risks posed by emergency plant pests. This includes providing input to agency programs to improve threat prevention and biosecurity preparedness along the continuum, and industry preparedness activities through plans, on-farm programs, contingency plans and surveillance.

Animal Health Australia (AHA) coordinates many biosecurity programs for its members – including Australian livestock industries, governments and veterinarians. AHA works to improve animal health, biosecurity, market access, livestock welfare, productivity, food safety and quality. It provides education and training to members to assist them with their responsibilities under the Emergency Animal Disease Response Agreement (EADRA). Several animal health surveillance projects are in place to improve tracing and surveillance in the event of a disease outbreak. AHA works with industry to develop on-farm biosecurity plans to mitigate pest and disease risks.

and information to the local community on biosecurity pest, weed and disease management.

NSW State Emergency Service (SES) is a significant response agency that leads natural disaster responses and in case of biosecurity emergencies is a significant support agency.

Industry associations and professional bodies

Industry associations and professional bodies participate in biosecurity management in NSW and around Australia. These groups (including the Australian Veterinary Association and NSW Farmers) work with the State and Australian governments to develop industry standards and guidelines, as well as participating in biosecurity response agreements.

Animal Health Australia (AHA) and Plant Health Australia (PHA) work at a national level with government to consult with, and lead, industry participation in the development and implementation of industry standards and codes of practice.

They also:

- Help implement emergency response arrangements for effective biosecurity outcomes
- Undertake research
- Work to improve animal and plant health – to ensure the quality and safety of agricultural products
- Promote market access.



Community organisations & NGOs

Environmental organisations and non-government organisations such as Landcare work with government, industry and community groups to prevent and manage invasive species in NSW and throughout Australia. Community organisations and their members and volunteers (e.g. Landcare, Bushcare and Coastcare) and local environmental groups provide valuable resources for activities including weed, pest and disease education, surveillance and control activities, and helping engage the broader community in pest and disease management.

The community is a valuable resource for coordinated volunteer surveillance and pest management programs, as well as identifying pests or diseases during recreational activities. Community members also help to promote good biosecurity practices (e.g. cleaning gear after hiking and fishing), ensuring that pests and diseases are not spread in the natural environment.

3 BIOSECURITY MANAGEMENT ACTIONS

Timeliness is critical to the success of biosecurity incident management. The rapid identification of a new incursion that is correctly identified allows it to be treated at the time of smallest impact and cost. Having systems in place that allow for immediate reporting and response is a priority for all stakeholders. A critical part of the system is the ability to track the movement of diseases and pests – not only to determine the spatial dimensions of the impact, but also the speed at which it is spreading. NSW is well placed with effective reporting systems, world class diagnostic systems and effective spatial and temporal tracking. The following section outlines these programs.

IDENTIFICATION AND RISK ASSESSMENT

With finite resources to address the risks and impacts of pests, disease and invasive species, activities and investment must be prioritised. Biosecurity management can be classified under four approaches:

1. Prevention
2. Eradication
3. Containment
4. Asset-Based Protection.

Table 8: NSW Government Weed Action Program funding (2010 – 2017). Source NSW DPI

YEAR	Funding allocated to NSW projects	Funding allocated to REGIONAL projects
2016-17	\$1,473,643	\$8,510,357
2015-16	\$1,455,880	\$9,289,119
2014-15	\$1,459,870	\$8,642,000
2013-14	\$1,528,898	\$8,406,615
2012-13	\$1,395,408	\$8,309,586
2011-12	\$1,447,685	\$8,080,301
2010-11	\$924,049	\$7,844,951

These four approaches are aligned with the invasion process from arrival to widespread establishment.

The most cost-effective way to minimise the impacts of pests and diseases is to prevent their incursion in the first place, using a risk based approach to target resources appropriately. This requires being able to identify high risk species, thoroughly assess their potential invasiveness and implement effective barriers to prevent their establishment.

The risks posed by an incursion of a new invasive species (animal or plant) is informed by whether it has invaded other countries, its biology, its native range, preferred habitat, suitable climate and how well this matches conditions in NSW and Australia. Formal risk assessment techniques for invasive species estimate the likelihood (including of successful reproduction, establishment and spread) and consequences (including environmental and economic impacts and social considerations).

The NSW Government invests significantly in the management and eradication of weeds – at both the state and regional levels. Funding through the Weeds Action Program to support regional level projects has provided over \$59 million for projects (since 2010) at the local level that support the control and eradication of weed species from NSW. **Table 8** provides a breakdown of the funds committed through the NSW Weeds Action Program since 2010.

New plant incursions can colonise areas rapidly and successful control will be highly dependent on a timely and rapid response. The challenge in the initial stages of establishment is to ensure early detection, reporting and rapid action by developing and deploying effective and efficient ways to eradicate or contain the introduced species before it becomes widespread. This usually results in a species-led approach.

The eradication of established pests and diseases spread over wide areas of different land tenure is rarely practical except for geographically isolated areas such as islands. Priorities for the control of these species must be determined and resources focused in areas where the benefits will be greatest. This requires identifying the priority assets most at risk.

Assets may be environmental, primary production or community (human health, infrastructure or cultural). A prioritised approach to invasive

NEW CALICIVIRUS VIRUS RELEASED

Nationally, wild **European rabbits** are Australia's most costly pest animal, causing over \$200 million in losses each year to the agricultural industry and threatening the survival of more than 300 Australian native flora and fauna species. In 2017, NSW DPI led a national project to release and monitor the latest form of biological control for European rabbits – a Korean strain of Rabbit Haemorrhagic Disease Virus (RHDV1K5: a form of calicivirus). RHDV1 K5 was selected through a testing program against a variety of other strains to ensure maximum effectiveness on the Australian rabbit population. Although it is known that RHDV1 K5 affects the European Brown Hare as well, it will not affect other species in Australia.

The national release at more than 600 sites included more than 200 NSW release sites on private and public land with collaboration between DPI and Local Land Services. Local Land Services played a key role in utilising local knowledge and stakeholders to effectively coordinate release sites across the state. A 20%–30% decline in rabbit population was anticipated. Based on initial monitoring, early signs of success have shown an average 40% reduction in rabbit populations at release sites, with up to 70% reductions observed at some sites. This program is ongoing.



CANE TOADS: ESCAPE TO THE SOUTH

In NSW, **Cane toads** have an established population north of Yamba on the Clarence River in the far north-east of the State. However, breeding populations have previously established at Lake Innes near Port Macquarie and Taren Point in Sydney. In both instances the populations established near transport hubs (a waste transfer station and industrial site in Taren Point). Through support of the community, after 10 years the Port Macquarie invasion was eradicated in 2007 and continued monitoring at the site found no further toads over the next three years, confirming their eradication. A similar program at Taren Point in Sydney has been successful in controlling cane toads and the Sutherland Shire Council is now working to confirm total eradication of the cane toad population from this site. These are both examples of how trade and transport of material can increase biosecurity risk and how community and government can work together to eradicate invasive species.



species management ensures maximum benefit from finite resources.

The large number of weed species in NSW has led to the development of a formal quantified Weed Risk Management (WRM) system to provide a transparent process for prioritising management under Regional Weed Management Plans. Although the number of pest animal species in NSW is relatively small, aspects of the WRM system will be used in developing prioritisation guidelines to support Regional Pest Animal Management Plans.

Monitoring of invasive species management activities is required at all levels (local, regional, state and national) and at all stages of invasion (prevention, eradication, containment and asset protection). Monitoring measures the effectiveness of our actions in reducing the impacts of invasive species and provides data about return on investment. Using this information, invasive species programs can be reviewed and evaluated, and the investment of resources (human and financial) realigned as required. Regional weed and pest animal plans will be supported by a Monitoring, Evaluation, Reporting and Improvement (MERI) framework that ensure plans reprioritise invasive species and management areas and actions as required.

PREVENTION AND PREPAREDNESS

NSW has ongoing strategies and participates in programs at state and national levels to help it prepare for, and prevent, biosecurity risks.

Figure 1 (Invasion Curve) shows that prevention and preparedness is a much more effective and efficient control method for biosecurity threats than the containment, eradication and asset protection phases which follow if threats occur. If prevention and eradication is successful, ongoing control costs can be avoided.

Key tools and resources which support NSW's approach to prevention and preparedness include:

- Education and training
- Compliance
- Surveillance
- Research and diagnostics
- Farm biosecurity plans
- Industry biosecurity plans.

Figure 1: Invasion Curve (sourced from Agriculture Victoria)

GENERALISED INVASION CURVE SHOWING ACTIONS APPROPRIATE TO EACH STAGE

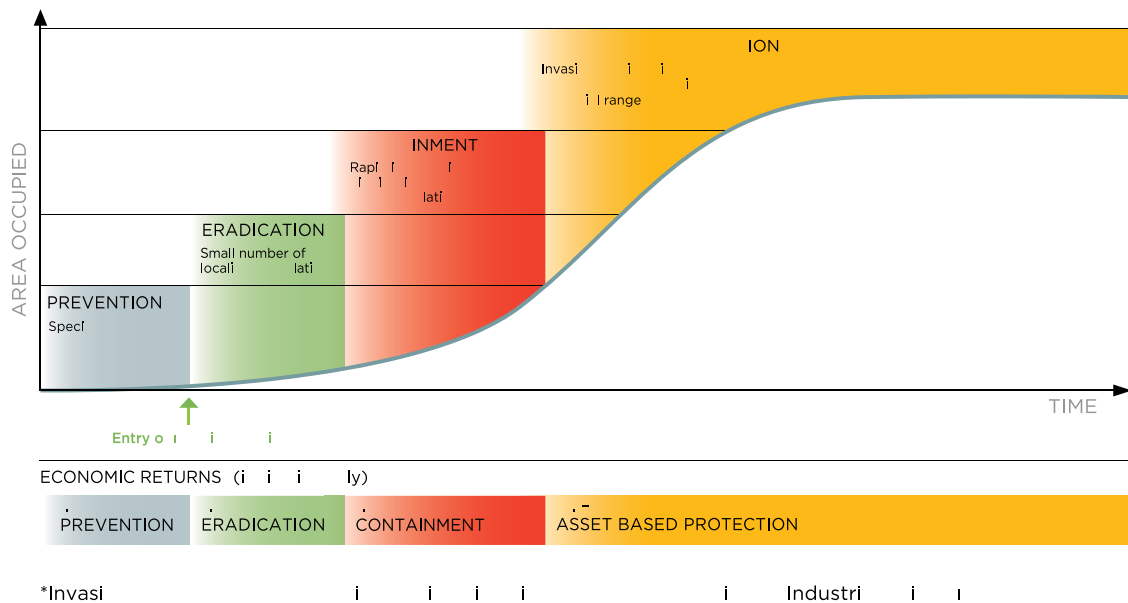


Table 9: NSW Biosecurity prevention program (2013-2021)

PREVENTION		
Element	Activities	Service Provision
Policy and Legislation	Support new Biosecurity Act strategies and systems; Provide online training for officers responsible for compliance and administering the Act	NSW DPI continues to develop measures and innovative biosecurity systems to prevent the incursion of new pests, diseases and weeds through community engagement, education and training, monitoring, testing and surveillance.
Education	E-courses for the early detection of disease; Training; Social research of small lot holders	Provision of face to face training for Authorised Officers responsible for compliance and administering the Biosecurity Act as well as increasing engagement with vets and community to understanding the value of biosecurity and build a shared responsibility through e-learning courses on early detection of disease.
Market access	Quarantine criteria; Targeted surveillance to support disease freedom	Social research of small lot holders supports increased peri-urban early detection of threats and the continued monitoring of existing pest and disease outbreaks combined with increased traceability of animals and products such as NILS, laboratory analysis, supporting the Biosecurity Hotline and quarantine measures to enhance 'early detection' and continuity of market access such as through targeted surveillance.
Surveillance	Early detection of threats; Laboratory analysis; Monitoring existing pest and disease outbreaks	
Compliance	Increase traceability of animals and compliance inspections; Product tracing	
Emergency	Affecting plants and animals; Key contact for Emergency Pest Hotlines	Creating contemporary and responsive legislative and regulatory framework in line with the new Biosecurity Act.

Table 10: NSW DPI biosecurity preparedness activities (2013-2021)

PREPAREDNESS		
Element	Activities	Service Provision
Policy and Legislation	<p>Training, simulations with Local Land Services and Police;</p> <p>Ausvetplan and Plant Plan, research and communication outreach.</p> <p>Design of Border Bridge Review and the development of policies and procedures</p>	<p>NSW Biosecurity increases the capacity and capability of community, industry and government partners to be prepared for biosecurity incursions through preparedness activities, communication and training, research, compliance and surveillance of risk and incursions.</p> <p>Use of technologies such as camera traps and drones and DNA barcoding of invasive weeds and vertebrates to provide a network of passive and active sensors is now becoming commonplace in pest animal management. Cornerstone to the surveillance of forestry dieback and shellfish harvest management is aerial and GIS mapping, increasing NSW vision over biosecurity issues.</p>
Education	<p>Communication access; Wild dog alert; Tramp ant information sessions, Bee biosecurity best practice</p>	
Market access	<p>Maintenance of LHMS database; Certification trialling</p>	
Surveillance	<p>Biosecurity workshops; DNA barcoding; Rapid diagnostic testing expansion; Disease pest status; Photo traps; Aerial mapping (e.g. BMAD); GIS in shellfish harvest management; Phylloxera surveillance</p>	<p>Introduction of NLIS pork and a pilot trial export horse certification scheme enables significant tracking and surveillance outcomes and licensing of medicinal plants to prevent over production/exploitation. The evaluation of dairy food safety and the shellfish industry enhances compliance across NSW. Significant improved detection processes developed – such as ciguaCheck® for citrus – or PCR float testing method for Potato cyst nematode (PCN)</p>
Compliance	<p>NILS Pork; Licensing of hemp and opium, evaluation of shellfish and dairy food safety scheme</p>	
Emergency	<p>Biosecurity farm planning; Emergency personnel training</p>	<p>Biosecurity training and simulation exercises – involving key emergency service actors (NSW DPI, Local Land Services and Police) – enhances engagement and capability to act in the event of an incursion. Instruction and guidance provided by farm biosecurity plans and disease guidelines provides solid preparedness advice for industry and community.</p>



Wild dogs occur across large areas of NSW. A national wild dog action plan is in place, (NSW is a contributor) with the mission “to provide direction for the national management of wild dogs to minimise their negative impacts on agriculture, biodiversity and social assets”. Data collected across the state is being used to ensure resources are being effectively targeted and to identify if current control methods are effective in managing population growth and population density of wild dogs.

Local Land Services works in collaboration with wild dog groups to deliver aerial baiting programs to target areas where wild dogs cause significant impact and control is complex based on the landscape. The most recent Spring 2017 aerial baiting campaign saw 227,119 aerial baits over 8,466kms.

One of the highest risks for NSW is the introduction of Foot and Mouth Disease (FMD). This disease is currently not present in Australia, and because of this our animal products are available to many overseas markets. If FMD did arrive in NSW, markets would close, animal productivity would fall (herds would also be destroyed) and the transport of food, people and vital services would be interrupted. The Australian Government has valued a FMD outbreak as having a potential \$50 billion impact over 10 years.

Other major threats include:

- The introduction of exotic invasive ants (Red Imported Fire Ants) into NSW and the subsequent social amenity costs and production losses
- The introduction of exotic plant and animal species through new e-trade systems
- The introduction of plant diseases such as Karnal bunt (a wheat disease) and Citrus canker that would cost the cereal and citrus industries many hundreds of millions of dollars

- The potential for the introduction of high risk biosecurity matter (carried in by increasing numbers of international passengers).

Major plant and animal disease outbreaks are recognised by the NSW Government as major risks to productivity and markets, environmental health and in some cases as risks to the community. Their spread is often rapid and they are complex to contain. Fortunately, NSW has a strong and effective surveillance framework in place to combat these risks. Plant diseases can also spread rapidly with complex pathways most often by airborne vectors. Surveillance and response for crop based diseases is carried out at farm level, with diseases such as Russian Wheat Aphid detected quickly and then monitored effectively in crops. Surveillance and response for diseases in the environment is much more complex and problematic due to the massive and often isolated areas involved. Environmental pests and diseases can spread unnoticed in natural areas for longer periods than production based threats.

CASE STUDY

Neglected and abandoned enterprises – promoting shared responsibility

In 2016-17, NSW conducted a 12-month operation in response to the biosecurity risks posed by neglected or abandoned horticultural enterprises, primarily orchards. Known as NEGABAN, it aimed at raising awareness and providing education to landowners unaware of their biosecurity responsibilities regarding these neglected or abandoned properties.

Impact

Neglected sites pose a biosecurity risk through disease incubation. Abandoned enterprises were evaluated based on concerns of a disease risk (including that posed to surrounding enterprises) and if the management levels were sufficient to maintain and monitor biosecurity hazards.

Response

During the compliance operation 98 properties were identified as being in a degraded state throughout NSW. Of these, 32 per cent were identified to be neglected or abandoned and NSW DPI worked with the owners of the properties to ensure the horticultural enterprises were remediated or the risk removed. When engaged by NSW DPI, and with the risks identified, all owners immediately undertook the necessary work or gave undertakings to better manage their properties.

Outcome

Owners better understand biosecurity risk and manage their orchards appropriately. The success of Operation NEGABAN has led to the monitoring and control of neglected and abandoned horticultural enterprises becoming a regular compliance activity.

SURVEILLANCE

Surveillance is key to the early detection of biosecurity threats and provides for the monitoring of the impact of ongoing management programs. It provides early detection of threats, minimising the spread and impacts and allowing for cost effective, rapid responses. Surveillance programs also play an important role in ensuring that our trading partners can be confident that a particular disease is not present (proof of freedom). Surveillance includes:

- Tracing or tracking of stock movements
- Collection of disease and pest samples for analysis and diagnosis
- Use of image and data collection technology
- Aerial mapping, and on ground identification, mapping and reporting.

NSW DPI, Local Land Services and OEH participate in active surveillance activities at state and national levels, along with industry and the community as major participants. Active surveillance programs are in place for plant pest and diseases, animal pests and diseases, aquatic pests and diseases, weeds and invasive pests and animals.

NSW has systems in place for detecting and tracing the spread of pests, disease and invasive species. NSW continues to improve systems and use new innovative technologies that enhance the capacity for surveillance and data capture. NSW DPI is developing a new Biosecurity Information System to help protect us from biosecurity threats. The system combines innovative mobile data capture, business intelligence and geospatial capability into a cloud-based toolset for biosecurity managers. A range of advisory information is also available for stakeholder groups which promote early identification and reporting of suspected pests, diseases and weeds through established telephone hotlines and easy to use web-based systems.

Figure 2: The contribution of passive surveillance to invasive species management

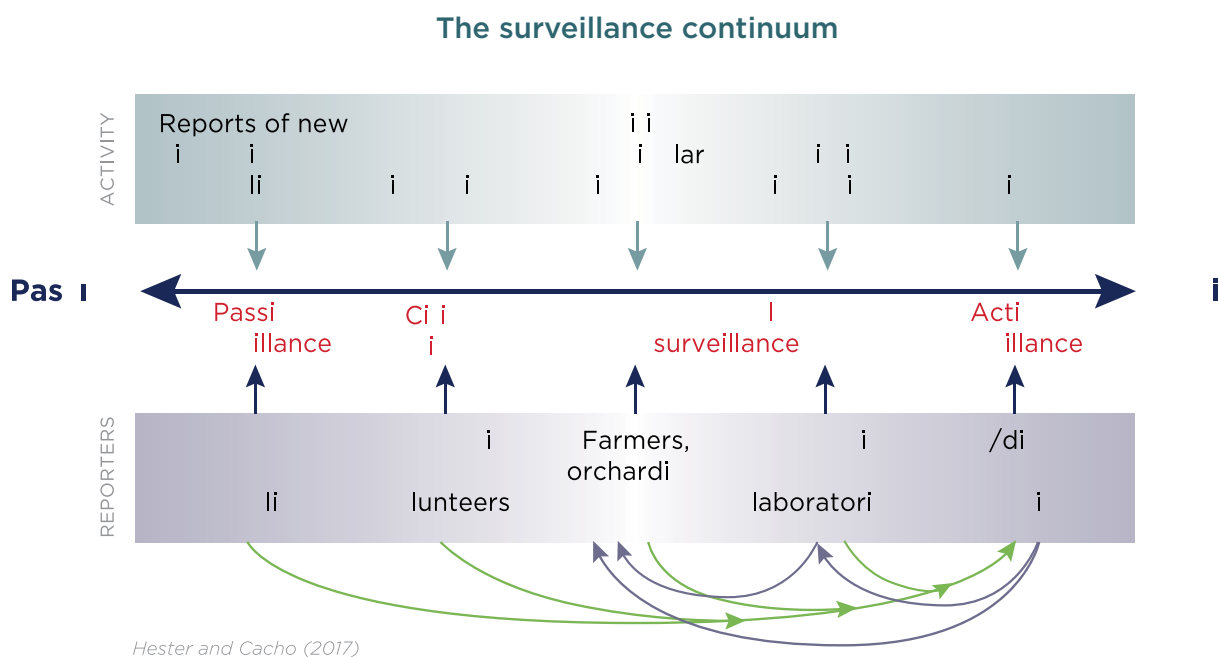


Figure 3: Submissions for notifiable disease exclusions to EMAI Veterinary Diagnostic Laboratory from private veterinarians 2016-17 (approximate)

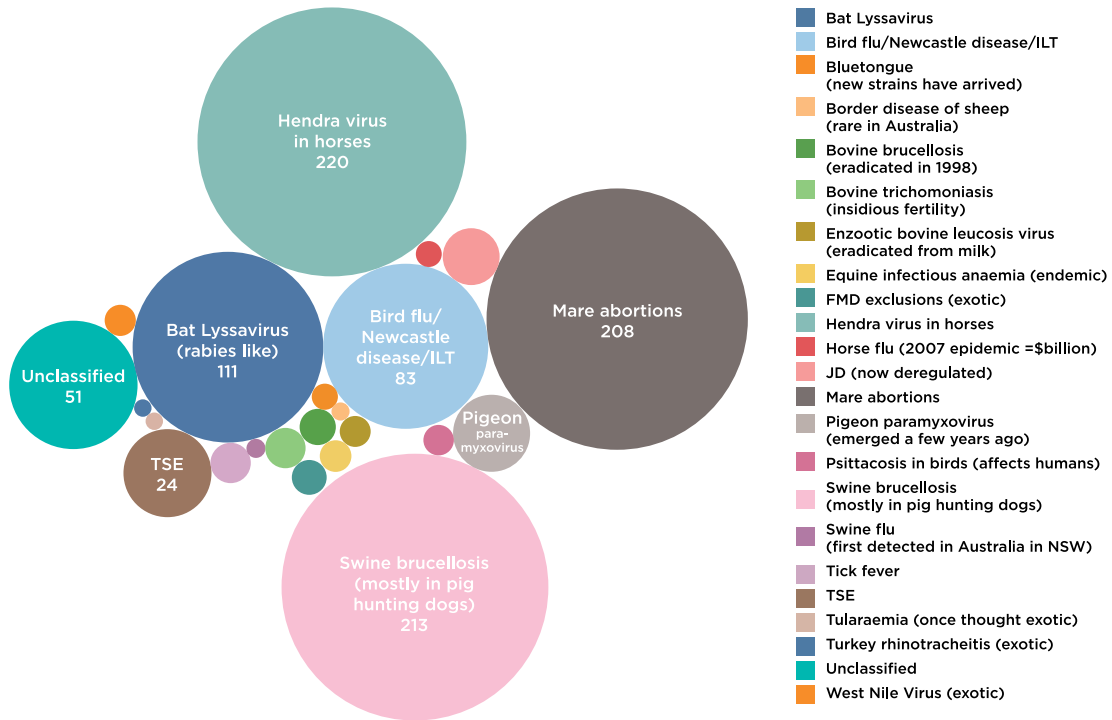
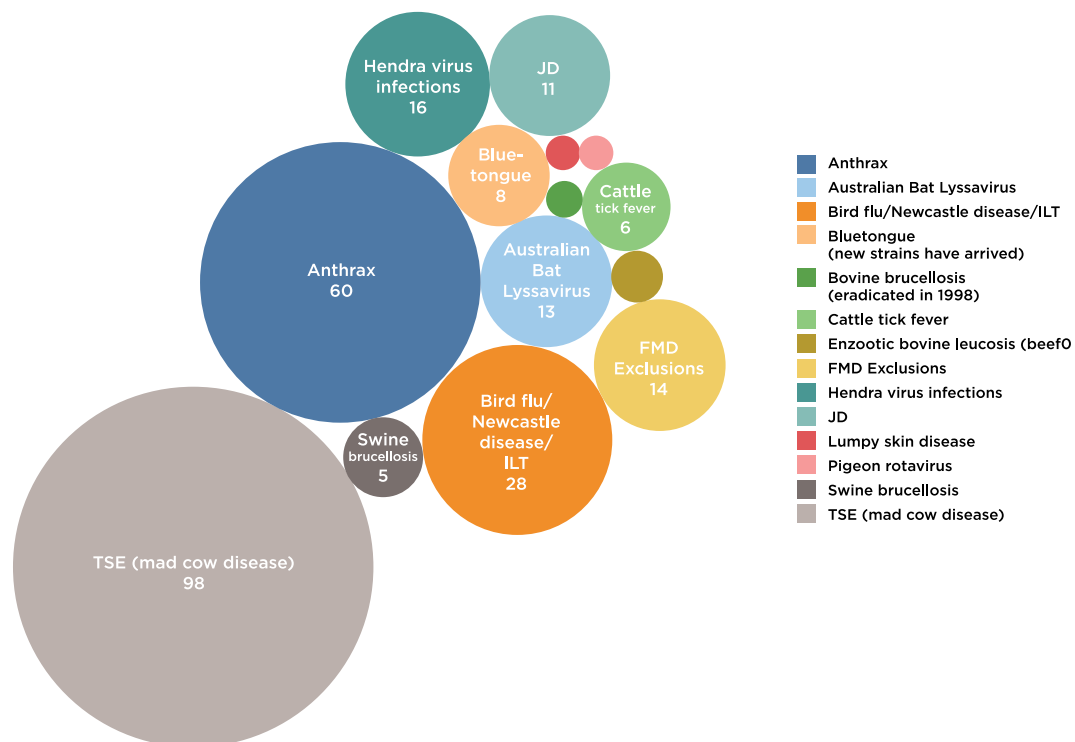


Figure 4: Submissions for notifiable disease diagnosis to EMAI Veterinary Diagnostic Laboratory from Local Land Services district veterinarians, 2016-17 (approximate)



Livestock tracing

The National Livestock Identification System (NLIS) is Australia's permanent, whole-of-life tracking system. It allows cattle, sheep, pigs and goats to be traced for biosecurity, food safety, product integrity and market access purposes. It is a key industry initiative in partnership with governments across Australia. NLIS provides the capacity to trace animal movements across the major livestock industries and quickly implement movement controls to contain and / or eradicate biosecurity risks protecting NSW trade and exports. Live Trace is a NSW program that assists the NLIS by spatial and temporal tracking of movement. The *Biosecurity (National Livestock Identification System) Regulation 2017* presents an updated and more efficient regulatory framework for NLIS in NSW into the future.

'Livestock' includes one or more cattle, sheep, goats, pigs, deer, bison, buffalo, camelids, equines (i.e. horses and donkeys), 100 or more poultry birds or 10 or more emus or ostriches. Since September 2012, anyone who keeps or owns livestock in NSW is required to ensure the land on which the livestock are kept has a Property Identification Code (PIC).

A PIC is a unique identifier for land, assigned to individual properties by Local Land Services. They are fundamental to the integrity of the NLIS system because movements on the NLIS database are recorded between PICs. PICs provide traceability to specific properties for disease and chemical residue management protecting livestock industries and ensuring food safety for the community. In NSW there are currently 107,286 active PICs.

Research and diagnostics support rapid responses

The Elizabeth Macarthur Agricultural Institute (EMAI) - the NSW DPI's Centre of Excellence for Plant and Animal Health - is NSW's premier biosecurity facility and part of a national network of diagnostic facilities. Its laboratories provide rapid diagnosis to support emergency responses and state and national disease surveillance, as well as services to the private sector. A significant component of NSW surveillance success is the availability of Local Land Services and private veterinary practitioners that provide livestock producers with rapid diagnostic services and advice in disease management.

The world class analytical and diagnostic facilities at EMAI ensure that diagnosis is rapid and accurate. In 2016-17, there were 20,000 requests, equating to over 500,000 diagnostic tests. Most of these tests helped ensure that animals and plants were free from disease, allowing Australia to trade in export markets. Over 6,000 of these tests included requests to support exclusion from notifiable diseases (2016-17). Over 400,000 of the diagnostic tests related to animals, with the bulk of these for cattle and sheep. A further 7,000 (2015-16) and 20,000 (2016-17) diagnostic tests related to plants, while the number of analytical tests undertaken on oils and stockfeed was over 100,000 in 2015-16 and 150,000 in 2016-17.

Through NSW DPI, EMAI provides local, state, national and global disease advice to the Australian Government, the World Organisation for Animal Health (OIE) and the Food and Agriculture Organisation of the United Nations (FAO).

COMPLIANCE ACTIVITY

NSW DPI is the lead agency for the administration of legislation that protects and manages biosecurity in NSW for producers and consumers. NSW uses partnerships with industry and the community to encourage greater understanding of biosecurity and food safety practices and support for innovation. NSW DPI plays a major role in communicating and promoting best practice to industry and the community. It also updates major industry stakeholders (Australian Pork Limited, Meat and Livestock Australia, Australian Plague Locus Commission) and smaller stakeholders on a regular basis.

Assisting and engaging with industry and community is a key priority for NSW. Without community engagement and awareness to report and notify non-compliance, threats such as neglected and abandoned horticultural enterprises could not be addressed. NSW DPI staff, Local Land Services and Local Government actively provide information packages to increase awareness in the community and encourage the development of a culture where reporting non-compliance is a given.

The NSW Government provides training to support the implementation and understanding of legislation and policy. Joint education and training programs are delivered in partnership with Local Land Services and Local Government to

support up-skilling the knowledge of employees and ensure consistency is achieved. NSW DPI runs joint compliance activities with Local Land Services, these include property-to-property transfer investigations and aiding Local Land Services officers with complex investigations. NSW promotes voluntary compliance and mitigating and preventing biosecurity risks.

When non-compliance occurs, NSW:

- Provides information through effective communication and engagement programs
- Uses measures to encourage compliance without resorting to formal court action – such as warning letters, directions (directed works), penalty notices, remediation orders, or a combination of these
- Uses overt and covert surveillance tools
- Investigates suspected breaches of the laws
- Undertakes works and seek cost recovery where directed works have not been completed or undertaken subject to a lawful direction
- Prosecutes – leading to conviction and where court imposed penalties may include fines, imprisonment, forfeiture of assets and goods, prohibition orders, good behaviour bonds, and community service orders.

Table 11: NSW DPI biosecurity compliance and enforcement activities (2016-17)

Biosecurity compliance activities	FY 2016-17
Audits/ inspections (ICA, CA, hemp, machinery, stock food)	706
Investigations (plant, animal, bee, cattle tick operations)	828
Permits /Certification (bee, PHC, plant, animal)	4227
Properties Quarantined (Cattle tick program)	524
Biosecurity Enforcement Activities	
Warning / Advisory letters	289
Directions / Orders / Undertakings	52
Penalty notice issued	28

NSW works with other state and territory jurisdictions to promote consistency in the application of enforcement provisions by regulators. This ensures stakeholders in different Australian jurisdictions do not receive differential treatment with respect to measuring compliance with legislative obligations.

Compliance staff undertake regular audits and verification inspections to ensure biosecurity practices are properly implemented, ensuring risks are properly managed and preventing restrictions to market access for trade that would otherwise occur. Voluntary compliance practices and schemes are actively supported as low impact ways of achieving positive biosecurity outcomes. NSW supports and encourages voluntary compliance through a range of educational activities that aim to build the capacity of the community and industry to play an active role in complying with regulations.

Industry compliance programs, such as industry assurance schemes (e.g. self-accreditation and certification), provide companies with real opportunities for self-governance, as well as improved biosecurity and market access outcomes.

In 2014-15 there were:

- 1,217 sites inspected for emergency plant pests or diseases
- 875 licenses, accreditation and permits issued
- 90 enforcement actions undertaken
- 8,500 fruit fly trap inspections
- 458 livestock saleyard and abattoir surveillance activities
- 1,200 disease cases checked for suspected emergency disease
- 1,245 compliance activities including audits and inspections.

In 2015-16, NSW DPI:

- Undertook approximately 500 audits and inspections
- Conducted 1,000 investigations
- Issued almost 7,000 permits / certificates
- Quarantined almost 700 properties.

Source: NSW DPI

THREATS FROM INVASIVE SPECIES

Invasive species can damage infrastructure and cause financial losses to agriculture and other industries. The cultural, public amenity and ecological impacts of invasive species can be more difficult to quantify, but they are substantial. There have been significant declines in Australia's native flora and fauna (including extinction) since the arrival of European settlers, with introduced pest animals and plants contributing to much of this loss. With new introduced species being detected regularly by the Australian Government at the national border and in the open environment, invasive species represent one of the greatest threats to biodiversity in Australia. Invasive species management will also need to increasingly account for changes in the ability of invasive species to establish and spread as a result of changing climate patterns.

Wild dogs, feral pigs, wild rabbits, foxes, feral goats, feral cats, wild deer and carp are the most significant widespread pest animals in NSW. Other pest animals, such as wild horses, rats and cane toads, can cause regional or localised problems. Pest birds such as Indian mynas, introduced turtles (e.g. Red-eared sliders) and invertebrate pests (e.g. invasive ants) are emerging threats. It is estimated that pest animals cost the Australian economy over \$1 billion annually with a cost to NSW of around \$170 million (State-wide review of pest animal management, NRC. 2016). Management actions on established pest species such as rabbits, feral pigs, foxes and rodents are ongoing due to the environmental, economic and social risks they pose.

Over 1,750 introduced plant species have become established in NSW, with at least 340 of these weeds having significant environmental impacts. These include bitou bush, lantana, blackberry and privet. In many cases, weeds form monocultures which displace native species (NSW Invasive Species Plan, 2016-2023). In agricultural areas, weeds can out-compete crops and pasture species, resulting in lower economic returns and the need for expensive and ongoing control measures. In 2014, it was estimated that weed impacts and weed management costs on the NSW agriculture sector were around \$1.8 billion per annum (NSW Invasive Species Plan, 2016-2023).

More than 250 introduced marine species have been detected in Australian coastal waters to date. Marine pests such as the northern Pacific seastar and Japanese kelp in Tasmania and Victoria, and the Asian green mussel in

Cairns, can create serious problems for marine environments and animals, as well as the industries and communities they support. Freshwater pest fish, such as European carp and Tilapia, can also out-compete native species. Aquatic pests, both marine and freshwater, pose a significant risk to the profitability of Australia's \$2.4 billion-a-year fisheries and aquaculture industries.

Invasive species – indicators of performance

Invasive species are a major biosecurity threat to the economy, environment and the community. To measure the impacts of invasive species over time, a range of indicators have been developed.

The figures in Tables 12, 13 and 14 (sourced from NSW DPI and NSW OEH) provide baseline data that will be used to measure performance in future years. This will determine if NSW programs and activities have been successful at limiting the introduction of new species and the spread of existing invasive species. It will also assist future performance evaluation in the invasive species area.

Roles and responsibilities in invasive species management in NSW

The respective roles and responsibilities of key parties involved in invasive species management in NSW are outlined below. Government agencies have important roles to play in policy, information sharing, coordination, public land management and research. However, biosecurity is a shared responsibility that also requires active involvement by industry, private landholders and the general community.

- **State Weed Committee:** The State Weed Committee is responsible for ensuring a coordinated and strategic approach to weed management in NSW. It provides strategic planning advice to NSW DPI, Local Land Services and to regional weed committees to ensure consistent approaches across the State.
- **State Pest Animal Committee:** The State Pest Animal Committee is responsible for ensuring that the approach taken developing Regional Pest Animal Management plans across the State is coordinated and strategic. They must be effective, risk-based and inclusive of all major stakeholders. The State Pest Animal Committee advises on regional and State pest animal policy and regulation and oversees the implementation of key policy and strategy documents.

Table 12: Invasive species metrics – non-indigenous terrestrial vertebrates (NSW DPI, NSW OEH) 2013-17

Invasive species		
Terrestrial vertebrate animals (non-indigenous)	No.	Description
Number of Non-Indigenous Animals (NIA) naturalised in NSW	64	
Number of new NIA reported in the wild over the past five years.	72	
Number of NIA species eradicated in the past five years	6	<ul style="list-style-type: none"> ▶ Asian black spined toad ▶ Mexican Red Knee Tarantula ▶ Leopard gecko ▶ African pygmy hedgehog ▶ Asian black spined toad (2nd introduction) ▶ Red Imported Fire Ant
Number of species under eradication programs (2016-17)	1	Dromedary camel
Number of species for which risk assessments have been undertaken	109	NIA risk assessments conducted by Invasive Plants and Animal Committee
Number of species with a defined containment zone	1	Cane toad
Number of species where the containment zone has decreased during the past five years	0	
Number of species where the containment zone has increased in the past five years	0	
Number of non-indigenous terrestrial vertebrate species being managed to reduce environmental impacts	17	Cane toads, fallow deer, red deer, rusa deer, sambar deer, chital deer, feral cats, feral goats, feral horses, feral pigs, feral donkeys, foxes, black rats, brown rats, house mice, wild rabbits and Indian myna
Number of non-indigenous terrestrial species being managed to reduce agricultural impacts	18	Wild dogs, feral pigs, feral goats, wild rabbits, foxes, fallow deer, red deer, rusa deer, sambar deer, chital deer, black rats, brown rats, house mice, feral donkeys, European starling, European blackbirds, Indian myna and European sparrow

Table 13: Invasive species metrics – plants (NSW DPI, NSW OEH) 2013-17

Invasive species Plants	No.	Description
Number of exotic plant species naturalised in NSW	1,750	
Number of new exotic species detected in the wild over the past five years that are known to be invasive	6	Mouse ear hawkweed, Skunk vine, Frogbit, Kei apple, Sicilian sea lavender and Paper mulberry.
Number of species eradicated in the past five years	0	
Number of species under eradication programs	8	Parthenium weed, Orange Hawkweed, Mouse Ear Hawkweed, Amazonian Frogbit, Tropical Soda Apple, Miconia, Boneseed and Parkinsonia
Number of species with a defined containment zone	4	Bitou bush, Water Hyacinth, Alligator weed and Lantana
Number of species where the containment zone has decreased in the past five years	2	Bitou bush and Water Hyacinth
Number of species where the containment zone has increased in the past five years	0	
Number of species for which risk assessments have been undertaken	316	
Number of species being managed to reduce environmental impacts	266	
Number of species being managed to reduce agricultural impacts	316	
Number of Regional Weed and pest animal Management Plans in place	11	
Weeds inspections on properties 2016-17	>8,457	
Notifiable reports 2016-17	46	
Compliance activities 2016-17	150	Activities where owners were required to rectify an issue
Training and capability improvement activity	>400k	Web views
Training and capability improvement activity	400	Weed professionals registered in Weeds Extranet

Table 14: NSW Invasive fish and aquatic disease data currently available for NSW (NSW DPI, NSW OEH)

Metric	Description
Invasive aquatic pests in NSW	<p>Salt Water:</p> <p><i>Acanthogobius flavimanus</i> (Yellowfin goby) <i>Carcinus maenas</i> (European green crab) <i>Caulerpa taxifolia</i> (Caulerpa) <i>Maoricolpus roseus</i> (New Zealand Screw Shell) <i>Sabella spallanzanii</i> (European Fan Worm) <i>Tridentiger trionocephalus</i> (Trident Goby/Chameleon Goby/Striped Goby/Japanese Goby)</p> <p>Fresh Water:</p> <p><i>Cyprinus carpio</i> (Common or European carp) <i>Carassius auratus</i> (Goldfish) <i>Misgurnus anguillicaudatus</i> (Oriental weather loach) <i>Gambusia holbrooki</i> (Eastern gambusia) <i>Geophagus brasiliensis</i> (Pearl cichlid) <i>Xiphophorus hellerii</i> (Swordtail) <i>Cherax quadricarinatus</i> (Redclaw crayfish) <i>Rocio octofasciata</i> (Jack Dempsey cichlid) <i>Amniataba percooides</i> (Barred grunter) <i>Tanichthys albonubes</i> (White cloud mountain minnow) <i>Oreochromis mossambicus</i> (Tilapia) <i>Xiphophorus variatus</i> (Platy) <i>Perca fluviatilis</i> (Redfin Perch)</p>
Notifiable aquatic diseases in NSW	<p>Epizootic haematopietic necrosis of fish (EHN virus) Epizootic ulcerative syndrome of fish (infection with <i>Aphanomyces invadans</i>) Gill-associated virus disease (GAV) <i>Marteilia sydneyi</i> (QX disease) Ostreid herpesvirus-μ variant—OsHV-1 μvar (OSHV1) that causes Pacific Oyster Mortality Syndrome (POMS) <i>Perkinsus olseni</i> (Perkinsosis)-Winter mortality (of Sydney Rock Oysters)</p>
Invasive aquatic species detected in the wild over the last 5 years	<p><i>Oreochromis mossambicus</i> (Tilapia) (<i>Xiphophorus variatus</i> (Platy)</p>
Invasive aquatic species being managed to reduce aquaculture or environmental impacts in NSW. (2016-17)	<p><i>Oreochromis mossambicus</i> (Tilapia) (<i>Xiphophorus variatus</i> (Platy)</p>

Table 15: Rubric assessment of invasive species management in NSW (2016-17)

	Very poor	Poor	Fair	Good	Excellent
Incursion management	>20 introductions per year	>15 introductions per year	<10 introductions per year	<5 introductions per year	<2 introductions/ per year
Eradication	Species detected and reported longer than 5 year	Species detected and reported between 1 and 5 years	Species detected and reported within months	Species detected and reported within weeks	Species detected and reported within days
	Unable to eradicate	> 3 year delimitation eradication not meeting milestones	3 year delimitation and eradication undertaken	Delimited within 3 months and eradicated	Species isolated eradicated/ treated within days.
Containment	Species uncontained	Species established but continually expanding	Species confined to initial geographic area	Species confined to initial geographic area and population vigour reduced	Significant reduction in geographic area for species
Asset based protection	No asset protection in place	Limited asset protection in place	No impact to high value assets	Limited impact to specific assets	No measurable external impacts from pest population in most assets situations

NSW DPI created **Table 15** to provide a measure of overall performance of the management of NSW invasive species using a 'rubric' approach. The coloured zones are the NSW Government estimate of 2016-17 performance.

Non-NSW DPI roles and responsibilities in invasive species management in NSW

- **Local Land Services** is the interface between landholders and government across invasive species management. Local Land Services is responsible for delivering specific operational aspects of terrestrial pest animal management to the community, including education and compliance under the *Biosecurity Act 2015* and the *Local Land Services Act 2013*. This includes planning and coordination for improved pest animal management across the state. A key role of Local Land Services is to build the capacity of landholder groups to undertake pest animal management in line with state-wide policies. Operational aspects of invasive plant management are managed by Local Control Authorities. Local Land Services also provides operational assistance during incursions and surveillance operations
- **Department of Industry – Crown Lands and Water:** The Department of Industry – Crown Lands and Water administers and manages Crown land, which makes up approximately half the State. It develops, funds and implements invasive species management strategies on land under its direct control. It also supports activities undertaken by community groups and other stakeholders that manage land on its behalf, including community trusts and councils.
- **Forestry Corporation:** The Forestry Corporation oversees around two million

hectares of native forests for sustainable timber production, recreation and biodiversity. It manages invasive species where they are a threat to the productivity and/or biodiversity of native forests and where they are a threat to neighbouring properties.

- **Office of Environment and Heritage (OEH):** OEH develops and implements management strategies for invasive species on more than seven million hectares of lands managed under the *National Parks and Wildlife Act 1974* (approximately 9% of the State). It works collaboratively with stakeholders including Local Land Services and Regional Weeds committees. OEH also develops, coordinates and reports on state-wide initiatives to reduce the impacts of invasive species on biodiversity. Among these initiatives is the Saving our Species program which protects threatened species from threats such as pest animals and weeds, as well as specific strategies for Key Threatening processes, many of which are invasive species. OEH undertakes research into new invasive species control tools and monitors the effectiveness of invasive species management on lands it manages. OEH also has an advisory role to NSW DPI on environmental invasive species management across NSW and sits jointly with NSW DPI on the National Biosecurity Committee.
- **Local Control Authorities (LCAs):** LCAs include Local Councils and Weeds County Councils. They are responsible for implementing priority weed control programs (including enforcement), conducting inspections, controlling weeds on LCA-managed lands and providing education, training and resources for both the public and for staff. LCAs and Regional Weed committees have the primary responsibility for delivering the NSW Weed Action Program via management programs throughout the State.
- **Local Government:** Local councils have additional obligations under the *Local Land Services Act 2013* and *Companion Animals Act 1998* to manage both pest and domestic animals on land they own, occupy or manage. Local Governments play an important role in coordinated pest control programs for weeds and pest animals.

- **Other public land managers:** All Commonwealth, state and local government agencies that manage land have an important role in the management of invasive species in NSW. These areas include: land reserved for its biodiversity, historic or scenic value; land that has a commercial value containing harvestable resources; land used for the State's infrastructure or transport corridors; and land that has not been claimed for any specific purpose.
- **Industry (including private land managers):** Key roles of industry in invasive species management include managing:
 - ▶ invasive species on land and in aquatic environments used for production
 - ▶ risks when trading in potential or known invasive species used for, or held by, nurseries, zoos and collectors, agriculture, horticulture, aquaculture and biofuel developments
 - ▶ vectors or pathways for invasive species to prevent the establishment of invasive species, through movement of goods, produce and equipment or related activities such as the disposal of ships' ballast.
- **Research and innovation organisations:** NSW DPI's Research units and other NSW government agencies, universities and other research and innovation organisations play a significant role in driving advances in invasive species technology and management. National and international collaboration for pest animal research is facilitated through the Centre for Invasive Species Solutions.
- **Special interest groups and community organisations:** Special interest groups and community organisations play an important role in the management of invasive species in NSW. These groups and individuals assist in the management of private and public lands through direct invasive species control and monitoring activities. Others work on conserving biodiversity which increases the resilience of our natural environment to pest animals and weeds. Building capacity throughout the community and sharing biosecurity responsibilities is essential.
- **Community:** All members of the community have an important role to play to help minimise the impacts of invasive species,

including surveillance through the detection and reporting of new incursions (see **Figure 2**). Eradication attempts need community support to be successful. Land owners, occupiers and the general public also have roles to play in the ongoing management of established pest animals and weeds – on their own land and in collaboration with their neighbours and community.

HUMAN HEALTH AND SOCIAL AMENITY

Maintaining human health and social amenity is a key focus of the NSW Biosecurity Strategy. NSW DPI and its partners manage a range of issues including the identification and containment of infectious diseases such as zoonoses. People in close contact with animals or animal products are most at risk of contracting a zoonosis. To mitigate risks, NSW DPI and Local Land Services have comprehensive policies and procedures outlining protocols for the investigation and handling of sick animals.

Zoonotic diseases endemic to NSW include Q Fever, Hendra, Anthrax and the Australian Bat Lyssavirus (ABLV). Q Fever is a relatively common zoonotic illness in Australia, capable of spreading to humans from animals and the environment. In 2016, 225 cases were detected in NSW – 74% of those in people who worked in high-risk occupations, while 85% of patients reported having close contact with animal products or discharge (a known risk factor). Annual rates for the disease in NSW vary but have dropped since the early 1990's.



In addition to Q fever testing, NSW also monitors and tracks other zoonotic diseases. In 2015 NSW conducted over 80 tests on native bats for ABLV. This testing regime allows NSW DPI to provide warning and advice to residents to protect both the community and livestock from the potentially deadly virus. The 2015 survey found only 10 cases of infected bats in those tested. When ABLV is detected, information is provided to doctors and regional vets.

ENVIRONMENT AND BIODIVERSITY PROTECTION

The NSW Government works to protect the environment through long term engagement and awareness strategies and programs, legislation and government policy – to create a framework that protects the natural environment from exotic pests and diseases. NSW participates at a national level through the committees and agreements established under the IGAB.

NSW relies on various state and regional level organisations to support its protection of the environment. OEH has ongoing projects to manage common and widespread pests (e.g. foxes, feral cats, feral pigs, feral goats, deer) and weeds (e.g. Bitou bush and Lantana) to protect native and threatened species which are considered priority environmental assets. The Saving Our Species Program is a NSW state-wide initiative to address the ongoing risks facing threatened species in NSW. Under this program, 79% of threatened species projects developed involve significant actions to address the impacts of pest animals, weeds and/or disease. OEH administers the *Biodiversity Conservation Act 2016* which lists key threatening process, most of which (24) relate to impacts from invasive species.

PROTECTING THE COMMUNITY AND INDUSTRY FROM HENDRA VIRUS

Since the **Hendra virus** was first recognised in Queensland in 1994, there have been 18 properties on the mid and far north coast of NSW where the virus infection has been confirmed, resulting in 20 horse deaths. The most recent case in a horse in NSW was in June 2017 near Lismore, which was managed by NSW DPI and Local Land Services veterinarians and biosecurity staff. Hendra has led to the death of four people in Queensland, but none in NSW. NSW DPI, Local Land Services and NSW Health work together closely to monitor and alert the community to any suspected exposures or risks, providing monitoring and appropriate post-exposure treatment for livestock and people. Understanding of Hendra in Australia has been bolstered through a scientific research program, delivered through funding from NSW, Queensland and the Australian governments. It has identified transmission pathways and the nature of the virus, leading to the release of a viable horse vaccine in 2012.

The Hendra vaccine is the single most effective way of reducing infection risk in both horses and humans. To support vaccination NSW DPI, Queensland Department of Agriculture and Fisheries and the Australian Veterinary Association conduct regular media campaigns to encourage horse owners to vaccinate. Local Land Services utilised local and regional networks to actively communicate information about Hendra (including the preventative mechanisms) to landholders. In NSW over 50,000 horses have been vaccinated against Hendra. However, there are many horses in the risk zones that remain unvaccinated, and there is an ongoing campaign to increase vaccination rates. NSW DPI, in partnership with Local Land Services, also works with landholders (particularly those on smaller blocks) to teach them proper livestock management and risk reduction techniques. This includes covering water sources and keeping trees away from troughs, to reduce the risk of Hendra on their properties.



Plant industries pests and diseases

A plant pest is any organism which can cause disease in a plant and includes invertebrate pests that threaten agricultural production, forestry or native plants and amenity.

NSW DPI undertakes regular surveillance for new plant pests and diseases. The NSW DPI Biosecurity Hotline has been set up to manage surveillance reporting in NSW.

A plant pest is classified as an Emergency Plant Pest (EPP) when it is either:

- A known pest overseas but not previously occurring in Australia
- A variant form of a pest already in Australia
- An entirely new or unknown pest of uncertain origin, or
- A pest occurring in Australia that is being officially controlled to minimise spread and to manage impacts on market access.

To reduce the impact of pests, weeds and diseases, NSW DPI works in partnership with Local Land Services, landholders, community groups and industry specialists to increase the understanding of biosecurity risks and management. NSW DPI provides diagnostic services and information on specific prevention, management and treatment of plant pest and diseases. It also implements biosecurity measures to prevent introduction and to eradicate or manage current pests.

Since 2011, there have been 20 positive exotic plant pest detections, and over 1,200 reports of potential detections. Of the 20 confirmed, 25% were detected through community surveillance and reporting (NSW DPI).

On farm plant biosecurity

The actions of NSW plant based producers are important in maintaining Australia's plant biosecurity status. Farmers and horticulturalists are often the first point of surveillance of production plant based diseases and plant pest outbreaks.

Plant Health Australia has partnered with Animal Health Australia in a joint communication and awareness resource, Farm Biosecurity, which provides biosecurity advice for both crop and livestock producers.

The Grains Farm Biosecurity Program is funded by growers via Grain Producers Australia, in

partnership with the governments of five grain-producing states. Grains Biosecurity officers are responsible for raising awareness of biosecurity among grain growers and others along the supply chain. The officers attend field days, training sessions and conferences, giving talks and presentations on biosecurity. The grains sector has developed codes of conduct and grains standards that are strictly adhered to – e.g. fumigation of grains, quality of grains and requiring pest free grain on delivery.

Horticultural industry managers also have a variety of means to manage their General Biosecurity Duty. There are:

- Multiple quality assurance programs that list requirements (such as farm hygiene and good management practices) before growers can sell their produce

At the time of publishing, the status of **wild deer** as a game animal had been revoked in nine Local Government Areas across NSW, allowing game hunting licence holders to use a wider range of control measures. Monitoring of wild deer distribution is ongoing, and will focus on developing estimates of regional populations and impacts for deer species. The NSW Government is currently preparing a state-wide wild deer strategy and Local Land Services regions are developing pest animal strategies that will guide coordinated management of wild deer in priority areas.



- Certification requirements for organic growers, again looking at farm management and environmental controls
- Export market requirements for state based trade and international trade – e.g. showing disease and pest controls in place
- Biosecurity manuals developed by industry.

Animal industries pests and diseases

The NSW Government is obliged under the *Biosecurity Act 2015* to detect and manage notifiable disease outbreaks. The risks to government of failure to detect these diseases are managed by an active district-based disease and pest surveillance program. Part of the program requires government veterinary officers to investigate potential notifiable disease outbreaks and unusual diseases on farm that may be new, emerging or difficult to diagnose.

NSW DPI and Local Land Services officers conduct targeted surveillance projects, inspections of livestock at saleyards and monitoring of compliance programs. The outcome is district-based early detection of notifiable diseases and valid reports on the animal pest and disease statuses of all districts in New South Wales. These reports are aggregated at state level, for subsequent official reporting to Animal Health Australia and, through the Commonwealth of Australia, to the World Organisation for Animal Health (OIE). The surveillance program is supported by the EMAI government veterinary diagnostic laboratory with world-class diagnostic facilities and by research staff who design and improve diagnostic tests and, working with field



veterinarians, investigate the epidemiology of diseases that have significant biosecurity impacts.

Animal pests (both vertebrates and invertebrates) can have an adverse impact on agriculture, the natural environment and community lifestyle and amenity. Animal pests may be exotic animals which are introduced, either accidentally or deliberately. Native animals may also be pests in certain situations.

Private veterinary practitioners play a vital role in rural communities, by providing livestock owners with animal health, welfare and production advice, and by investigating and treating disease. They also play an integral role in programs for detecting and responding to significant disease incidents in Australia's livestock industries.

- In the livestock industry, each industry is working to develop a set of industry standards which incorporates biosecurity and management plans that growers are expected to comply with.
- Cattle, sheep and goat producers will need to comply with new Livestock Production Assurance (LPA) requirements from 1 October 2017, including completing learning modules on biosecurity and having an on-farm biosecurity plan.

The **Citrus Biosecurity Project**, supported by Citrus Australia and Hort Innovation Australia, includes a variety risk mitigation activities to improve biosecurity planning, preparedness and awareness. The First Detectors Network is a group of trained growers who monitor their crops regularly for any sign of exotic pests. In 2016, the citrus biosecurity manager teamed up with officers from the NSW Government who assisted with surveillance of backyard citrus plants in Sydney and in peri-urban Gosford.

The **Vegetable and Potato Biosecurity Program** is an outreach program funded (through grower levies) by AUSVEG. It aims to enhance the biosecurity practices of producers, as well as others along the supply chain in that industry. Two dedicated biosecurity officers develop biosecurity awareness material, write articles on a biosecurity theme for industry magazines, meet with producers to improve awareness at field days, and liaise with growers during pest incursions. In 2016, the officers worked in the Greater Western Sydney area to tailor awareness material for growers speaking languages other than English.

- The cattle industry has also implemented a voluntary Johne's market assurance program (J-BAS) that involves biosecurity planning.
- The dairy industry uses tools such as the Healthy Farms Checklist and Dairy Assurance Score in place to help farmers manage the risks on their property.
- Intensive industries (such as poultry and pork) require a high level of biosecurity management due to the nature of their product and the animals. This is reflected in industry standards and biosecurity manuals from Animal Health Australia
- For pork farmers, Australian Pork Limited has several resources to address biosecurity risks, from the PigPass traceability system to a pork industry biosecurity toolkit.



The **oyster industry** enforces strict biosecurity plans due to the vulnerability of their product from exotic pests and diseases. As oysters cannot be moved in the case of an incident, it is crucial that growers are aware of biosecurity incidents that could occur and countermeasures they should have in place. For example, inappropriate or contaminated waste runoff into an estuary can wipe out entire oyster patches. Growers are also required to clean down boats between estuaries to prevent transporting water borne pests and diseases to clean waterways e.g. pacific oyster mortality syndrome (POMS).

Aquatic pests and diseases

Responsibility for the prevention and management of aquatic pests and diseases is shared between State and Australian government agencies, industry and the community.

NSW DPI manages disease and pest issues affecting the aquaculture industry, ornamental species and wild populations of fish and shellfish in NSW. Other factors which may impact on fish health, such as toxic algae outbreaks, are also monitored by NSW DPI. Disease and pest threats are managed by increasing community awareness through education programming, increasing reporting mechanisms to identify and report on extent and cause of fish kills in NSW and by implementing operational policies based on an assessment of the risks.

Activities that increase the risk of translocating pest species include shipping, aquarium releases, contaminated aquaculture shipments, and deliberate illegal stockings. NSW DPI implements policies and education programs to help prevent and control pest incursions. For new and significant incursions, the feasibility of eradication is considered as part of the risk based process to design an appropriate response.

NSW DPI has a range of surveys and research projects underway for introduced marine and freshwater pests in NSW, with data on distribution and population dynamics used to help manage these pests.

Table 16: Aquatic pests and disease reports from community and industry surveillance (2014-17). NSW DPI

Year	Reports	Confirmed outbreaks
2017 (Jan-May)	46	No new pest or disease outbreaks confirmed
2016	69	<ul style="list-style-type: none"> ▶ QX detected by oyster farmers in Tweed River after a significant period with no reports ▶ EUS detected in Riverina (first detection west of the Divide in an aquaculture facility) ▶ Nodavirus detected in commercial aquaculture facility in Clarence River
2015	71	<ul style="list-style-type: none"> ▶ QX detected by oyster farmers in the Richmond River (reconfirmed after approximately a decade with no reports) ▶ Redfin Perch detected in Coxs River, Lake Wallace ▶ <i>Caulerpa taxifolia</i> re-detected in Lake Macquarie (in 2009 Lake Macquarie was considered <i>Caulerpa</i> free after multiple years of surveillance with no plants detected)
2014	86	<ul style="list-style-type: none"> ▶ Tilapia detected in Cabarita Beach ▶ Redfin Perch detected in Wentworth Falls, Lake Lyell

NSW DPI works with industry, other agencies and the community to manage all types of aquatic biosecurity risks. NSW DPI strategically plan and support national aquatic pest and disease control. In 2010, NSW DPI released the 'NSW Control Plan for the pest fish *Cyprinus carpio*' and is involved in a significant national research effort directed at future control options for carp – led by the Invasive Animals Cooperative Research Centre. Prevention is a key aspect of aquatic biosecurity with containment and eradication of new pests and diseases extremely difficult. Working with industry and community groups NSW DPI is working to develop community participation and understanding of the biosecurity measures such as cleaning equipment and not releasing captive species into the wild.



Controlling water hyacinth. NSW DPI



4

RESPONDING TO BIOSECURITY EMERGENCIES

NSW regularly participates in state and national biosecurity responses through a variety of activities related to the prevention, surveillance, diagnostics, control, containment, eradication, research and education of biosecurity risks.

In managing biosecurity, NSW identifies and responds to diseases affecting animals, aquatic and plant life, as well as to invasive plants and animals causing damage to the environment and biodiversity. Human health and social amenity are also a key focus. Over the past 10 years, NSW DPI and its partners have responded to a wide range of biosecurity threats across all sectors (highlighted in **Table 10**).

Biosecurity threats can be categorised as threats to:

- Agricultural production
- Market access
- Environment and biodiversity
- Animal and plant and aquatic health
- Human health and social amenity.
- Cultural heritage, infrastructure



Fire ants

Eradication, Containment and Asset Based Protection

Eradication

The NSW Government has specific risk-based policies and procedures to respond to biosecurity risks within the state and which complement national arrangements under Intergovernmental Agreement on Biosecurity (IGAB). When a pest or disease is determined to be nationally significant, national response requirements are initiated under the response agreement. Under the deeds, responses are generally aimed to eradicate the target pest or disease.

Under the IGAB, the **National Environmental Biosecurity Response Agreement (NEBRA)** sets out emergency response arrangements, including cost-sharing arrangements for responding to biosecurity incidents that primarily impact the environment and / or social amenity and where the response is for the public good. The detection of Red Imported Fire Ant in Botany Bay, NSW in 2014 initiated a national response under NEBRA and resulted in its eradication.

The **Emergency Animal Disease Response Agreement** is the national agreement that provides the framework for animal disease incidents. The Equine Influenza outbreak of 2007 is an example of an animal biosecurity incident that was managed to eradication under this agreement.

Early detection allows for the best chance of eradication.

The NSW DPI Elizabeth Macarthur Agricultural Institute and other NSW DPI diagnostic laboratories provide rapid diagnosis and emergency response support for animal, aquatic and plant emergencies.

Eradication of invasive species and diseases is costly and labour intensive and can vary in effectiveness depending on the situation and how much time has passed since arrival. The success and choice of eradication measures will depend on how widespread the pest or disease may be, the techniques and resources available, the accessibility of the affected environment (e.g. aquatic or terrestrial) and the impacts on human health, threatened species and other native biodiversity and industry.

Table 17: Plant biosecurity emergency pest and disease responses in NSW (2008-2017)

Year	Issue	Scientific name	Host plants
2017	Tomato potato psyllid in WA	<i>Bactericera cockerelli</i>	Solanaceae family
	Yellows decline in NSW	<i>Candidatus Liberibacter solanacearum</i>	Parsley (seed)
	Brown marmorated stink bug	<i>Halyomorpha halys</i>	Fruit and vegetables
2016	Lupin anthracnose in NSW	<i>Colletotrichium lupini</i>	Lupins
	Pine nematode in NSW	<i>Bursaphelenchus vallesianus</i>	Pine trees
	Russian wheat aphid in SA	<i>Diuraphis noxia</i>	Wheat, barley
	Grapevine pinot gris virus in NSW/SA		Grapevines
	Hazelnut mite in VIC	<i>Tetranychopsis horridus</i>	Hazelnuts
2015	Giant pine scale in VIC/SA	<i>Marchalina hellenica</i>	Pine trees
	Powdery mildew in NSW	<i>Pseudoidium sp.</i>	Citrus trees
	Nectria cankers in NSW	<i>Rugonectria castaneicola</i>	Oak trees
2014	Verticillium wilt in NSW	<i>Verticillium dahliae VCG1A</i>	Cotton
	Cucumber green mottle mosaic virus in NT		Cucurbitaceae family
	Panama disease TR4 in QLD	<i>Fusarium oxysporum f.sp. cubense</i> Tropical race 4	Banana plants
	Exotic beetles post border breach CWLTH		Timber in service
	▶ Asian longhorn beetle	<i>Anoplophora glabripennis</i>	
	▶ Japanese sawyer beetle	<i>Monochamus alternatus</i>	
	▶ Brown mulberry longhorn beetle	<i>Apriona germari</i>	
Little cherry virus in TAS		Cherry trees	
Vegetable leaf miner in QLD	<i>Liriomyza sativae</i>	Legumes	
2013	Banana freckle in NT	<i>Phyllosticta cavendishii</i>	Bananas
	Tomato red spider mite in NSW	<i>Tetranychus evansi</i>	Solanaceae family weeds and Kangaroo apple (Lane Cove)
	West Indian drywood termite Newport in NSW	<i>Cryptotermes brevis</i>	Timber in service
2012	Melon necrotic spot virus in NSW		Watermelons
	West Indian drywood termite Double Bay in NSW	<i>Cryptotermes brevis</i>	Timber in service
2011	Potato spindle tuber viroid in NSW		Glasshouse tomatoes
	Green snail in VIC	<i>Cantareus aperta</i>	Non selective
	Mango malformation disorder in QLD	<i>Fusarium species (various)</i>	Mango trees
2010	Myrtle rust in NSW	<i>Austropuccinia psidii</i>	Myrtaceae family
	Chestnut blight in VIC	<i>Cryphonectria parasitica</i>	Chestnut and oak trees
	Impatiens necrotic spot virus in NSW		Potted nursery plants
	Black scab in NSW	<i>Elsinoë australis pathovar</i>	Jojoba
2009			
2008	West Indian drywood termite Ramsgate in NSW	<i>Cryptotermes brevis</i>	Timber in service
	Phytophthora die back in NSW	<i>Phytophthora melonis</i>	Kemps Creek Nature Reserve

Table 18: Animal and aquatic biosecurity incidents (2007-2017)

Year	Issue	Issue type
2017	Frogbit	Invasive aquatic plant
	White spot in prawns in Queensland - participation in national response	Aquatic
	Anthrax (1 incident)	Animal
	Hendra virus (horses, three incidents)	Animal
	Pigeon rotavirus	Animal
2016	Alexandrium algal bloom outbreak	Aquatic
	Anthrax (5 incidents)	Animal
	Hendra virus (horses, one incident)	Animal
	Tularaemia (confirmation of historic cases)	Animal
2015	Anthrax (3 incidents)	Animal
	Hendra virus (horses, two incidents)	Animal
	Red imported fire ant	Invasive invertebrate
2014	Hendra virus (horses, one incident)	Animal
	Anthrax (1 incident)	Animal
	Bellingen river snapping turtle	Animal
2013	High Pathogenic Avian Influenza (HPAI) (H7N2) (nationally cost shared)	Animal
	Anthrax (3 incidents)	Animal
	Hendra virus (horses, four incidents)	Animal
2012	Avian influenza (turkeys) (H9N2)	Animal
	Anthrax (4 incidents)	Animal
	Avian influenza (chickens) (nationally cost shared)	Animal
	Pigeon paramyxovirus	Animal
2011	Hendra virus (horses, eight incidents)	Animal
	Kunjin/West Nile virus in horses	Animal
	Pacific Oyster Mortality Syndrome (POMS)	Aquatic
	Abalone viral ganglioneuritis (AVG)	Aquatic
2010	Sea squirt (determined to be non-invasive)	Aquatic
	Anthrax (3 incidents)	Animal
	Pacific Oyster Mortality Syndrome (POMS)	Aquatic
2009	H1N1 Influenza in pigs and in humans (human swine flu)	Animal
	Anthrax (4 incidents)	Animal
2008	Equine influenza proof of freedom	Animal
	Anthrax (9 incidents)	Animal

Table 19: Top 10 NSW DPI priority focus of surveillance and response activities for NSW biosecurity threats (2017)

	Animal	Aquatic	Plant	Invasive plants and animals
1	Foot & mouth disease	Abalone Viral Ganglioneuritis	<i>Xylella fastidiosa</i> and confirmed and unconfirmed vectors	Red Imported Fire Ant (prohibited matter - active eradication of all infestations)
2	Anthrax	White Spot Syndrome Virus Disease of Crustaceans	Khapra beetle	Parthenium weed (prohibited matter - active eradication of all infestations)
3	Avian influenza	Tilapia (all fish of the family <i>Oreochromis</i>)	Huanglongbing and Asian/African citrus psyllid complex	Hawkweeds (prohibited matter - active eradication of all infestations)
4	Bluetongue and other arboviruses (national arbovirus monitoring program)	Pacific Oyster Mortality Syndrome (Ostreid Herpesvirus -1)	Internal and external mites of bees (<i>Apis</i> spp.)	Tropical Soda Apple (control order in place - eradication target)
5	Hendra virus	QX Disease	Giant African snail	Bone seed (control order in place - eradication target)
6	Cattle tick	Epizootic Ulcerative Syndrome	Grapevine phylloxera	Parkinsonia (control order in place - eradication target)
7	Virulent footrot	Nodavirus	Potato Cyst Nematodes	Rabbits (pest control order in place, biological control agents released)
8	Transmissible Spongiform Encephalopathy (Mad Cow Disease)	Asian Green Mussels (<i>Perna viridis</i>)	Citrus canker	Wild dogs (pest control order in place)
9	Australian bat lyssa virus	Redfin Perch (<i>Perca fluviatilis</i>)	Brown-marmorated stink bug	Foxes (pest control order in place)
10	Newcastle disease	European Fan Worm (<i>Sabella spallanzanii</i>)	Exotic gypsy moth	Feral Pigs (pest control order in place)

In government led responses, the NSW Government assesses the level of risk and focuses resources in areas where the benefits of control will achieve the greatest result.

Through the development of new systems, training of staff and emergency exercises for both government and community members, NSW DPI will continue to ensure the State is well prepared and equipped to deal with new biosecurity emergencies. It will also support the responses of other governments across Australia.

A collaborative program involving NSW DPI, Local Land Services and NSW Office of Environment and Heritage is trialling detector dogs to sniff out and detect invasive weeds such as Alligator weed, Orange hawkweed and Mouse-ear hawkweed. Detector dogs can improve the effectiveness of control and eradication programs by locating pests and diseases such as remaining weed fragments or plants that are difficult to find.

Containment

Under the national biosecurity deeds, containment is the initial response phase after identification of an outbreak of a pest or disease. For NSW to be effective in managing outbreaks, surveillance and identification of threats is the crucial first step, with early identification allowing for rapid containment of the outbreak to minimise its spread. NSW utilises agency and industry partnerships to provide rapid responses to confine or 'delimit' the outbreak ideally to small areas to minimise damage and costs of control. The *Biosecurity Act 2015* provides the tools to enforce controls that maximise response effectiveness and protect stakeholders. As a signatory to the national response deeds, NSW has an obligation to contain outbreaks to the smallest area possible with optimal results



being containment to where the outbreak was first identified.

Containment of biosecurity pests and diseases may also be a property level responsibility. Animal disease can be contained through treatment programs and movement restrictions. For plant disease (such as Phylloxera) there are also movement restrictions in place to prevent the spread of disease into currently free from disease areas. Farmers are generally familiar with biosecurity measures for new stock and fodder introduced to their properties. These measures protect farms from the uncontrolled spread of pests and diseases by keeping them contained.

Motorists will be familiar with the restrictions for the movement of fruit and vegetable matter to preserve disease free status at state or territory borders and at times in regional areas where specific agricultural industries occur (e.g. entering the Riverina or the Hunter Valley).

Containment is a coordinated set of measures aimed at halting or limiting the spread of a pest or disease. This is a critical management practice to minimise size and cost of eradication programs. In certain cases, where pests and diseases have spread beyond the economic or practical feasibility of control, containment practices can be used to keep outbreaks within defined areas to maintain disease free status in areas yet to be infected or populated. Such programs can be described as transitioning to management.

Asset-based protection

Asset-based protection activities take place when an invasive species has become so widespread that it would be inefficient to control it everywhere it occurs and containment would provide a low return on investment. Activities in this category aim to reduce the effect of an established pest or disease on targeted assets of value.

Assets can be economic (such as livestock and crops), social (health and social amenity) or environmental (ecosystems, landscapes, flora and fauna) and divided into two categories:

1. Privately owned assets such as livestock and crops and built structures
2. Other assets – including public health, social amenity and environmental (e.g. threatened species and ecological communities).

Table 20: NSW Biosecurity eradication and control activities

ERADICATION / CONTAINMENT		
Element	Activities	Service Provision
Compliance	Single inspection results platform.	Planning functions aligned to the Local Land Services through the establishment of Invasive Species Coordinator positions throughout NSW.
Surveillance	Increased foodborne illness detection and response; Conduct targeted surveillance; Improve diagnostic tests and vaccines; Noxious weeds planning and control supported by new Local Land Services coordinator positions; Pinewood nematode eradication from Port Botany.	High risk surveillance at Port Botany for Pinewood nematode; NSW biosecurity undertook surveillance, tree sampling and destruction to eradicate this pest. Use molecular technology to identify insecticide resistance. Provide information on disease or pests status targeting diseases and pests that contribute to economic losses to improve control options.
Policy and Legislation	NSW DPI supports non-English speaking (CALD) activities.	Validate current tests and develop new diagnostic tests and vaccines for (three) emerging or existing pig diseases.
Education	Biosecurity compliance officers successfully undertake food safety audits.	Contained outbreaks.
Emergency	Fire Ants response delivered in accordance to National response plan. New weed bio-control agents introduced.	NSW DPI ensures non-English speaking (CALD) stakeholders have fair access to policy and legislation. Lead the development and delivery of a training program for partner organisations on the new Biosecurity Act 2015 and relevant subordinate legislation, policy and procedure changes.
Market access	Trial export health certification for horse and other livestock; Proof of Freedom certification performed.	Programs and services developed in consultation with culturally diverse groups. Fast track delivery of new bio-control agents for high priority weeds in partnership. Proof of Freedom certification lodged for Fire Ants and after action reviews conducted for the Port Botany Fire Ant response. Infection status of existing accessions in citrus were confirmed and added to this national resource. Timely and reliable management of livestock export health certification requests.

COMMUNITY ENGAGEMENT AND SURVEILLANCE FOR GIANT PINE SCALE

Giant pine scale is a pest that can damage Australia's softwood plantation industry. To conduct surveillance of amenity plantings in a cost-effective way a crowd-sourced survey was undertaken. Surveillance for giant pine scale was considered an easy pest for the public to look for as the pest's fluffy wax excretions are easily visible to the naked eye and pine trees are a well-recognised tree group. NSW DPI targeted golf clubs and cemeteries to conduct surveillance in their grounds. There were 53 site inspections carried out by the public with no positive detections and NSW currently remains free of this pest.



Privately owned assets

Actions to protect these kinds of assets can have a high private benefit to the land manager or producer and only a small benefit to surrounding land managers and producers who might be affected by local-scale spread. An example might be weed control to protect crop productivity or animal health measures to maintain herd productivity.

Publicly owned assets

Actions to protect this asset class have a higher public benefit. Threatened species and natural ecosystems have intrinsic value as part of our environment, and in some cases provide direct economic value to our community. Biosecurity protects ecosystems from invasive species which can invade habitats and drive out species and change ecosystems. Examples of this are the Cane toad and the pest plant Lantana. Invasive species such as feral cats can also directly prey on threatened species diminishing populations and changing the population dynamics of ecosystems. While having a devastating impact on ecosystems, such invasions can also impact on agricultural productivity and ecotourism.

The threat of RIFA to NSW is an example of an invasive species that will impact directly on social amenity, infrastructure and impact on industry through lost productivity and control costs. For social amenity, RIFA invasion will change the way communities will be able to utilise recreation spaces.

Overall, the responsibility for leading asset-based protection activities is determined by whether the benefit is predominantly private or public. Public benefit situations such as in parks and reserves require a public funded response. Private benefit situations would include a farm where a weed is widespread and affecting crop productivity but control programs would provide little community benefit. Occasionally there will be circumstances where there are both private and public benefits from a control program and in such cases shared funding models are used across government, industry and private individuals.

Table 21: NSW biosecurity asset-based protection activities

ASSET-BASED PROTECTION		
Element	Activities	Service Provision
Compliance	Local Shellfish program compliance is >90%.	Through-chain risk management includes assessment for local shellfish programs meeting NSW regulatory requirements.
Surveillance	Improvement in diagnostics for livestock industry; Resistance testing for cotton insect pests; technologies for detection of invasive species.	Developing surveillance tools such as an innovative early detection system for wild dogs (Wild dog alert) and technologies for the detection and differential diagnosis of invasive species including rabbits, dogs, and DNA barcoding of weeds.
Policy and Legislation	Noxious weed compliance data routinely entered into the NSW Biosecurity Information System.	Resistance testing for cotton aphid and two-spotted mite, and dimethoate and cyhalothrin resistance in cotton seedling thrips.
Education	Communications strategies and resources are developed and delivered to reduce foodborne illness; compliance training and new Biosecurity standards and regulations training (<i>Biosecurity Act 2015</i>) developed.	Development of 'Point-of-Care' diagnostics for livestock industries targeting four key diseases and pests that contribute to economic losses and improve control options. Development of ecologically based tool for the control of invasive weeds, wild rabbits and dogs.
Emergency	Giant Pine Scale response T2M	Food safety communication resources and other tools that support compliance developed for food businesses.
Market access	Ecological control for Invasive species (weeds, rabbits and dogs)	Training programs on regulations and standards developed for key stakeholder groups including Local Land Services and NSW police on the newly enacted Biosecurity Act 2015; Compliance training program developed. Noxious weeds control supported to ensure consistent and effective regulation and investment across NSW Industry provides incentives and education programs for invasive wild dogs, rabbits, and fruit fly programs. Proposed Transition to Management (T2M) Program for Giant pine scale emergency response.

Working together in a biosecurity emergency response

The NSW DPI-Local Land Services alliance shares responsibility for emergency management and implementing strategies that deliver safe and resilient communities. These cover animal, plant and aquatic pests and diseases, locust plagues, natural disasters and other emergencies which impact on animals, plants or agriculture. Local Lands Services also supports preparedness, response and recovery for animal pest and disease and plant pest and disease emergencies and other emergencies impacting on primary production or animal health and safety.

The NSW Government works collaboratively within its agency framework and with other jurisdictions and non-government organisations to deliver strong biosecurity for NSW. At the government level, NSW DPI is the lead agency in biosecurity management but works in partnership with Local Land Services and Local Government to provide biosecurity services for landholders. NSW Office of Environment and Heritage (OEH) provide environmental biosecurity expertise and NSW Health provides expertise to control biosecurity related health issues for the community.



Feral cats are significant predators of NSW biodiversity

The Australian Government has responsibility for managing biosecurity as it relates to the introduction of biosecurity matter across Australia's borders. NSW works with the Australian Government and other jurisdictions to manage biosecurity events within NSW borders and we maintain capability and capacity to assist other jurisdictions in their response activity. NSW also works within the national biosecurity framework to harmonise legislation, policy and strategy:

2011: The NSW and the ACT governments established a Memorandum of Understanding (MoU) to promote regional collaboration between the two jurisdictions. It was introduced to further develop cross-border relationships in service delivery, economic development and resource management, all of which are also integral parts of biosecurity management. NSW also has MOUs with Queensland, South Australia and Victoria for similar purposes.

2016: NSW, Victoria and Queensland reviewed their capability to deliver commitments under the National Environmental Biosecurity Agreement (NEBRA) and shared information on policy, systems and intelligence. The harmonisation of new biosecurity legislation has been achieved through collaboration between jurisdictions.

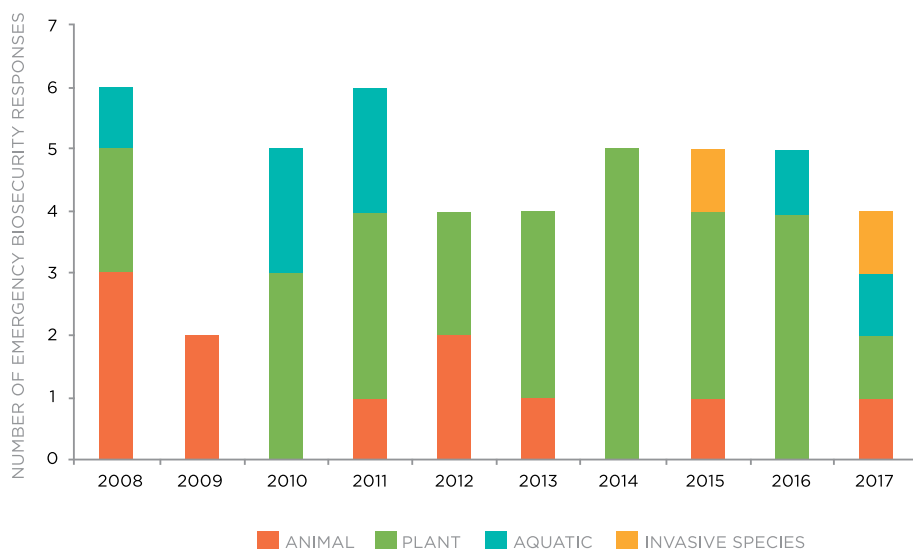
2018: Queensland and NSW will work together on a cross border biosecurity emergency exercise known as Exercise Border Bridge. Planned for implementation in March 2018, it will involve a simulated plant and/or animal biosecurity response.

NSW is a member of the National Biosecurity Committee (NBC) which was established under the Intergovernmental Agreement for Biosecurity (IGAB). NBC is responsible for coordinating national biosecurity arrangements across all state and territory governments. Under the national deeds, NSW is supported by, and supports, other Australian states, territories and the Commonwealth. This is reflected through a series of agreements and joint exercises established over the past six years. Collaboration with the other jurisdictions delivers critical capability and capacity that would otherwise limit our ability to manage biosecurity incidents.

Cross-jurisdictional collaboration allows for rapid and effective responses. NSW will continue to support biosecurity responses in other states as part of NSW's obligations under the national biosecurity agreements, and to improve its readiness for biosecurity events.

NSW DPI, the NSW Office of Environment and Heritage (OEH), NSW Health, Local Land Services (LLS), State Emergency Services organisations and Local Government all partner in the delivery of biosecurity for NSW. NSW DPI is the lead in the

Figure 5: Biosecurity emergency responses in NSW categorised by type (2008-2017). NSW DPI



Agriculture and Animal Services Functional Area (AASFA) and works with Local Land Services and other agencies and organisations to support the NSW State Emergency Service - by coordinating animal welfare relief services for livestock, wildlife and companion animals, as well as assisting affected primary producers.

NSW DPI is the appointed combat agency for biosecurity (animal and plant) emergencies - under the NSW State Emergency Management Plan (EMPLAN) - and leads other agencies in emergency prevention, response and recovery activities. NSW is also providing technical assistance for other responses across Australia - including banana freckle, white spot disease and giant pine scale. **Figure 3** shows the locations affected and the biosecurity responses in place under the IGAB in early 2017.

The NSW SEMP (State Emergency Management Plan) provides a well-established management framework for responding to emergency terrestrial or aquatic pests and diseases. It includes an integrated 'all sectors, all hazards' model. The NSW SEMP is supported by national arrangements and plans. Together, these provide for emergency prevention, preparedness and response and recovery - including surveillance, field operations, laboratories, extension and research (p30 of the NSW Biosecurity Strategy).

Figure 6: Relationships required for biosecurity emergency responses



5 REDUCED IMPACTS FROM ESTABLISHED PESTS, DISEASES AND WEEDS

NSW has ongoing strategies and participates in programs at state and national levels to help it prevent and prepare for, biosecurity risks. As shown in the Invasion Curve (**Figure 1**), prevention and preparedness is a much more effective and efficient control method for biosecurity threats than the containment, eradication and asset protection phases which follow if threats occur.

Prevention, or early intervention, is preferred to managing incursions after they are established. For NSW, the strong diagnostic and analytical capability provided by our laboratories and scientists - combined with wide spread surveillance capacity provided by NSW DPI, Local Land Services, OEH, industry and community members - maximise the opportunity to generate a quick, effective and efficient response to threats.

For long term management, it is important to determine the feasibility and cost of eradication compared to the cost of long term containment or asset based protection strategy. These decisions will determine the nature of the response and the appropriate use of management tools under the Act, as the response moves from eradication to containment and asset based containment.

When determining the appropriate response to a biosecurity issue, the following is considered:

- Whether there is a private or public benefit, and the roles and responsibilities of the risk creators and beneficiaries
- The science relating to the pest or disease and the feasibility of available management options
- The risk posed by the threat and the potential cost related to the consequences
- Economic and social impacts
- The roles of government, industry and the community in combating and resourcing the threat response.

NSW biosecurity management approaches prioritise prevention, early detection and eradication. These aim to provide the highest return on investment and the best protection.



6

STRENGTHENED BIOSECURITY SCIENCE AND RESEARCH CAPACITY AND CAPABILITY

NSW has developed strong applied science based approaches and verification programs to measure compliance and assess the effectiveness of regulatory and industry performance in biosecurity.

Research delivers practical diagnostic kits and tests, vaccines, capture devices, control tools and intellectual property used in biosecurity incidents. The expertise developed in plant and animal biosecurity, and food safety, provides the next generation of tools required for identification, surveillance and control of exotic disease causing pathogens, pests and weeds.

The core capabilities and resources of biosecurity research in NSW include leading world scientists collaborating with science and research teams, leveraging their skills to identify and resolve biosecurity risks. This work is being acknowledged through international, peer-reviewed publications.

Research and science collaboration with other jurisdictions, research organisations, industry and universities underpins NSW's expertise and capability in managing biosecurity.

NSW has an extensive archive of pests, pathogens, animals and plants used to support research. Scientific evidence is constantly expanding through collaboration with universities, other research organisations, environmental and Local Land Services and Local Government and the agricultural community. NSW DPI's Vertebrate Pest and Weeds Research units, the Orange Agricultural Institute and other NSW government agencies, universities and other research and innovation organisations play a significant role in driving advances in invasive species technology and management. National and international collaboration for pest animal research is facilitated through the Centre for Invasive Species Solutions.



Elizabeth Macarthur Agricultural Institute (EMAI) quarantine and research laboratories

EMAI's high bio-containment laboratories and animal facilities are the only state-owned PC3/QC3 and PC2/QC2, ISO and NATA accredited laboratories in NSW. EMAI also accommodates weed biocontrol quarantine facilities while delivering at-cost recovery world class diagnostic and research to industry. NSW DPI Orange Agricultural Institute and the Tamworth Agricultural Institute are also conducting valuable biosecurity research. Over the past 10 years, NSW has developed key partnerships with leading research facilities including the Australian Centre for Genomic Epidemiological Microbiology (Ausgem).

Established in 2014, Ausgem is as a collaborative partnership between the NSW DPI's EMAI and the ithree institute at the University of Technology Sydney (UTS). Its primary aim is to conduct research on biosecurity threats including current and emerging pests and infectious and parasitic diseases of animals and plants. Ausgem uses a ground-breaking One Health, genomic epidemiological approach which combines the unique and complementary skills and resources of its founding partners. Specifically, it harnesses the high throughput genomic, proteomic and bioinformatics skills available within the ithree institute, UTS and the pathogen libraries, as well as the laboratory and epidemiological skills available from EMAI and NSW DPI.

**7**

WELL-TRAINED AND WELL-RESOURCED PEOPLE

To effectively manage biosecurity risk, stakeholders must have the capability to adequately prepare their community and businesses to prevent and manage biosecurity risk, and be able to respond effectively to incidents if they occur. Landholders require skills in plant and animal pest and disease management and agency staff require the additional skills of response and recovery management. NSW DPI and Local Land Services and Local Government offer a range of training and information materials targeted for land managers. There are also a range of training programs offered specifically for biosecurity incident emergency responders. The following section outlines the training available to stakeholders.

Nationally accredited biosecurity training

Tocal College has partnered with biosecurity agencies across all jurisdictions to deliver biosecurity emergency response training for over 10 years. Tocal is currently working on a national project called Biosecurity Emergency Response Training Australia. The training and assessment materials developed will support the Certificate III in Public Safety (Biosecurity Response Operations), Certificate IV in Public Safety (Biosecurity Response Supervision) and the Diploma of Public Safety (Biosecurity Response Management). Training officers in each jurisdiction (or partner agencies such as AHA or PHA) will deliver the training and will conform to a national standard.

NSW Emergency Management training

The NSW DPI Emergency Management Unit training focuses on emergency role specific training. The EMtrain platform delivers e-learning and will continue to expand. Face-to-face courses will include multi-agency Incident Management Team, Logistics Support courses, Field Operations and Design and Manage exercises. This training is run in combination with other NSW government emergency management agencies. NSW is currently working with other jurisdictions to develop standardised national biosecurity material to improve both the state and nations response capacity.

Local Land Services

Local Land Services deliver on-ground biosecurity training to land owners including competency based training and accreditation for the use of control products under pest control orders. Targeted programs training in vertebrate pests with linked incentives are provided for wild dog control, deer management, pigs and goat eradication for example, and integrated pest management control (IPM) vertebrate pest control.

Local Land Services also provide informal capacity building to assist land owners to complete biosecurity plans and activities, required for farmers trading stock. Farm Biosecurity planning workshops are held regionally across NSW to assist landholders with legislation, industry changes and to improve biosecurity practices. The regions host workshops across the state for local landholders to deliver a variety of key messages. Biosecurity and animal health messages are linked to messages on improving production gains. District vets are on hand in workshops to explain the benefits of animal health and biosecurity outcomes.

Local Land Services undertake preparedness exercises for emergency management response to an emergency animal disease such as standstill exercises at saleyards, perform after action reviews with local emergency committees and provide representation on committees for preparedness / planning for prevention / consequence management plans.

Animal Health Australia

Animal Health Australia provides education and training to producers to assist with their responsibilities under the Emergency Animal Disease Response Agreement (EADRA). There are three specialist biosecurity emergency response qualifications available in emergency animal disease training – part of the PUA12 Public Safety Training Package:

1. Certificate III in Public Safety (Biosecurity Response Operations)
2. Certificate IV in Public Safety (Biosecurity Response Leadership)
3. Diploma of Public Safety (Biosecurity Response Management).

Online training available for veterinarians includes:

- Johnes's Disease Market Assurance Program training – accreditation program training

- Australian Government Veterinarian accreditation
- Australian Animal Pathology Standards Program
- National TSE Surveillance Training
- Rapid Response Team Training / National Biosecurity Response Training.

Plant Health Australia

Plant Health Australia's biosecurity online training system provides free access to e-learning courses related to plant biosecurity, available to anyone with an interest in biosecurity. There are four online courses available:

1. Foundation – provides a summary of the plant biosecurity system and the Emergency Plant Pest Response Deed
2. Reporting a suspect emergency plant pest – demonstrates when and how to report a new plant pest
3. Biosecurity for Beekeepers – provides advice on keeping honey bees healthy using industry best practice
4. National Exotic Plant Pest response management – describes the purpose of the Consultative Committee on Emergency Plant Pests and the National Management Group, the roles and responsibilities of PHA members, and the decision-making process in an incident.

Plant Biosecurity Cooperative Research Centre (CRC)

The Plant Biosecurity Cooperative Research Centre aims to increase Australia's critical shortage of plant biosecurity specialists. To train the next generation of biosecurity experts, education and training is embedded throughout its research programs with 18 PhD candidates trained in its tenure. Each PhD candidate will have supervisors from academia as well as industry or government.

They are also providing resources for new online training modules in pest diagnostics and provide Vocational Education and Training learning and teaching materials in plant biosecurity to registered training organisations and secondary schools.

The current Plant Biosecurity CRC is scheduled to close in June 2018. At this time how the work

WEED DNA BARCODE BREAKTHROUGH

For the first time, we have the potential to develop a timely and easy way to distinguish between invasive and native grasses at their early growth stages. NSW DPI scientists are now working on a handheld tool that could identify weeds based on their DNA barcodes. This provides the opportunity to shortcut the traditional identification process, which often involves examination of the plants' flowers that can only take place once the plant has reached maturity. By minimising identification time, this breakthrough will help halt the spread of weeds including Chilean needle grass and Serrated Tussock which costs farmers more than \$40 million in lost production each year. The diagnostic tool could be applied to identify other invasive weed species. The NSW Weeds Action Program provided funding for the initial stage of research and the project team have secured further funding by the Australian Government's Agricultural Competitiveness White Paper. <https://dpiactive.dpi.nsw.gov.au/weed-dna-barcode-breakthrough/June 2017>.

conducted by the CRC will continue will be determined by the Australian Government.

Veterinary Training – emergency animal disease awareness

Training improves the understanding and capabilities of private veterinarians of how to report and investigate emergency animal diseases. NSW DPI with Local Land Services and the Australian Veterinary Association presented emergency animal disease awareness training seminars across NSW from June 2016 to February 2017.

Table 22 provides a snapshot of achievements by NSW DPI, Local Land Services and OEH in relation to Goals 2 & 3 of the NSW Biosecurity Strategy. The table outlines achievements and where activity has been identified for implementation in order to meet the outcomes nominated in the Strategy for Goals 2 & 3.



Goal 2: Biosecurity contributes to sustainable economic growth



Goal 3: Biosecurity protects the environment and community

Table 22: Strategy Goals 2 & 3 (a snapshot of achievements by NSW DPI, Local Land Services and OEH in relation to NSW biosecurity)

Strategy Goals and Outcomes	Achievements	Future activity	
<p>Outcome 3: Biosecurity management actions</p>	<p>3.1 Improve early detection and reporting systems, drawing on the latest technologies and diagnostics</p>	<ul style="list-style-type: none"> ▶ Weed detector dogs trained for hawkweeds. ▶ DNA barcoding for early diagnosis of cryptic weed species. ▶ DNA identification testing tool developed for Tilapia. ▶ Aquatic surveillance plan in place. ▶ Setting up Biosecurity Collections digitisation project. ▶ Deliver National Plant Pest Surveillance project and National Bee Pest Surveillance Program sentinel hives projects at ports of entry. 	
	<p>3.2 Undertake surveillance activities that are underpinned by robust science and prioritised according to risk</p>	<ul style="list-style-type: none"> ▶ DNA testing, rapid diagnostics, photo traps, areal mapping in place. ▶ Risk assessments are used to determine priority for surveillance. ▶ Biosecurity Collections management and staff ISO9001:2015 certified and NATA accredited. ▶ Validation of Phylloxera Exclusion Zone status through annual program regional surveillance. 	<ul style="list-style-type: none"> ▶ Improvement in plant surveillance activity is expected from the implementation of a new Plant Biosecurity Strategic Plan and the associated activity, and the increasing capability and capacity of Local Land Services will improve plant surveillance outcomes. ▶ Implement the database KEMu in Biosecurity Collections to promote efficiency and national alignment. ▶ Resource Biosecurity Collections accessioning backlog. ▶ Implement improved plant pest monitoring information systems that are harmonised with other jurisdictions (including replacing Pestmon). ▶ NSW DPI is establishing an animal biosecurity early warning risk group.
	<p>3.3 Improve current tracing systems so that they meet national performance standards</p>	<ul style="list-style-type: none"> ▶ There are currently 107,286 active PICs (Property Identification Codes) in NSW. ▶ Quarterly monitoring of NLIS compliance for saleyards, abattoirs and agents. ▶ Local Land Services program of saleyard NLIS compliance audits. 	<ul style="list-style-type: none"> ▶ Work is ongoing to continuously improve electronic based tracing and reporting. ▶ Develop and implement Bee registration system. ▶ Collaborate with NSW EPA to improve traceability of recycled waste applied to agricultural land.

Strategy Goals and Outcomes	Achievements	Future activity	
Outcome 3: Biosecurity management actions	3.4 Expand the National Livestock Identification Systems to allow tracing of additional livestock species	<ul style="list-style-type: none"> ▶ NLIS in NSW is currently tracing the movements of cattle in NSW. ▶ Pig movements data now being loaded to the NLIS database. 	
	3.5 Continue to develop more efficient ways of demonstrating proof of freedom from pests, diseases and weeds	<ul style="list-style-type: none"> ▶ PC3/QC3 and PC2/QC2, ISO and NATA accredited laboratories based at Elizabeth Macarthur Agricultural Institute provide diagnostics and analytics for biosecurity in NSW. ▶ New statistically sound sampling protocols developed for proof of freedom surveillance for RIFA at Port Botany. ▶ Data harvested from NSW fruit fly data and science papers submitted defining pest free areas to use in market access agreements. ▶ Transition fruit fly monitoring from old barcode readers to iPhone/iPad data capture under way. ▶ Biosecurity Collections data of pest and disease status. 	<ul style="list-style-type: none"> ▶ Aquatic surveillance plan in place. ▶ Complete transition to iPhone/iPad data capture for fruit fly monitoring in NSW. ▶ Continue to explore adoption of the Victorian plant pest data collection systems.
	3.6 Increase focus on coordinated surveillance activities and strategic information management and accessibility	<ul style="list-style-type: none"> ▶ Weeds Action Program surveillance is more structured, risk based and reported more frequently. ▶ Data analysed on a regional basis to demonstrate the effectiveness of weed surveillance ▶ Develop and implement National Plant Surveillance Reporting Tool. 	<ul style="list-style-type: none"> ▶ Improvements required in cross-jurisdictional management of emergencies and for development of MOUs between agencies within NSW. ▶ Land manager investment is required to increase capacity.
	3.7 Develop and implement effective surveillance systems in natural environments	<ul style="list-style-type: none"> ▶ National Forest Biosecurity Surveillance Strategy (ACWP Project 12), 	
	3.8 Consider including plant industries & peri-urban properties in property registration & traceability systems	<ul style="list-style-type: none"> ▶ Undertook industry consultation during development of the <i>Biosecurity Act 2015</i>. ▶ Issue considered by a combined PHC and AHC working group. 	

Strategy Goals 2 & 3 (a snapshot of achievements by NSW DPI, Local Land Services and OEHL in relation to NSW Biosecurity)

Strategy Goals and Outcomes	Achievements	Future activity	
Outcome 4: Improved response to Biosecurity emergencies	4.1 Identify and prioritise biosecurity threats across terrestrial and aquatic environments and the agriculture and aquaculture sectors	<ul style="list-style-type: none"> ▶ Top 10 biosecurity threats across NSW agricultural industry and the environment identified. Plant threats prioritised nationally. ▶ White Spot disease kept out of NSW. ▶ Scripting for consistent data collection in response to Emergency Animal Disease and Notifiable Disease submissions at Elizabeth Macarthur Agricultural Institute labs. ▶ Collaborative work to agree on 42 national priority plant industry pests. ▶ NSW DPI collaboration priorities. ▶ Support plant industry pest and disease preparedness and response by developing the tool box for notifiables (under the Plant Diseases Act), including PrimeFacts, contingency guidelines and surveillance programs. 	<ul style="list-style-type: none"> ▶ Collaboratively work with industry and jurisdictions in identifying and addressing gaps in preparedness and response for national priority plant pests and transition to management for emergency plant pest incursions. ▶ Ongoing work with Industry biosecurity planning. ▶ Review of chemical control options for priority plant pests.
	4.2 Improve biosecurity prevention, preparedness, response and recovery across all sectors, but particularly where gaps currently exist, for example in fisheries and forestry industries and the environment	<ul style="list-style-type: none"> ▶ PrimeFacts on 42 priority pests published on the web. ▶ Targeted preparedness programs in plant industries e.g. National Forest Biosecurity Surveillance Strategy. 	<ul style="list-style-type: none"> ▶ Gaps currently exist in fisheries and forestry industries and the environment. ▶ Implementation across Local Land Services, NSW DPI of learnings for EAD. Preparedness Gap Project in Animal Biosecurity. ▶ NSW DPI Emergency management (EM) reform - commitment by NSW DPI to increase response capacity through training and resource. allocation. Continue to enhance EMTrain. ▶ Conduct Regional EM Risk Assessment.
	4.3 Improve cross jurisdictional collaboration in biosecurity management	<ul style="list-style-type: none"> ▶ Diagnostic collaboration across National government laboratories and Australian Animal Health Laboratory using digital histopathology platform. ▶ Cross border incursion response training planned for animal/plant incursion to develop cross border data sharing. ▶ NIAP Audit. ▶ National Diagnosticians Network. ▶ AusPESTCheck surveillance reporting. 	<ul style="list-style-type: none"> ▶ Improvements required in cross-jurisdictional management of emergencies and for development of MOUs between agencies within NSW. ▶ Cross- jurisdictional exercises being held e.g. Border Bridge in 2018. ▶ Participate in National Harmonisation of SOPs.

Strategy Goals 2 & 3 (a snapshot of achievements by NSW DPI, Local Land Services and OEHL in relation to NSW Biosecurity)

Strategy Goals and Outcomes	Achievements	Future activity
Outcome 4: Improved response to Biosecurity emergencies	4.4 Continue to incorporate research findings into the decision-making framework for responding to emergencies	<ul style="list-style-type: none"> ▶ After Action Reviews are held after all emergency responses in NSW and findings are used to improve decision making. AAR findings are captured in short and long term EM Reform priorities. ▶ Convert research findings into tools available for emergency response. POMS emergency response due to preparedness action by NSW.
Outcome 5: Reduced impacts from established pests, disease and weeds	5.1 Develop and adopt an integrated decision making framework to prioritise and inform risk based decisions on where to direct investment	<ul style="list-style-type: none"> ▶ Build stronger links with NSW DPI Agriculture to improve transition to management. ▶ Taxonomic research to understand organisms whether exotic or established or native mites, insects and pathogens.
5.2 Improve the effectiveness of control programs through research, advice and new technologies	<ul style="list-style-type: none"> ▶ All sectors are open to using new technology and adapting it. ▶ Implementation of robotic testing platform to improve disease testing and reporting. ▶ Sterile Fruit Fly trials. 	<ul style="list-style-type: none"> ▶ Revised ways of working in animal biosecurity focusing on policy cycle, evidence and evaluation and continuous improvement. ▶ Cattle tick review.
5.3 Improve capability to manage pests, diseases and weeds	<ul style="list-style-type: none"> ▶ The Australian Government funded project to increase landholder capability to manage established pests and weeds is under way and will be further rolled out over 2017-19. ▶ Awareness programs (Education). ▶ Local Land Services and NSW DPI and Industry integration. ▶ Share knowledge with stakeholders and partners. ▶ New Chemical registrations. 	<ul style="list-style-type: none"> ▶ There is ongoing work to increase understanding and improve the management of biosecurity threats.
5.4 Develop biosecurity risk mitigation strategies for established pests, diseases and weeds within NSW and in collaboration with other jurisdictions	<ul style="list-style-type: none"> ▶ Risk based research program related to NSW DPI programs is in place. ▶ NSW Government is represented as members of NBC sectoral committees. ▶ Developed market access procedures for seasonal Pest absence for Queensland fruit fly (QFF). ▶ Grains Farm Biosecurity Program. ▶ Bee Biosecurity Programs. 	<ul style="list-style-type: none"> ▶ Participation on Industry Biosecurity committees.

Strategy Goals 2 & 3 (a snapshot of achievements by NSW DPI, Local Land Services and OEI in relation to NSW Biosecurity)

Strategy Goals and Outcomes	Achievements	Future activity	
Outcome 5: Reduced impacts from established pests, diseases and weeds	5.5 Work with other jurisdictions to harmonise arrangements across borders	<ul style="list-style-type: none"> ▶ RDCs are represented by industry and government. ▶ Developed and updated numerous ICA procedures in consultation with other jurisdictions. ▶ Participate in national harmonisation of agricultural and veterinary chemicals. ▶ NSW active participation in national committees and working groups for plant pests and diseases. 	<ul style="list-style-type: none"> ▶ Review MOUs with jurisdictions
	5.6 Continue to contribute to national arrangements for managing established pests, diseases and weeds	<ul style="list-style-type: none"> ▶ NSW is a national leader in the development of policy and practices that lead to best practice biosecurity outcomes in Australia. ▶ Influential in NBC matters. 	
Outcome 6: Strengthened biosecurity science and research capacity and capability	6.1 Prioritise biosecurity research in collaboration with industry, research providers, the Commonwealth, and other jurisdictions	<ul style="list-style-type: none"> ▶ Excellent responsiveness through research for new and emerging pests, weeds and diseases. ▶ Participation in the Centre for Invasive Species Solutions. ▶ Molecular capabilities of Biosecurity Collections for ID supplementing morphological taxonomy. 	<ul style="list-style-type: none"> ▶ Participation in the national weed biocontrol consortium. ▶ Participation in the Centre for Invasive Species Solutions. ▶ Address diagnostics gaps for 42 priority industry plant pests through national collaboration. ▶ Resource accessioning backlog in Biosecurity Collections. ▶ Continue to develop and resource molecular capabilities of Biosecurity Collections. ▶ Strengthen linkage with NSW DPI Agriculture. ▶ Address limited environmental biosecurity research capacity, e.g. invasive ants, native plant diseases. ▶ Improve biosecurity research in collaboration with NSW DPI and with industry, universities, other research providers and other stakeholders.
	6.2 Work with the Commonwealth, other jurisdictions and industry to develop a nationally integrated biosecurity diagnostic network	<ul style="list-style-type: none"> ▶ Working as member of NBC sectoral committees. ▶ National Diagnostic Network in plant biosecurity collaboration and annual workshops. 	

Strategy Goals 2 & 3 (a snapshot of achievements by NSW DPI, Local Land Services and OEHL in relation to NSW Biosecurity)

Strategy Goals and Outcomes	Achievements	Future activity
Outcome 6: Strengthened biosecurity science and research capacity and capability	6.3 Strengthen research partnerships and encourage research to address knowledge gaps across the biosecurity continuum	<ul style="list-style-type: none"> ▶ Research partnerships current with RDCs and universities as well as with industry and jurisdictions. E.g. Centre for Invasive Species Solutions. ▶ NSW fruit fly researchers are collaborators in the multimillion “SIT plus” research program. ▶ National diagnostic expertise on key plant pest and disease groups of significance to the Australian environment and agriculture. ▶ Contribute to national diagnostic protocols and standards development.
	6.4 Improve capacity to manage animal pests using techniques that incorporate best-practice principles and animal welfare based outcomes	<ul style="list-style-type: none"> ▶ Recent calicivirus and carp programs. ▶ Policy work in feral pig, deer and other invasive species on-going.
	6.5 Develop innovative approaches to the management of biosecurity risks	<ul style="list-style-type: none"> ▶ NSW agencies and stakeholders are utilising new technology such as remote sensing, aerial surveillance, DNA sequencing, algorithms and a range of innovative approaches to maximize surveillance outcomes and responses.
	6.6 Invest in biological control programs for key pests and weeds	<ul style="list-style-type: none"> ▶ Paterson’s Curse control program and the more recent RHDV1 K5 calicivirus for rabbit control have proven successful. ▶ The future European carp control program is currently being assessed for suitability to control the Murray-Darling Basin Carp problem. ▶ Weed biocontrol quarantine facility established at Orange Agriculture Institute.

Strategy Goals 2 & 3 (a snapshot of achievements by NSW DPI, Local Land Services and OEI in relation to NSW Biosecurity)

Strategy Goals and Outcomes	Achievements	Future activity
<p>Outcome 7: Increased numbers of well-trained and resourced people</p>	<p>7.1 Develop skills knowledge and capability for the delivery of biosecurity activities within government and among stakeholders by providing opportunities for continuing education and postgraduate training</p>	<ul style="list-style-type: none"> ▶ Online <i>Biosecurity Act</i> training program delivered to over 1000 state and local government officers in 2016-17. ▶ Ongoing face to face training sessions ▶ On line EMTrain system underpinning training for emergency management. ▶ Intern arrangements in place for Biosecurity Collections digitisation project. <ul style="list-style-type: none"> ▶ Changing biosecurity risk and resource availability, and the development of new and emerging technologies requires that capability must continuously improve through training and development programs. ▶ Biosecurity training will be evaluated and tailored around identified sectors. A focus will be to improve capabilities and capacities within NSW DPI and Local Land Services around the implementation of the <i>Biosecurity Act 2015</i>. ▶ Industry training will be developed and implemented across identified sectors to build industry knowledge with the legislation. ▶ Community stakeholder training is under development to increase understanding and uptake of shared responsibility and General Biosecurity Duty. ▶ NSW DPI EM Reform – commitment by NSW DPI to increase response capacity through training and resource allocation. ▶ Continue to enhance EMTrain. Developing and delivering face to face EM training. ▶ Partnership with other States and Territories to develop new EM training course in partnership with Tocal RTC. ▶ Membership on NSW Technical Advisory Group (Training), and National Animal Health Training Steering Committee.
	<p>7.2 Continue to develop, adopt, and invest in new technologies</p>	<ul style="list-style-type: none"> ▶ ICA/CA accreditation and auditing functions transitioned to BYTE ▶ Need to identify and invest in innovative technologies to support NSW DPI. ▶ Plant Pest monitoring upgrade. ▶ KEMu database management system at Biosecurity Collections. ▶ Molecular underpinning of diagnostics and taxonomy at OAI/ Biosecurity Collections.
	<p>7.3 Develop and adopt information management systems that allow for strategic information management and easy access to information</p>	<ul style="list-style-type: none"> ▶ Participation in AusPESTCheck. ▶ Website review and development. ▶ Sample Manager – Diagnostic Systems. ▶ Ongoing improvements in information/intelligence systems to support the emergency response program. ▶ Further development of established pest, disease and weed information management systems.

Strategy Goals 2 & 3 (a snapshot of achievements by NSW DPI, Local Land Services and OEI in relation to NSW Biosecurity)

CASE STUDY

Training and Certification of authorised officers

The successful launch of the *Biosecurity Act 2015* went well beyond the approval and implementation of the legislation and its regulations. It also hinged on providing front line staff with the knowledge and tools to enact the new legislation.

Impacts

For the *Biosecurity Act 2015* to be effective, officers from NSW DPI, Local Land Services and Local Control Authorities (including Local Government officers) required training in both the extensive detail of the new legislation and the practical application of the new regulations under the Act. The development of the Act provided for Authorised Officers to exercise the functions of the legislation, including investigating, monitoring and enforcing compliance in order to prevent, eliminate, minimise and manage biosecurity risks.

Response

Extensive training roll-out

To enable this critical workforce, the Department of Primary Industries rolled out a 10-module online training course and more than 50 one-day face-to-face training sessions. During 2017 more than 1,000 people had completed biosecurity online training modules and more than 1,060 had attended face-to-face learning sessions at 30 locations across NSW. Most of these are from NSW DPI, Local Land Services and Local Control Authorities, particularly local government. More than 480 of these have now been certified as Authorised Officers, giving them powers under the Act.

Outlook

Further training planned

Additional officers will be certified authorised after completing the training. The online training modules will remain active on the EMTrain platform, and further face-to-face sessions will be offered across regional hub locations. These are specifically designed to cover the requirements for authorised officers from other government organisations but course are also available to the general public.



CHAPTER 4: BIOSECURITY IS UNDERPINNED BY A RESPONSIVE AND CONSISTENT LEGISLATIVE FRAMEWORK



GOAL 4 BIOSECURITY IS UNDERPINNED BY A RESPONSIVE AND CONSISTENT LEGISLATIVE FRAMEWORK

The effectiveness of any biosecurity system is underpinned by the quality of its regulation and compliance programs. A major initial focus of the NSW Biosecurity Strategy 2013-2021 (Goal 4) was to review the existing biosecurity related legislation and regulation and develop a single new Act that was risk based, harmonised with other jurisdictions and provided protection from biosecurity risks for agricultural and food industries, the environment and the community. The accompanying regulatory system needed to be robust and trustworthy, but at the same time, simple and streamlined so as not to overburden our industries and supportive of growing market access for NSW producers. *Table 23* lists the achievements and future implementation activities related to Goal 4 of the NSW Biosecurity Strategy.

OUTCOMES

- 8 A consistent and contemporary legislative framework**
- 9 Reduced red tape and improved market access**
- 10 Greater self-management of biosecurity risks by industries, businesses and other stakeholders**



8

A CONSISTENT AND CONTEMPORARY LEGISLATIVE FRAMEWORK

Prior to 2015, NSW had 14 pieces of legislation that dealt with the management of biosecurity risks. Many of these were recognised as containing provisions that were outdated and overly prescriptive.

With increasing biosecurity risk and new global biosecurity challenges, the existing legislative frameworks were proving difficult to adapt to contemporary biosecurity management requirements. In addition, with each of these Acts detailing how to assess, respond to and manage biosecurity risks in isolation, duplication and inconsistency between the Acts arose, particularly relating to emergency management, compliance provisions and enforcement powers.

The former legislative framework failed to recognise and formally acknowledge the important role played by industry and the community in the management of biosecurity risks across all land tenures. It also didn't recognise biosecurity risks to the environment. Furthermore, it was highly reliant on government

intervention and enforcement by inspectors and authorised officers – favouring almost complete government responsibility for emergency and ongoing control programs.

Biosecurity Act 2015

To deliver this goal, the *Biosecurity Act 2015* was passed by NSW Parliament in September 2015, replacing all or part of 14 other outdated Acts. The regulations, instruments, policies and procedures that underpin the *Biosecurity Act 2015* were developed in consultation with industry, community and government partners to ensure the development of a regulatory framework that would effectively respond to and manage biosecurity risks. Before the Act could commence, the supporting subordinate legislation needed to be developed. To facilitate this, a Regulatory Impact Statement was produced as the beginning of an extensive consultation process. The range of feedback received was extremely constructive and resulted in several changes to the proposed approach.

With the regulations finalised, the *Biosecurity Act 2015* and supporting regulations and orders commenced on 1 July 2017.

The new legislation saw the approach to biosecurity shift to one of a shared responsibility, introducing the principle of a General Biosecurity Duty. This can apply to anyone and provides that any person who deals with biosecurity matter or a carrier, and who knows (or ought reasonably to know) of the biosecurity risk posed (or likely to be posed), has a General Biosecurity Duty to ensure that the risk is prevented, eliminated or minimised – so far as is reasonably practicable.

The *NSW Biosecurity Act 2015* removes inconsistencies and duplication, reducing the risk of error and the burden of red tape, providing cost savings for industry and government through decreased regulatory burden. It allows for more industry based codes of practice, and accreditation and compliance schemes that can be audited by third parties while retaining the government approvals processes required by domestic and overseas markets.

The Act:

- Clarifies the rights, responsibilities and obligations of industry and the community, empowering better self management of biosecurity risks

- Complements the principle of shared responsibility presented in the NSW Biosecurity Strategy
- Provides for a range of tools and powers that can be used to support risk based management and allow for increasing efficiency and decreasing regulation
- Is tenure neutral
- Allows for an educative and advisory approach to be taken with stakeholders to help manage biosecurity risks
- Allows for consideration of economic, environmental and community issues when determining management arrangements
- Provides flexibility for industry to innovate and self-regulate through accreditation and certification quality assurance programs that support market access.

The Biosecurity Regulation, 2017 covers the whole biosecurity spectrum, reducing the need for multiple regulations. The NSW Biosecurity Regulation, 2017 formally acknowledges these partnerships and provides support for a range of approaches to managing biosecurity risks – through codes of practice and best-practice guidelines.

Traditionally, biosecurity risks have been largely managed by government – through regulatory tools enforced by inspectors (e.g. quarantines, bans and restrictions). Recent focus has been on creating productive partnerships between government, industry and the community, with each sector taking an active role in reducing the impacts of biosecurity risks. Examples of the General Biosecurity Duty in action include:

- Implementing codes of practice and industry standards such as disinfecting equipment
- Vaccinating animals
- Creating weed free buffer zones
- Adhering to stock movement protocols and approved pest management practices.

NSW DPI has also developed an extensive training program which aims to ensure Authorised Officers and relevant staff understand the application of the Act's tools and powers and how to effectively implement and communicate them to stakeholder groups.

Key pieces of NSW legislation which operate in tandem with the *NSW Biosecurity Act 2015* include:

- *Biodiversity Conservation Act 2016*
- *Crown Lands (Continued Tenures) Act 1989*
- *Forestry and National Park Estate Act 1998*
- *Game and Feral Animal Control Act 2002*
- *Local Government Act 1993*
- *Local Land Services Act 2013*
- *National Parks and Wildlife Act 1974*
- *Native Vegetation Act 2003*
- *Prevention of Cruelty to Animals Act 1979*
- *Wild Dog Destruction Act 1921*

Maintaining a strong agricultural industry is vital to protect the \$113 billion NSW food industry (which represents 24% of NSW's GDP). The seafood sector alone (including commercial fisheries and aquaculture) generates over \$500 million for the State each year and employs more than 4,000 people. The wild harvest commercial fishing component is worth more than \$90 million dollars at first point of sale, while NSW aquaculture production for both freshwater and marine species was valued at almost \$65 million in 2015-2016.

Protecting our aquatic environments from pests and diseases safeguards aquatic tourism, aquaculture industries and recreational and commercial activities such as fishing, boating and diving.

The NSW tourism industry is also an important consideration for biosecurity. It is worth around \$37.1 billion, with environmental tourism estimated to be worth \$7.42 billion. A pest or disease outbreak can have a major cost impact to this sector if an activity is affected.



9

REDUCED RED TAPE AND IMPROVED MARKET ACCESS

Australia's international reputation as a producer of quality agricultural products, and a leader in biosecurity, helped generate export earnings of almost \$45 billion in 2015-16. In 2017-18 this is expected to increase to almost \$49 billion (*IGAB review - ABARES 2017*). Maintaining a strong biosecurity status will ensure NSW can continue to support market access and expand its national and international trading and export opportunities. In NSW, the primary industries sector has a gross value exceeding \$15 billion per annum. This sector requires ongoing biosecurity support, providing for safe and secure food and agricultural products and promoting trade in both national and international markets.

Biosecurity is integral to the NSW Government's goal of growing the value of the State's primary industries. It protects current yields and production through disease and pest management. It also provides assurance to maintain existing markets and supports confidence that facilitates the expansion into new markets for NSW produce overseas and domestically.



10

GREATER SELF-MANAGEMENT OF BIOSECURITY RISKS BY INDUSTRIES, BUSINESSES AND OTHER STAKEHOLDERS

Voluntary compliance practices and schemes are actively supported as low impact regulation methods of achieving positive biosecurity outcomes. The NSW DPI supports and encourages voluntary compliance through a range of educational activities that aim to build the capacity of the community and industry to play an active role in complying with regulations. Voluntary compliance programs, such as industry assurance schemes (e.g. self-accreditation and certification), provide companies with real opportunities for self-governance and risk management, as well as improved biosecurity and market access outcomes.

Certification Assurance schemes were developed to allow a business to self-certify its produce to allow interstate and intrastate trade by meeting the destinations quarantine requirements. Different produce and pests have different requirements ranging from chemical treatments to post harvest inspections. The Interstate Certification Assurance (ICA) Scheme audit program is an example of industry certification. ICA is a national plant health certification scheme (accepted by all States and

Territories) that allows accredited business to self-certify plants and plant products as meeting specific interstate quarantine restrictions.

The scheme is based on quality management principles. It provides a harmonised approach to the audit and accreditation of businesses throughout Australia and the mutual recognition of Plant Health Assurance Certificates issued by accredited businesses (accompanying consignments of produce moving interstate).

The ongoing development of improved best practice guidelines promoted by industry and Animal Health Australia and Plant Health Australia are contributing to improved biosecurity practices and reduced biosecurity risks. The increasing adoption of farm biosecurity plans and other industry risk management strategies is a positive step.

Developing new legislation and regulatory instruments is an extremely complex activity with the likelihood of the need for revisions and updates as issues arise. The introduction of amended legislation and regulation brings a potential risk of non-compliance through lack of awareness, however the threat of biosecurity risks not being effectively managed is minimal. Government and industry are delivering a significant program of information and education

material supported by a strong communication strategy to minimise this risk.

Increasing the use of self-certification delivers red tape reductions, but increases the potential for risk to market access if biosecurity requirements are found to have been breached. Increasing awareness and industry leadership will mitigate this risk and the regulatory framework and associated penalties from the new Act and Regulations for breaches will also strengthen this area.

There is a significant opportunity to assess the impact that the new Biosecurity Legislation and Regulations will have on biosecurity outcomes in the State. Given that the legislative and regulatory framework is designed to harmonise with other jurisdictions and reduce red tape for stakeholders, there is an opportunity to evaluate the impacts in the period between this inaugural NSW State of Biosecurity Report and the subsequent reports.

A review of the *Biosecurity Act 2015* and Biosecurity Regulations is planned in 2018-2019.

Table 23 provides a snapshot of achievements by NSW DPI, Local Land Services and OEI in relation to Goal 4 of the NSW Biosecurity Strategy. The table outlines achievements and where activity has been identified for implementation in order to meet the outcomes nominated in the Strategy for Goal 4.



Checking National Livestock Identification System cattle tags. Source: Local Land Services.



Goal 4: Biosecurity is underpinned by a responsive and consistent legislative framework

Table 23: A snapshot of achievements against Goal 4 of the NSW Biosecurity Strategy

Strategy Goals and Outcomes	Achievements	Future activity	
Outcome 8: A consistent and contemporary legislative framework	8.1 Review existing NSW legislation, taking into consideration legislation in other jurisdictions	<ul style="list-style-type: none"> ▶ Reviews are on-going and systems are in place to ensure best practice risk based standards. ▶ NSW DPI actively supports industry to develop best practice guidelines and have them adopted. ▶ All plant, animal and invasive biosecurity legislation was reviewed and replaced as part of the Biosecurity Act implementation project. 	
	8.2 Develop and implement a new NSW Biosecurity Act that is in harmony with legislation in other jurisdictions.	<ul style="list-style-type: none"> ▶ The <i>NSW Biosecurity Act 2015</i> and <i>Biosecurity Regulation, 2017</i> are operational as at 1 July 2017. 	<ul style="list-style-type: none"> ▶ Ongoing review, improvement and harmonisation.
Outcome 9: Reduced red tape and improved market access	9.1 Streamline certification systems	<ul style="list-style-type: none"> ▶ NSW DPI auditable programs (ICA, CA, Hemp, EAPA, stock feed, goat depots, alkaloid poppy) have been integrated into a single CRM system (BYTE). 	<ul style="list-style-type: none"> ▶ NSW DPI has identified that a review of certification systems is required. ▶ Single IT platform for management of livestock export certificates. ▶ Further develop policies and procedures to assist third parties develop certification schemes.
	9.2 Develop an audit framework based on risk and compliance history	<ul style="list-style-type: none"> ▶ NSW DPI auditable programs (ICA, CA, Hemp, EAPA, stock feed, goat depots, alkaloid poppy) have been integrated into a single CRM system (BYTE). 	<ul style="list-style-type: none"> ▶ Enhancements to electronic systems are in continuous development to provide a level of customer service in line with DPI strategic goals and enhanced infield operational capabilities.
	9.3 Streamline regulations	<ul style="list-style-type: none"> ▶ Significant reform of biosecurity legislation. 	<ul style="list-style-type: none"> ▶ On-going evaluation of impacts will be undertaken to allow for improvement and targeted programs to deliver practice change.

Strategy Goals and Outcomes	Achievements	Future activity
<p>Outcome 10: Greater self-management of biosecurity risks by industries, businesses and other stakeholders</p>	<p>10.1 Develop regulatory standards and, where appropriate, independent third party auditing schemes</p> <ul style="list-style-type: none"> ▶ Review of systems on an ongoing basis. ▶ Systems are in place to ensure contemporary best practice risk-based standards. ▶ The <i>NSW Biosecurity Act 2015</i> provides for third party auditing schemes. Ongoing work to appoint third party auditors for plant certification schemes. <hr/> <p>10.2 Support the development of best practice guidelines</p> <ul style="list-style-type: none"> ▶ NSW DPI contributes to industry development of contemporary best practice guidelines grains and bee industry programs and Cotton Program. ▶ Appointment of Grains Biosecurity Officer and Bee Biosecurity Officer. <hr/> <p>10.3 Develop clear guidelines outlining the roles and responsibilities of stakeholders in biosecurity management</p> <ul style="list-style-type: none"> ▶ The <i>NSW Biosecurity Act 2015</i> clearly defines the responsibility of all stakeholders to carry out their General Biosecurity Duty. Training and information programs are in place to raise awareness and understanding. 	<ul style="list-style-type: none"> ▶ The review and development of Accreditation Authorities under the Biosecurity Act along with updating of policies and procedures will be undertaken. ▶ Assessments of service deliverables with accreditation authorities will be undertaken in 2018. ▶ Continue to develop guidance material for the community and stakeholders. ▶ Work with community to identify needs and areas for collaboration. <hr/> <ul style="list-style-type: none"> ▶ Continue to work with industry to develop guidelines. <hr/> <ul style="list-style-type: none"> ▶ Research work to capture changes in biosecurity management practices is planned for 2018-19 and ongoing. This work will contribute to targeted programs that aim to improve understanding of roles and responsibilities and practices. ▶ Development of information material for all biosecurity stakeholders, including the development and provision of industry guidelines.





CHAPTER 5: PLANNING FOR THE FUTURE

Future trends, unforeseen changes to the economy, environment, social and political issues can all influence biosecurity risks and their subsequent management.

The ability to anticipate and adapt to trends and risks will help NSW plan for future biosecurity opportunities and mitigation measures. As the movement of people and goods in and out of NSW increases, so will the biosecurity risks.

NSW aims to meet these challenges by developing programs that help identify and manage growing biosecurity risks in the future – with a focus on the early stages of the general invasion curve. This involves new programs to improve community awareness and biosecurity practices, surveillance and early-stage eradication programs.

Issues that are impacting, or likely to impact, biosecurity in NSW into the future include:

- Increasing environmental impacts from invasive species
- Willingness of government, industry and the community to share responsibility
- Availability of resources to all biosecurity participants
- Climate change
- Globalisation and the supply chain (transport and trade)
- Population growth and land use
- Availability of new technology (such as change to genetic engineering and mapping and artificial intelligence). Blockchain offers new possibilities in product tracking.

Increasing environmental impacts from invasive species

NSW is focusing on a range of existing pest animals and plants, aiming to manage, eradicate or control their spread and impact on the environment. This includes foxes, feral pigs, feral goats, deer, cane toads, carp, bitou bush, lantana and hawkweed.

The spread of pest animals and weeds into new areas can have a significant impact on the native vegetation and animals, often causing decline and loss of species and ecosystem modification.

NSW will focus on managing the impacts of invasive species across the biosecurity continuum. As well as preventing the establishment of new invasive species that could harm the environment, efforts will be made to control their spread and limit population numbers where damage is the greatest. This includes using new technologies and control techniques. Some emerging and widespread species (such as feral cats) cannot be eradicated. In these cases, cost effective and efficient control techniques will be developed and implemented to reduce their impact and research undertaken to support land manager efforts.

Willingness of government, industry and the community to share responsibility

Biosecurity stakeholders (including government) are facing an increasingly tight fiscal environment that will continue to impact on their ability to commit to the biosecurity system. Governments are increasingly looking to maximise the returns on their investments, while non-government stakeholders (who are being increasingly involved in sharing costs) are looking to have greater influence on decision making. The IGAB review found that while government and industry are well prepared and understand the partnerships needed to deliver effective biosecurity outcomes, land managers are yet to fully understand and accept the principle of 'shared responsibility' and do not regard their roles as well defined or as yet agreed.

A strong emphasis for engagement and education programs in NSW will be placed on improving acceptance and understanding by all parties of this aspect of delivering the biosecurity system.

Availability of resources to all biosecurity participants

The IGAB Review has recommended (Recommendation 31) that jurisdictions maintain funding levels at the 2016-17 levels until the next IGAB review. The NSW government will continue to support funding in areas that achieve the highest public benefit. Collaborative partnerships between government and industry, underpinned by stable decision making and robust risk analysis, ensure that financial resources are used effectively.

Industry and community participants are increasingly becoming involved in supporting the biosecurity system and may offer substantial resources. The resources they bring include expertise, on-ground activities in surveillance and control and networking, communication and coordination.

NSW DPI uses a variety of risk identification and assessment methods to identify and understand a biosecurity risk and what level or risk it poses to the economy, the environment and the community, as well as the appropriate management response.

Resource decisions based on risk analysis require identification and categorisation of the risk status of biosecurity threats. Using that data, management activities are prioritised and targeted programs aligned to risk category are developed and delivered.

If a biosecurity risk is identified, NSW DPI uses an analysis tool – a Biosecurity Threat Decision Tree – to determine if, and to what level, government intervention is required to address the risk. If intervention is necessary, the tool identifies whether it should be funded by government or if costs should be recovered from an individual, a firm or an industry (on a fee-for-service or levy basis).

At a national level, the IGAB (and its supporting agreements and deeds) create a framework which defines governance and cost sharing agreements between governments, industry and the community. This provides clarity and improved collaboration for national responses – to determine if an emergency response is required and who will pay the cost based on the principle of ‘risk creators’ (those who create the risk) and ‘beneficiaries’ (those that receive the benefit).

Shared responsibility for biosecurity promotes better use of resources through the collaborative management of risks. Industry will have an increasing role in biosecurity to minimise risks and support market access. Community surveillance programs provide a significant surveillance and reporting resource in pest and disease management that contributes greatly to the overall resources available for biosecurity in NSW. The NSW Government has a range of advisory programs and materials that support industry and the community in their suspected pests and diseases surveillance and reporting work.

Climate change

Impacts on native biodiversity from pests and diseases, population growth, land clearing and climate variability will continue. It is estimated that 70% of threatened species in NSW are under pressure due to invasive species, while introduced fish species make up approximately a quarter of all freshwater fish species in the Murray-Darling Basin.

Climate variability (including extreme weather events), changes in weather patterns and increases in temperature can create favourable conditions for some invasive species which are often hardier and more adaptive than native flora and fauna. Increases in air temperatures may result in southern range extensions for tropical and subtropical pests such as cane toads and cattle tick, while weeds currently restricted by the cold (e.g. fireweed) are likely to move into higher altitude areas.

Increases in water temperatures can also affect the distribution of native and invasive species in both marine and freshwater environments.

Globalisation and the supply chain (transport and trade)

Transport of goods and people is a key driver of biosecurity risks in NSW, with demand growing due to increases in trade and the movement of people for migration and tourism at national and regional levels.

Greater Sydney currently receives more than 38.5 million international visitors, over 500,000 tonnes of air freight and one million shipping containers every year. The variety and traffic on the pathways into Sydney can facilitate the intentional or inadvertent movement of biosecurity risk material – e.g. by vehicles, equipment, packaging materials, soil, ballast water and hull biofouling. This is an area that will require greater surveillance and focus into the future. In addition, increased access to the internet has accelerated illegal trading of exotic plant and animals globally.

The Australian Government is forecasting that the number of passengers, commercial vessels and break bulk pathways in Australia will increase by 73% from 2016-17 to 2025. With such rapid growth, it is not feasible to maintain current risk levels through “at border” intervention.

In the future NSW will need to focus on working smarter, adjusting the current system and

developing innovative new ideas to manage the biosecurity risk at different stages. With the growth of internet trade and increases in the private movement of biosecurity risk material (at the state and international level) NSW will need to focus on mitigating the risk of this increasing trade. New biosecurity methods will take place through pre-border national arrangements and post-border risk management, surveillance, and implementing technological and social changes.

Population growth and land use

Australia's population and migration has been steadily increasing for many years. By 2031, it's anticipated around 9.23 million people will live in NSW, with most growth expected to be in the Sydney region. This growth, combined with urban environments encroaching on natural and agricultural land, presents an increasing biosecurity risk that NSW is working to address. Through research and working with the community, NSW DPI aims to improve public understanding of biosecurity and the risk factors posed by urbanisation and the movement of people into agricultural and natural land.

Availability of new technology

Moving forward, NSW will need to ensure it embraces new technologies and strategies to tackle the changing risk profile of biosecurity in the State. Advances in diagnostic testing and the development of biological and other control techniques will provide ongoing support to

biosecurity management programs. This includes innovations from facilities such as the state-of-the-art bio-secure diagnostic laboratories at NSW DPI's Elizabeth Macarthur Agricultural Institute, which will continue to provide rapid diagnosis of emergency diseases and support state and national disease surveillance. NSW will also continue to develop and deploy technologies that improve surveillance, response and eradication work. Most recently technological advances have included:

Drone technology

Drones present exciting new opportunities for innovative surveillance activities and provide cost effective monitoring for land, livestock and weeds. The DPI Tocal Agricultural Centre uses drones for training activities in agriculture and land management.

New smartphone 'apps'

Apps provide simple and effective ways for the community and industry to get involved in biosecurity. Some recent developments in this space include:

- **Weedwise app** – provides information on 300 high risk weeds, their control and legal requirements.
- **Vertebrate Pest Research Unit app and mapping program** – allowing landholders and the community to report evidence of rabbit disease in their local area and to map the

Figure 7: Growth of international passengers arriving at Sydney airport over time (2006-2016)



spread and effectiveness of several biocontrol agents or viruses. This can then be used to help plan follow-up control to reduce rabbit populations.

- **National Farm Biosecurity app** – assists farmers to develop comprehensive on-farm biosecurity plans.

GROWING THE ECONOMY THROUGH IMPROVED ACCESS TO MARKETS

In NSW, the primary industries sector has a gross value exceeding \$15 billion per annum. This sector requires ongoing biosecurity support, providing for safe and secure food and agricultural products and promoting trade in both national and international markets.

Maintaining a strong agricultural industry is vital to protect the \$113 billion NSW food industry (which represents 24% of NSW's GDP). The seafood sector alone (including commercial fisheries and aquaculture) generates over \$500 million for the State each year and employs more than 4,000 people. The wild harvest commercial fishing component is worth more than \$90 million dollars at first point of sale, while NSW aquaculture production for both freshwater and marine species was valued at almost \$65 million in 2015-2016.

The NSW tourism industry is also an important consideration for biosecurity. It is worth around \$37.1 billion annually, with environmental tourism estimated to be worth \$7.42 billion annually. A pest or disease outbreak can have a major cost impact to this sector if an activity is affected. For example, the Crown of Thorns starfish (an introduced marine pest in Queensland) continues to threaten Australia's \$1.5-\$2 billion reef tourism industry. The ongoing cost and human effort required to control this pest is significant, with multiple control measures in place. A labour-intensive control program involves two teams of 10 to 12 divers who rotate (10 days on and four days off) to cull and remove the starfish from reef areas.

The NSW Government is committed to continuing its work with industry and the community to protect and grow primary industries in NSW. Sharing the responsibility for biosecurity management will become more important as national and global consumer demands increase.

USING DRONES FOR WEED DETECTION AND MANAGEMENT

NSW DPI, OEH, Northern Inland Weeds Advisory Committee and the Sydney University Centre for Field Robotics have partnered to develop ground breaking 'smart' capability for unmanned aerial vehicles allowing them to identify weed species with 90 per cent accuracy.

Following a very successful NSW Weeds Action Program (WAP) funded project which saw the development of algorithms that can differentiate four key weed species from a variety of vegetation types, the team has been successful in securing funding through the WAP to make the system more robust for field application.

The algorithms continually collect information about target weeds in a variety of situations and use this data to build a profile to increase the identification confidence levels. Simply put, this technology gets smarter the more often it is used.

This tool has obvious applications for weed managers and a cost benefit analysis is currently being prepared to determine the feasibility of using the technology during regional weed inspection programs.



NSW horticulture exporters ensure produce meets stringent requirements to be accepted for import into specific markets. On farm, it is in the interest of the primary producer to ensure that best biosecurity management practises (BMP) are applied during the growing and harvest periods. BMP incorporates regular crop monitoring by third party agents, such as agronomists, who evaluate and report on pests of economic concern which then forms part of the farm's integrated pest management program (IMP). Farms, orchards and packaging sheds may need to be registered and audited by an accredited government inspector, which the exporter must pass before they can sell into domestic or international markets.

The ultimate objectives of BMP, IMP and export audit programs is to ensure that premium quality, pest and disease free product is exported without exposing the importing country to any biosecurity threat.



New pests and diseases, or outbreaks of endemic diseases, can significantly impact on the ability of primary industry to contribute to the NSW economy. For example, a 12-month outbreak of foot and mouth disease in Australia would have long term impacts on meat, dairy and wool export markets and could cost the economy as much as \$50 billion over 10 years. In 2001, the outbreak of foot and mouth disease in the United Kingdom resulted in an estimated £8 billion loss to tourism due to the flow on effects of the disease.

As NSW looks to grow its economy, biosecurity will provide a stable base to ensure the population's food supply is maintained, commodities for export are provided and NSW is promoted as a good place to invest in agricultural land and technology.

Industry contributes to biosecurity management and supports trade by:

- Developing and implementing best management practices and certification assurance agreements (including self-certification schemes that reduce red tape and improve market access for interstate and intrastate trade)
- Representing members and participating in State and Commonwealth biosecurity committees
- Participating in emergency responses
- Funding or co-funding educational and research programs.

USING SCIENCE AND RESEARCH TO IMPROVE OUR BIOSECURITY MANAGEMENT

Biosecurity management will continue to be underpinned by science, research and a risk based approach. Advancements in technology will help to enhance current surveillance and diagnostic systems as the NSW Government collaborates with industry, research providers, the Commonwealth and other jurisdictions to improve biosecurity responses.

Innovative approaches – such as remote sensing, biological control and diagnostic techniques – will continue to be developed and refined.

Seven innovative NSW DPI projects – designed to better manage significant weeds and animal pests – have been funded through the Australian

BELLINGER RIVER TURTLE DISEASE OUTBREAK

In 2015 large numbers of **Bellinger River Snapping Turtles** (*Myuchelys georgesi*) were affected by an unknown agent. This turtle is found in only one place on earth in a near pristine sixty (60) kilometre stretch of the river on the Mid North Coast of NSW. The progress of the agent was so virulent the potential existed for the whole population to become extinct.

A response team of staff from the Office of Environment and Heritage (OEH), Local Land Services and Department of Primary Industries (DPI) assisted by Bellingen Shire Council, Taronga Zoo, Bellingen Animal Hospital, Environment Protection Authority (EPA), Wildlife Health Australia (WHA), University of Western Sydney (UWS) and WIRES as well as local community members was mobilised immediately.

Dead and dying turtles were removed from the river to reduce the chance of spreading pathogens to other catchments. The upper catchment area in New England National Park was also closed.

No pesticides were detected at any of the sample sites. Pathologists from EMAI and the nation's leading animal health laboratories and UWS worked on analysis of this disease and co opted specialist support from interstate and overseas.



No conclusive evidence about the type or nature of the pathogen or toxin was identified. It has been suggested that this may have been a novel pathogen.

Seventeen healthy turtles were collected in quarantine and are now part of a captive breeding program, to help rebuild the wild population and save this species from extinction. The species is now on the road to recovery. The rapid cooperative and integrated response to this incident undoubtedly helped save this iconic local turtle species from extinction.

Government's Agricultural Competitiveness White Paper. These new projects will share \$10.5 million in funding for 23 national projects, which will deliver new or improved control tools and technologies to farmers and land managers.

The projects will focus on reducing the impacts of significant weed and animal pests by:

- Improving detection methods of multiple pest animals and weeds using thermal and 4K imaging technologies.
- Developing a DNA barcode-based tool for rapid on-site identification of Chilean needle grass and serrated tussock grass.
- Coupling computer vision recognition of pest animals with automated pest control actions in a remote recognition and response device.
- Designing e-Technology Hub - Intelli-Traps, which use new generation technology to improve pest management effectiveness and enhance welfare outcomes in partnership with Invasive Animals Ltd.
- Taking advantage of biological control and advances in management of Noogoora burr (in partnership with the Cotton Research and Development Corporation).
- Preventing seed set of weedy tree species in partnership with Mid Coast Council and Hunter Local Land Services.
- Reducing Chilean needle grass seed banks using essential oil products.
- Using artificial intelligence (that might link to the e-Technology hub above).

CONCLUSION

Where to from here?

The inaugural 2017 NSW State of Biosecurity Report has examined the many and varied aspects of the NSW biosecurity system – a system that helps mitigate biosecurity risks to industry, the environment and the community of NSW.

The report identifies the value of NSW industries and assets that are protected and enhanced by effective biosecurity management, as well as the considerable community benefit delivered. It also notes how biosecurity helps safeguard our environmental assets and protects us from diseases and pests that would otherwise reduce the quality of life of the NSW community.

The report identifies the escalating risks to NSW's biosecurity from globalisation, increasing accessibility to international travel and the related movements of people and risk causing biosecurity material into NSW. The expansion of internet shopping and trade, and the movement of parcels into NSW from all over the world, brings with it significant risks of incursions. These are expected to increase exponentially over the coming years. The 2017 IGAB review report identifies these risks and recommends ways to better utilise diminishing resources to improve the situation. It also recognises the critical contribution partnerships play in the effective and efficient delivery of biosecurity and the increasing role that non-government stakeholders have – particularly in surveillance and asset protection. Effective partnerships increase resource leverage, which will become increasingly important to manage escalating risks.

The introduction of the *Biosecurity Act 2015* is a significant event in NSW's biosecurity management. The new Act consolidates previous NSW legislation and harmonises with national legislation. In time, all jurisdictions will be aligned – allowing for better biosecurity outcomes across Australia. The Act, which reinforces the principle of shared responsibility and also introduces the General Biosecurity Duty. This increases the obligation of all stakeholders to minimise biosecurity risk.

This report examines how well stakeholders understand biosecurity and its associated issues. Future reports will offer the opportunity to track improvements in the understanding and adoption of biosecurity management practices. The report uses available data to portray current impacts of invasive species, recognising the need to improve data sets in the future. Invasive species are significant environmental and biodiversity threat, which reduce profits and productivity. Effective surveillance and a quick response to incursions is recognised as a critical aspect of biosecurity management.

The report provides a range of data on animal and plant disease management and future reports will be able to build on this work. NSW's analytical and diagnostic capability is acknowledged and regarded as a significant asset for NSW.

Overall, this inaugural report provides background on the diverse range of requirements and activities necessary for effective biosecurity in NSW and how these services are currently being delivered. Future reports will provide an opportunity to focus more on data that supports changes and improvements and also to map changes to risk. The timing of the next State of Biosecurity Report will overlap with the end of the current NSW Biosecurity Strategy in 2021. This will provide an opportunity to evaluate the contribution the strategy has made to biosecurity in NSW.

Biosecurity in NSW is facing increasing threats that will require innovative solutions and rely heavily on effective partnerships with strongly engaged and informed stakeholders.

GLOSSARY OF TERMS

Appropriate Level of Protection (ALOP)	The level of protection deemed appropriate by a country establishing a sanitary or phytosanitary measure to protect human, animal or plant life or health within its territory (Source: IGAB). The ALOP for Australia is a high level of sanitary and phytosanitary protection aimed at managing and reducing biosecurity risks to a very low level, but not to zero.
Aquatic	In or on water (fresh, brackish or salt).
Best management practice	Methods or techniques that integrate all available knowledge and research that is proven to deliver the most effective, cost-efficient and humane invasive species control, while making optimum use of existing science and knowledge resources.
Biodiversity	The variety of life forms, the different plants, animals, microorganisms and the ecosystems they form.
Biosecurity	Protecting the economy, environment and community from the negative impacts of pests, weeds and diseases.
Biosecurity risks	The potential of a disease or pest entering, emerging, establishing or spreading in Australia; and, the disease or pest causing harm to the environment, or economic or community activities (Source: IGAB).
Competency based	Training that meets units of competency, which are agreed statements of the skills and knowledge required for effective performance in a particular role or function.
Containment	Restricting the spread of an incursion.
Disease	The presence of a pathogenic agent in a host and/or the clinical manifestation of infection that has had an impact (that is, significant negative consequences) or poses a likely threat of an impact. It includes microorganisms, disease agents, infectious agents and parasites (Source: IGAB).
Emerging species	A newly established invasive species whose distribution and abundance is expanding.
Emergency Animal Disease Response Agreement (EADRA)	A national government and industry cost sharing agreement in respect of emergency animal disease responses.
Emergency Plant Pest Response Deed (EPPRD)	A national government and industry cost sharing agreement in respect of emergency plant pest and disease responses.
Eradication	The permanent removal of an invasive species, including all individuals and propagules, from a defined area that has little or no likelihood of re-invasion.
Establishment	The point at which a species can reproduce at a sufficient level ensuring survival in a new habitat without further input from outside the system.
Evaluation	The process or results of an assessment or appraisal in relation to stated objectives, standards or criteria.

General Biosecurity Duty	The General Biosecurity Duty supports the principle of shared responsibility, and means everyone is doing what is reasonable for them to do to prevent, eliminate or minimise biosecurity risks. As defined by the <i>NSW Biosecurity Act, 2015</i> .
High priority weeds	Weeds present in a location/region/state and deemed eligible for control.
High risk weeds	Weeds with high potential to adapt to specific location/region/state, but not yet present in that location/region/state.
Intergovernmental Agreement on Biosecurity (IGAB)	An agreement between the Commonwealth and state and territory governments, except Tasmania. The agreement aims to strengthen the working partnerships between governments, improve the national biosecurity system and minimise the impact of pests and diseases on Australia's economy, environment and the community.
Impacts	The (usually negative) economic, environmental and/or social effects of invasive species.
Incursion	An isolated population of an invasive species detected in an area where it had not been previously known, but expected to survive for the immediate future.
Invasive species	A species whose establishment and spread threaten to harm natural ecosystems, habitats or species, or cause social or economic harm.
Native species	A species within its natural range (past and present).
National biosecurity system	Australia's biosecurity system encompasses and fully integrates import and export activities, services and functions—into, within, and from Australia—and covers the spectrum of pest and disease threats to Australia's environment, production and people.
National Environmental Biosecurity Response Agreement (NEBRA)	A national agreement to establish arrangements for responses to nationally significant biosecurity incidents where there are predominantly public benefits.
New invasive species	Any introduced species that has not been recorded in the area previously and whose impacts are likely to be significant.
Passive Surveillance	Any encounter with a pest by a member of the public that is reported to a relevant authority
Pest	Any species, strain or biotype of the Kingdoms Animalia (excluding human beings), Plantae, Fungi, Monera or Protista that has had an impact (that is, a significant negative consequences), or poses a likely threat to having an impact (Source: IGAB).
Primary Producer	Is an individual, partnership, trust or company operating a primary production business if they undertake: plant or animal cultivation (or both) fishing or pearling (or both) tree farming or felling (or both).
Shared responsibility	Shared responsibility means everyone takes responsibility for biosecurity matters under their control. Everyone has an obligation to protect Australia from pests and diseases.
Zoonoses	Zoonotic diseases are infectious diseases that can pass from animals to humans. Seventy-five per cent of new human diseases are zoonotic.



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