

NSW Department of Primary Industries

State of Biosecurity Report

2018 – 2021



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Acknowledgment of Country



Aboriginal people have a spiritual and cultural connection and an inherent right to protect the land, waters, sky, and natural resources of New South Wales. This connection goes deep and has been since the dreaming. The entire landscape, including traditional lands, fresh water, and seas, has spiritual and cultural significance to Aboriginal people. If the cultural and spiritual values of Aboriginal people are sustained by providing protection, respect, quantity, and quality, then many other components of Aboriginal life will be healthy. By this understanding, there is no separation of Country, culture, waters, and wellbeing. The health of the natural environment, fresh waters, land animals, marine animals, and people are intimately connected.

In compiling this Report the NSW Department of Primary Industries (NSW DPI) acknowledges this and that Aboriginal people as the first protectors have continuously cared for the Country and the natural environment of NSW for thousands of generations. NSW DPI acknowledges the custodians and honours the ancestors, the Elders both past and present and extends that respect to other Aboriginal people in NSW.

Minister's Foreword



I am pleased to present the second *NSW State of Biosecurity Report*. Biosecurity continues to be a major factor in the ongoing well-being of the State, economy, community, and environment. It protects and supports:

- our access to domestic and international markets – in 2020-21 the State recorded a record primary industries output of \$20.9 billion, and more than \$100 billion from the food industry;
- the jobs, production, and quality of our agricultural, food and supporting industries, underpinning our global reputation and access to clean and safe food;
- the development and implementation of farm productivity through partnerships with industry groups, research bodies, other governments, and the private sector; and,
- our marine estate, deserts, alpine regions, rainforest, estuaries, rivers, lakes, and wetlands to ensure the future of our unique and irreplaceable biodiversity, our distinctive ecosystems, and ecological communities.

This report describes the wide-ranging issues affecting biosecurity and actions taken by government, industry, and the community in protecting our way of life since the release of the initial *State of Biosecurity Report* in 2017. In addition, the report details how the objectives of the *NSW Biosecurity Strategy (2013-2021)*

for the management of animal and plant pests and diseases, and weeds in NSW terrestrial and aquatic environments have been met over this period.

I am buoyed by the results it highlights in the State's progress in protecting us from pests, diseases, weeds and contaminant threats and actions taken in response to biosecurity disasters and emergencies, and long-term management issues to date. Some of the achievements are:

- successful and strategic management of over 7,500 reports of pests, weeds, and diseases, including 150 complex emergency pest and disease responses;
- over 950,000 diagnostic tests were delivered to support surveillance outcomes to determine the presence of a biosecurity risk;
- over 290,000 actions to manage widespread weeds, including 50,000 engagements with landowners;
- targeted, boots-on-the-ground programs to reduce the impact of established pests and weeds, benefiting primary producers and the economy with savings of over \$360 million;
- a 20% increase, in the proportion of primary producers with a biosecurity management plan in place, with nearly 7 in every 10 farmers now having a current plan to manage biosecurity risks on their property;
- improved awareness and understanding with over 80% of the general population recognising the importance of biosecurity, with close to 1 in every 3 people reporting a high understanding of biosecurity, and similar numbers suggesting a high ability to act;
- improved biosecurity and food safety responses through targeted surveillance programs, support by a new ICT platform that supports better data capture and sharing; and
- an interagency mouse plague response that provided the framework for the \$150 million support package to help farmers, households, and small businesses.

These efforts have ensured the State maintains its enviable market access and reputation for high-quality, safe, and disease-free food and fibre – an achievement even more significant against the backdrop of the COVID-19 pandemic.

Biosecurity threats are increasing and outbreaks from exotic incursions are rising in number, complexity, and severity. In 2020/21 responses to less complex emergencies increased by 15%, with current figures for 2021/22 forecasting a further 50% increase. We need to ensure markets remain open for our primary industries, that our community is confident our primary industries are meeting high standards of food safety, that the impact of adverse events is minimised and that rapid recovery, with increasing resilience over time, is supported.

I look forward to working together with industry, research, government partners and the community to maximise outcomes for NSW primary industries, the communities they support and the resources they rely on, both today and into the future.



The Hon. Dugald Saunders MP

Minister for Agriculture

Minister for Western New South Wales

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Executive Summary

This is the second *New South Wales State of Biosecurity Report* (the Report) and it details the status of biosecurity in NSW over the period 2018-21. The Report specifically focuses on how the objectives of the *NSW Biosecurity Strategy* (2013-2021) for the management of animal and plant pests and diseases, and weeds in NSW terrestrial and aquatic environments, have been met for this period.

The Report sets out how biosecurity is managed in NSW and recognises the role of government agencies, industry bodies, primary producers, communities, and others in the supply chain. The Report also identifies emerging issues and makes recommendations for ongoing biosecurity performance measurement.

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



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



\$360+ million

forecasted savings from current programs to reduce impacts of established pests, disease and weeds

Successful biosecurity risk management has protected, and will continue to protect, the NSW economy, industry, the environment, and the health and wellbeing of communities from the negative impacts of animal and plant pests and diseases, weeds, and contaminants. Effective biosecurity provides a stable base to ensure the population's food supply is maintained, commodities are eligible for export and NSW is recognised as a good place to invest in agriculture and technology. Appropriate biosecurity standards and measures will minimise the risks to from zoonotic diseases to the people of NSW and protect environmental assets for future community enjoyment.

The economy

The NSW primary industries sector has a gross value exceeding \$20.9 billion in 2020-21. It employs more than 83,000 people directly and 76,000 people in the agri-food manufacturing sector, with 2,300 (40%) of the State's food processing businesses located in regional areas.

The NSW food industry is worth over \$100 billion and is a significant contributor to the economy with 55,000 food businesses across the State. The food processing industry alone generates \$25 billion for the State each year.

Strong international demand lifted NSW primary industry exports to record levels of \$6.6 billion in 2020-21, led by cropping commodities including wheat, canola, pulses, and coarse grains.

The future value of these sectors, including the protection of our international trade reputation and ongoing export market access, depends on the State's capacity to anticipate, mitigate and manage biosecurity risks. NSW DPI can report that current programs to reduce impacts of established pests, disease and weeds are forecast to deliver over \$360 million forecasted savings from reduced biosecurity impacts. In addition, NSW DPI is working to reduce red tape by increasing greater self-management of biosecurity risks. Including a reduction of the need for primary producers to issue over 1,700 plant health certificates per annum.

NSW has maintained price premiums in highly competitive markets as a result of our biosecurity reputation and global standing as a producer of clean, safe food and fibre. All biosecurity incursions put this competitive advantage at risk if they are not well managed.

The environment

Invasive species threaten the State's unique natural environment, the survival of hundreds of native plants and animals, and impact the price of food, human health, and both commercial and recreational activities. Priorities for government investment sit with preparedness, prevention, eradication, and containment of new invasive species in the initial stages of invasion where the return on investment is greatest, while management of widespread invasive species is supported where it provides greatest benefit or where effort can be targeted to reduce their impact.

- Invasive species have significant and wide-ranging impacts. The estimated annual cost of managing weeds in NSW, including lost production costs, is \$1.8 billion.
- The estimated annual economic loss in NSW from the impact of invasive pest animals is \$170 million.
- Invasive species contributed to a 2% increase in the number of threatened species in the three years to December 2020, which total 1,043 species.
- European carp are estimated to make up 80% of the fish biomass of the Murray-Darling Basin, which covers one seventh of Australia's landmass, and includes the country's most significant agricultural areas.
- Between 2018 and 2021, a total of 188,549 inspections of land for state and priority regional weeds were undertaken of which 4,935 resulted in some form of compliance activity, such as a biosecurity direction, and undertaking, a permit or certification.

Human health and social amenity

Strong biosecurity helps protect the NSW population from zoonotic diseases. These are bacterial, fungal, and viral illnesses that can be transferred through direct or indirect contact from animals to humans. A range of zoonotic diseases are endemic to NSW which include Q fever, Hendra, anthrax, and the Australian bat lyssavirus. NSW undertakes surveillance work for some exotic zoonotic diseases (such as bovine spongiform encephalopathy) to facilitate international trade of NSW animal products to international markets.

The amenity of public spaces is a biosecurity outcome that supports the productivity and social fabric of the people of NSW. For example, pests such as red imported fire ants can have a devastating impact on public amenity if left unchecked. Since 2017 NSW has contributed over \$37 million to the National Red Imported Fire Ant Eradication Program to contain, suppress and eradicate fire ants from South East Queensland and prevent their establishment in NSW.



Case Study: Abalone Viral Ganglioneuritis

In 2021, NSW DPI successfully eradicated abalone viral ganglioneuritis (AVG) from 30 enclosed live-holding seafood facilities in metropolitan Sydney. The disease had entered the facilities following detection in wild western Victorian abalone populations and importation through the live seafood market. Strong collaboration and commitment from NSW DPI and industry saw all cases resolved and border restrictions revised and improved to protect NSW abalone stocks.

AVG is a viral disease of abalone that poses a real risk to NSW wild populations and can result in up to a 90% mortality rate when introduced to naïve populations. If introduced to NSW wild abalone populations, the disease could lead to localised extinctions of this environmentally and culturally significant species, and loss of the \$5.5 million NSW abalone industry.

The NSW industry share value is approximately \$34 million, and this does not include impacts on marine estate, social and cultural costs.

NSW DPI teams collaborated to investigate NSW live abalone holding facilities. Operation Aquaria was implemented, and Compliance Officers inspected live abalone in 278 retail, wholesale, processing, and restaurant premises across NSW. Sick abalone were identified and submitted for AVG exclusion with testing confirming AVG had entered 30 facilities across metropolitan Sydney. Individual Biosecurity Directions were issued to affected businesses to destock and decontaminate their premises. Dangerous contact premises were also inspected and cleared of any infection.

How biosecurity is managed in NSW



Five

agreements with key biosecurity partners in place

Managing biosecurity in NSW requires a strategic and integrated approach. The regulatory framework supports a risk-based approach for managing biosecurity, which is underpinned by partnerships between government, industry and the community. These partnerships are central to the concept of biosecurity as a ‘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 of biosecurity in NSW, the role of industry and the community is crucial for success. Biosecurity stakeholders in NSW include:

- farmers/primary producers and agri-businesses;
- food processors, food retailers, and food supply chain businesses;
- food, fibre, and other industry associations and professional bodies;
- non-government organisations, such as animal advocacy organisations;
- tertiary education sector;
- research organisations;
- government departments and entities;
- land managers and users – public and private;
- agricultural, animal welfare, environmental and community groups;
- tourism and recreation businesses;
- animal care and husbandry providers; and,
- the people of NSW.

Further information on these roles and responsibilities is available on the NSW DPI website.

Improved stakeholder awareness and understanding

Recent social research undertaken in NSW indicates there is a wide range of stakeholder biosecurity awareness and understanding. While these research findings demonstrate that the broader population has a good general sense of what biosecurity is, the sheer breadth of the issue in relation to environment, industry, and society and what it means for NSW results in some confusion.¹ Specifically, for primary producers, biosecurity is already an issue of top concern, and most are highly engaged in the issues as they relate to their own operations. However, the research identified a range of opportunities for improving or maximising the biosecurity risk management actions of producers and other stakeholders.

A range of significant improvements have been made to the biosecurity awareness and understanding :

- over 80% of the general population recognise the importance of biosecurity, with results also indicating greater appreciation of biosecurity benefits in protecting the environment, public health, and animal welfare;
- 28% of the population reporting a high understanding of biosecurity, with 33% of the population reporting a high ability, feeling more confident, to act in relation to a biosecurity issue;
- 84% of primary producers agreed that their industry has an increased focus on biosecurity within the last 5 years, with 79% feeling the same within their own businesses;
- 67% of primary producers reported having a biosecurity management plan in place, and,
- 76% of primary producers see shared responsibility as government, industry, and the community working together, with their own focus on prevention and management at the farm level.

¹ Whereto Consultants, 2021 Biosecurity Attitudinal Research Report



Case Study: Biocontrol of Hudson Pear

Hudson pear (*Cylindropuntia pallida*) is one of eight species in the genus, that are present in every Australian mainland state. This invasive cactus currently occupies roughly 100,000 hectares in NSW alone, with the potential to spread to over 600,000 hectares in the North West of the state. As a weed, it has adverse social, property and tourism impacts. In addition, it has been linked to the death of wildlife and stock through entanglement and injury. Through a collaborative partnership between New South Wales Department of Primary Industries and the Queensland Department of Agriculture and Forestry, and with funding through the Australian Government's Rural R&D for Profit project, a cochineal insect (*Dactylopius tomentosus* 'californica var. parkeri' lineage) was imported and tested in Australia to add biocontrol to the management toolkit for Hudson pear.

The first releases of the Hudson pear cochineal were made in late 2017, and since then, further investment by the NSW State Government has seen the construction of a dedicated mass-rearing facility in Lightning Ridge. This facility has been instrumental in rearing hundreds-of-thousands of cochineal-infected segments for release against Hudson pear. At some release sites the results have been spectacular, with complete control (no other management methods required) of Hudson pear. More widely though, the biocontrol agent is being used in an integrated management approach, where the core, heavily invaded areas are treated with the cochineal, while outlying populations and those along fence lines, roadsides and catchments are treated with a registered herbicide. Community engagement has also played a vital role in the success of this project, ensuring that accessibility to and ownership of the management tools is firmly in the hands of all stakeholders.

Elements critical to running an effective biosecurity system



950,000+

diagnostic tests delivered to support surveillance outcomes

Biosecurity surveillance, diagnostics and traceability

Surveillance is a critical component of an effective biosecurity system. NSW Department of Primary Industries (NSW DPI), in partnership with the Australian Government Department of Agriculture, Water and the Environment (DAWE), Local Land Services (LLS), Local Control Authorities (LCA) and NSW Environment and Heritage (NSW EH), coordinates, promotes and participates in surveillance activities at state and national levels, along with industry, other stakeholders and the community.

Active and passive surveillance programs are in place for plant pests and diseases, animal pests and diseases, aquatic pests and diseases, weeds, and invasive vertebrate and invertebrate pests and animals. These programs have resulted in the early detection of a range of the world's top 100 worst invasive species. Resources are being directed to encourage public awareness and provide mechanisms (such as the NSW Biosecurity helpline) to facilitate reports of incursions.

Examples of an engaged community and industry include:

- early detection of a range of the world's top 100 worst invasive species, such as the yellow crazy ant infestation in Lismore central business district in May 2018 and February 2021; khapra beetle detection in NSW and the ACT in 2020; and frogbit weed detection in the Camden area in 2020
- early detection of a range of diseases, including *Fusarium commune*, in a commercial pine nursery in 2021; abalone viral ganglioneuritis (AVG) in live abalone holding tanks around the Sydney area in 2021; and QX disease in oysters detected in the Macleay River in 2020
- increased engagement with biosecurity-related social media platforms and community groups, such as the NSW DPI Facebook, Instagram, Twitter, and LinkedIn pages, that provide best practice information and alerts/updates of current pest, weed and disease incursions
- use of digital reporting and management applications, including:
 - MyPestGuide² Reporter for some NSW surveillance activities
 - Biosecurity Information System (Weeds), which records the presence of high-risk weeds, inspections undertaken by Local Control Authorities and compliance actions
 - FeralScan, which provides on-the-ground reports, knowledge and understanding of biosecurity surveillance activities to assist in deciding when and where feral animal control should be undertaken.
- increased education, including through the NSW DPI 2021 Gateway Pests of NSW e-learning modules that target people working in areas along high-risk pathways in sea, air and cruise line ports as our front-line defence against exotic invaders.

² Note - MyPestGuide is a tool developed by the Western Australia Government to encourage everyone (public, industry and government) to

report observations of any common, interesting or possibly exotic pests, as well as the absence of pests across Australia.

The world-class analytical and diagnostic facilities in NSW continue to support surveillance outcomes and ensure that biosecurity diagnosis is rapid and accurate. Between 2018 and 2021, over 950,000 diagnostic tests (from 20,000 customers) were delivered, including:

- over 926,000 animal health tests (mostly cattle and sheep);
- over 7,000 tests to confirm exclusion of notifiable diseases (with a large majority of these tests facilitating Australian export trade for animals and plants); and,
- a further 73,505 tests related to plants.

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 allow tracking of livestock movements in real time. As of February 2022, there were 140,115 active PICs in NSW.

Compliance activities

Biosecurity and Food Safety compliance officers (NSW DPI) and Local Land Services (LLS) staff (authorised under the *NSW Biosecurity Act 2015*) undertake regular audits, and verification inspections and investigation reports of non-compliance to drive better biosecurity outcomes for NSW. NSW DPI worked collaboratively with the community and landowners completing over 50,000 engagements and actions with landowners to manage widespread weeds. In addition, more than 36,000 audits and inspections of animal and plant industries were conducted between 2018 and 2021 to protect NSW from biosecurity threats, with more than 11,600 enforcement actions.

Additional, almost 189,000 state priority weed inspections were undertaken by Local Control Authorities between 2017 and 2021, with more than 4,900 biosecurity compliance actions completed (including inspection of directions, undertakings, permits or certificates).

Biosecurity incident response

In accordance with the national biosecurity emergency response deeds, NSW DPI responds collaboratively to support incidents occurring both within NSW and nationally. Between 2018 and 2021, NSW DPI invested \$31 million in contribution to 25 national biosecurity responses, five of which were located within NSW. Total investment from all jurisdictions in response to the 25 incident responses totalled \$232 million.

Preparation and timely responses are key to avoiding or limiting the devastating impact of an emergency pest, disease or weed outbreak. NSW DPI has a sound reputation as a leader in emergency response management responding to more than 7,500 reports, including management of 150 complex pest, weeds, and disease incidents between 2018 and 2021. In 2020/21 responses to less complex emergencies increased by 15%, with current figures in 2021/22 forecasting a further increase in the level of response by 50%.³

³ NSW Department of Primary Industries (NSW DPI), Financial Data 2018-2021, (NSW DPI, 2021).

The Future



The management of biosecurity in NSW will need to change to meet the challenges of the future. Priority attention will continue to be given to safeguarding the economy, industry, and the environment from the threat of incursions, and minimise the impact of biosecurity threats through rapid and effective responses. However, the Commonwealth Scientific and Industrial Research Organisation (CSIRO) has articulated some of the challenges ahead:⁴

- **Outbreaks across biosecurity sectors are continuing to rise in number and complexity**, due to a range of factors including growing levels of trade and travel, urbanisation, climate change and biodiversity loss. Between 2012 and 2017, the annual number of interceptions of biosecurity risk materials at Australian borders rose by almost 50% to 37,014. Domestic passenger movements through Australia’s capital cities are expected to double between 2015 and 2030, while the volume of freight in and out of the country is expected to increase by 120% over the same period.
- **Modelling shows that almost tripling investment in interventions to 2025 will still result in increased residual biosecurity risk** compared to 2014-15 levels. This suggests systems require more transformational change in approaches and responsibilities to generate greater efficiencies and effectiveness.

Maintaining current investment levels will reduce industry resilience and sustainability into the future, requiring reactive industry support packages and reduced market access through loss of reputation.

While immediately ‘scaling up’ current approaches is the first step, the system must be reshaped and improved to meet the challenges of the future. Scaling up should be focused on elements where returns on investment are highest and will give the most immediate benefit, particularly in the surveillance, diagnostics, and detection of biosecurity threats. However, new techniques and technologies must also be implemented to detect threats sooner and respond to and contain them more efficiently than has traditionally been possible. There must be a focus on harnessing the collective knowledge and capability of all stakeholders and working in partnership to further mature the concept of shared responsibility. Finally, there must also be an emphasis on building the capability, capacity, and resilience of the NSW system into the future.

⁴ Commonwealth Scientific and Industrial Research Organisation (CSIRO), [Australia’s Biosecurity Future: Unlocking the Next Decade of Resilience](#) (Australia’s Biosecurity Future Report), (Canberra: CSIRO, 2020).

Introduction





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

The purpose of this report is to inform the people of NSW of activities being undertaken to safeguard the NSW economy, environment, and community from current and future biosecurity risks. This Report:

- identifies achievements and performance against the goals and outcomes outlined in the *NSW Biosecurity Strategy (2013-2021)*;
- investigates how economic, social, scientific, and environmental factors will impact 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; and,
- provides benchmark data for future reporting about shared responsibility.



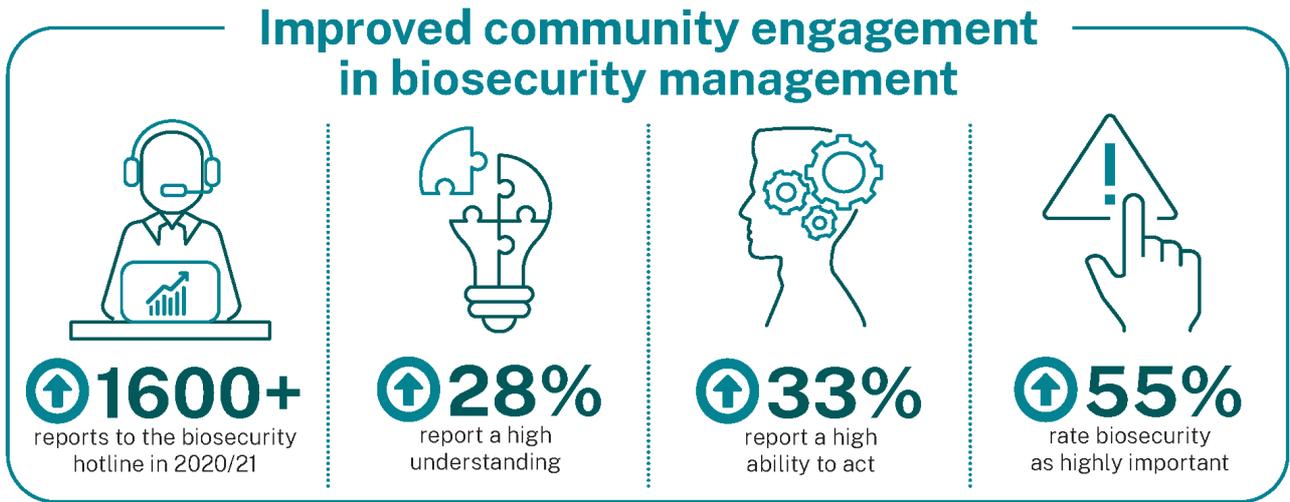
Biosecurity supports food safety across the food industry supply chain – from paddock to plate.

Biosecurity is a Shared Responsibility



Goal 1 - Biosecurity is a Shared Responsibility

The concept of biosecurity as a 'shared responsibility' was a critical goal of the *NSW Biosecurity Strategy (2013-21)* that remains central to the management of biosecurity threats nationally. Engagement of all stakeholders, including industry, other jurisdictions, research bodies, the private sector and the wider community is critical. Prevention, early identification, and reporting are essential to containing new and emerging biosecurity risks and require the awareness and engagement of all stakeholders. In achieving this goal, two outcomes were identified in the strategy: improved community engagement and stronger partnerships.



Improved community engagement in biosecurity management

The successful engagement and involvement of farmers, industry, and the general community in biosecurity management practices are critical to the achievement of biosecurity outcomes in NSW. An integral part of biosecurity prevention, preparedness, response, and recovery is for community members to identify and respond to biosecurity risks, including:

- on their own properties or backyards;
- during recreational activities (eg: hiking, biking, fishing, four-wheel-driving);
- as participants in community projects; and,
- by reporting suspected occurrences of pests and diseases.

NSW DPI, Local Land Services (LLS) and Local Control Authorities work in partnership with farmers, industry and the community to encourage a greater understanding of biosecurity and food safety practices and support for innovation.

Between 2018 and 2021, NSW DPI strived to improve community engagement in biosecurity management through a suite of awareness and education programs. Pest Tales (primary school) and Feral Focus (secondary school) sought to establish basic concepts of biosecurity among school students, while tools to identify and report biosecurity risks, such as FeralScan, Western Australia’s MyPestGuide, NSW WeedWise, social media channels and consolidated hotline systems sought to raise awareness and enable action among the broader community. Targeted education and awareness programs were also delivered to increase community capacity and capabilities in biosecurity risk management. Some of the projects developed and delivered are noted below:

- The *Mission: Biosecurity* website developed in collaboration with other jurisdictions and in partnership with *Gardening Australia*.
- The Gateway Pest e-learning package to raise awareness of biosecurity, a shared responsibility, passive surveillance and specific key terrestrial and aquatic gateway pests (LLS

and NSW DPI joint project). The six eLearning modules developed focused on 'Gateway' pests of concern, their pathways of introduction, their impacts and hideouts and the action to take if detected. The target audience for the modules is staff working in local government areas in port-side councils, but they are also applicable to freight and logistics workers, agricultural sectors and the broader community.

- The 2016-20 Spot the Pest – interactive, in-person workshops for local governments surrounding Port Botany in collaboration with Local Land Services (LLS).
- A range of biosecurity workshops in both peri-urban and regional areas of NSW in collaboration with LLS.
- DPI staff attendance at agricultural field days and local shows, and engagement with community gardens in Sydney.
- Programs engaging with the pork industry, pig owners and producers to develop, pilot and deliver a biosecurity management planning resource tool kit to address biosecurity and African swine fever (ASF) threats.
- The development and revision of a wide range of web materials to assist stakeholders to maintain traceability best practices and awareness of notifiable or significant diseases.
- DPI staff participation in enhancing AUSVETPLAN resource documents for key diseases, such as foot and mouth disease, ASF, African horse sickness, bluetongue, avian influenza, and Australian bat lyssavirus, and the valuation of and compensation for pigs and pig products.
- The use of Human Centred Design principles to conduct social research with stakeholders to understand communication pathways, biosecurity awareness and engagement preferences.

There has been a gradual increase in contact to the NSW Biosecurity hotline and webform by community stakeholders reporting biosecurity issues, with 2,519 calls and emails in 2020-21. This is a 16% increase in communications since the initial State of Biosecurity report period. This does not include direct contact by the community and industry members with NSW DPI staff, Local Lands Services biosecurity officers, and staff from NSW EH and National Parks, NSW Health, and local government authorities. The increase is a positive result that highlights an increasing focus by the community on reporting suspect or unusual pests and diseases and other biosecurity concerns.

To further raise community awareness, NSW DPI continues to promote biosecurity education and information sharing.

Understanding stakeholder attitudes: NSW Biosecurity Attitudinal Research 2021

In 2021 NSW DPI undertook a large scale statistically valid survey of NSW residents to assess current awareness, attitudes, understanding and behaviours of biosecurity among primary producers and the general NSW population, which provided comparisons with previous research published in 2017. The concept of shared responsibility and strong industry partnerships are not only embedded in the enabling legislation, but they are also central to effective surveillance which 'maximises the likelihood of early detection of new and emerging pests'.

The research project surveyed over 1,500 rural, regional, and urban stakeholders in two groups – the general population (1,163 online interviews) and primary producers (550 telephone interviews). Five

qualitative case studies were also undertaken, covering the metropolitan, regional, and peri-urban areas, aquatic producers, as well as Aboriginal and Torres Strait Islanders.

The Australian Government Department of Agriculture, Water and the Environment also surveyed biosecurity stakeholders in 2016 and the biannual Australian Farm Survey, sponsored by Animal Health Australia and Plant Health Australia, provided data in 2021. Where data was comparable, differences and similarities with NSW DPI data is shown in the following table.

Table 1: NSW DPI Biosecurity Attitudinal Research (2021) – perceptions of biosecurity definitions and importance

Issue	NSW general population	NSW primary producers	2021 AHA/PHA Biosecurity program Survey (Australian primary producers)	Australian Government Survey of Primary Producers (no comparison available)
Biosecurity is regarded as important	55% (up 4% from 2017)	82% (equal to 2017)		88% (as reported in 2017)
Understand biosecurity as a term	59% (up 9% from 2017)	81% (as reported in 2017)	60% (as reported in 2017)	78% (as reported in 2017)
Define biosecurity as controlling pests and weeds (unprompted)	14% (up 1% from 2017)	83% (up 37% from 2017)	57% (up 1% from 2017)	53% (as reported in 2017)
Define biosecurity as controlling diseases (unprompted)	25% (Up 4% since 2017)	49% (as reported in 2017)	57% (up 1% from 2017)	60% (as reported in 2017)

Source: NSW DPI Biosecurity Attitudinal Survey, 2021; 2020 Farm Biosecurity Survey (Australian primary producers)

The research findings demonstrate that the broader population has a good general sense of what biosecurity is and its general relationship to the environment, industry and society. However, there is further work required to better develop this understanding particularly in relation to roles and responsibilities, and the consequences of biosecurity risks.

Research findings highlighted that the general population prioritises other pressing matters such as health, housing, employment, and environment over biosecurity.

NSW primary producers have a much stronger self-rated understanding of biosecurity and what it entails than the general population. The research shows that those with larger farming operations are far more likely to rate highly the importance of biosecurity to the agricultural industries and its economic impact. In comparison, those on smaller 'hobby' farms are more likely to rate environmental concerns and the protection of native flora and fauna as more important.

While the general population's perception of its ability to act on potential biosecurity issues has significantly increased, the government is still regarded as having the major responsibility for managing any biosecurity threats.

A significant engagement and communication effort has been made between 2017 and 2021. This engagement will continue in partnership with government, industry, and the community to maximise understanding of and engagement with biosecurity to achieve shared responsibility outcomes. As

outlined in Table 2, improvements have been made for both an individual's responsibility for biosecurity and the understanding that biosecurity is a shared responsibility.

Table 2: NSW DPI Biosecurity Attitudinal Survey (2021) – taking responsibility for biosecurity in NSW

Issue	NSW general population	NSW primary producers
Individuals are responsible for biosecurity	59% (up 6% from 2017)	80% (down 1% from 2017)
Government, industry and community responsible for biosecurity	70% (up 6% from 2017)	75% (up 23% from 2017)

Source: NSW DPI Biosecurity Attitudinal Survey, 2021

Primary producers

Responses were provided by 550 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

Some of the key findings about primary producers are highlighted below.

- 82% of primary producers see biosecurity as an important issue for primary production in NSW.
- 75% of respondents regard biosecurity as a shared responsibility between primary industry and government – an increase of 13% since 2017.
- 67% of respondents have a biosecurity plan in place – an increase of 20% since 2017.
- 65% strongly agree that their industry has increased its focus on biosecurity in the last five years.
- 60% strongly agree that their business has increased its focus on biosecurity in the past five years.
- Perceptions of the importance of animal welfare increased from an average rating of 7.8 in 2017 to 8.9 in 2021.
- Primary producers tend to define biosecurity in terms of the implications for their own business operations, as opposed to broader environmental, economic, and societal implications.

Key messages and issues

The development and delivery of education and communication programs are essential to ensure that all property managers can identify and understand the importance of biosecurity practices to their business, the environment and the community of NSW. NSW primary producers have shown they have a significant understanding of the behaviours needed to improve biosecurity in NSW, with a stronger focus on eradication and management compared to preparedness and prevention work.

While the perceived level of biosecurity importance has not changed over time, 84% of primary producers stated that their industry has increased its focus on biosecurity in the past five years, and 80% that their business has increased its focus.

The preferred communication path identified in the interviews by primary producers was state government channels, including NSW DPI and Local Land Services. Communication related to online training sessions and the development of mobile apps is seen to be of lower relevance. Further detailed information can be found in Appendix 1.

General population responses

The NSW community can contribute to biosecurity in many ways. Prevention and surveillance in particular are areas where home gardeners, travellers, bushwalkers and e-traders all have a biosecurity duty to contribute. For example, Yellow crazy ants were reported by a member of the public in February 2021 through the NSW DPI Invasive Species email hotline. Detector dogs and community volunteers were used to locate infested sites and appropriate measures were implemented to contain and treat the ants.

Key research findings

Some of the key findings about the general population are highlighted below.

- The general population's understanding of the term biosecurity has increased, with 28% reporting a high level of understanding compared to 21% in 2017.
 - Over 80% of the general population recognises the importance of biosecurity, with 55% of the population rating biosecurity as highly important and 26% rating biosecurity as somewhat important.
 - 42% of participants demonstrated no real understanding of what biosecurity is, a reduction from 50% in 2017.
 - The relative importance of biosecurity is seen to be lower than issues such as health, housing, and employment – highlighting that to drive relevance of future communications key messaging needs to be framed in terms that the general population can relate to in their day-to-day life.
 - Biosecurity is predominantly seen as the responsibility of the government, followed by related industry groups and a shared responsibility between government and industry.
 - 60% of participants believe they have sufficient knowledge and ability to prevent, eliminate and minimise biosecurity risks, up from 51% in 2017.
-

- Current behaviours related to biosecurity tend to be the result of perceived enforcement and/or habit, as opposed to being prompted by specific biosecurity concerns.

Key messages and issues

Overall, the survey showed an increase in biosecurity understanding and the ability to prevent, eliminate and minimise biosecurity risks. Despite this positive trend, further work is needed to continue to enhance levels of understanding, awareness and the associated importance or relevance attached to biosecurity. Further detailed information can be found in Appendix 1.



Increase Understanding of Biosecurity Practices and Risk

Snowy Hydro 2.0

NSW DPI successfully coordinated discussion of the risks, impacts, and proposed controls in relation to the Snowy 2.0 Main Works Project, with the requirement for three key fisheries and biosecurity management plans in the project's Infrastructure Approval, approved by the Minister for Planning and Public Spaces on 20 May 2020. These plans, involving expenditure of up to \$10 million over the first five years of the project, will ensure that the best biosecurity and fisheries management outcomes are achieved for the local community, economy and environment, and that key threatened fish species are considered in the biodiversity management objectives for the project.

Land Waste Management

NSW DPI chairs the National Biosecurity Committee (NBC) Waste on Land Working Group. The Working Group's aim is to draft a national framework to manage biosecurity risks associated with applying recovered organic waste containing vertebrate animal material to land. The Working Group will also develop sound technical advice to guide NBC's recommendations for the management of animal biosecurity risks associated with land-applied waste.

The research has identified opportunities to improve stakeholder understanding of the risks and obligations related to managing biosecurity including:

- ensuring continued biosecurity awareness and education initiatives are targeted at individual stakeholders' needs to improve knowledge and confidence to act;
- increasing the general population's knowledge of the breadth and scope of biosecurity; and
- increasing engagement with primary producers to encourage the undertaking of critical biosecurity behaviours that are currently not well implemented.

For primary producers, the top-rated future priorities for biosecurity management are increased:

- biosecurity surveillance at international borders;
- awareness and understanding of biosecurity among hobby farmers, backyard operators and recreational fishers;
- level of government resources to support primary industry in managing biosecurity;
- focus on reducing contamination or pollution of waterways and oceans; and,
- focus on sharing biosecurity issues between industry groups.

The results of the research correlate with data from other industry surveys. Most of the future improvement opportunities are mirrored in the attitudes of NSW farmers, with a 2020 survey⁵ of 550 primary producers revealing the top-rated future priorities for biosecurity management to be:

- biosecurity surveillance at international borders;
- awareness and understanding of biosecurity among hobby farmers and backyard operators;
- government resources to support primary industries in managing biosecurity;
- sharing of biosecurity issues between industry groups; and,
- awareness and understanding of biosecurity among the general population.

⁵ KG2 (Animal Health Australia and Plant Health Australia), *2020 Farm Biosecurity Producer Survey Research Report*



Biosecurity Champion Projects – Improving Engagement in Biosecurity Management

Each person has a biosecurity duty to protect our environment from pests, weeds, and disease. Despite all our efforts at the national border to stop the entry of exotic pests and diseases in NSW, there is always a chance something could slip through. People working in freight, logistics, ports, the agricultural sector, and the community are part of our frontline defence and play a critical role in surveillance activities to detect, identify and report high-priority pests. To broaden awareness and boost post-border surveillance and detection along these high-risk pathways, NSW DPI and Local Land Services developed a Gateway Pest e-learning training package, the first of its kind in Australia.

Stronger partnerships across the biosecurity spectrum



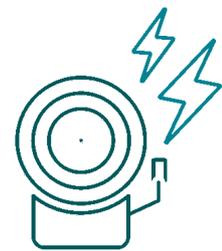
↑ 67%
of Primary Producers have a Biosecurity Management plan



🌐 Safeguarding

aquatic biosecurity by partnering with Snowy Hydro - \$10 million to mitigate recreational fishing and threatened fish population risks

↑ Five
agreements with key biosecurity partners in place



🌐 19
State and national emergency exercises



Stronger partnerships across the biosecurity spectrum

To enhance and deliver biosecurity programs for NSW, government, industry, and the community, stakeholders need to work together in partnership so that knowledge and resources are developed and shared. The NSW Government collaborates with diverse stakeholders at local, state, and national levels, including the community, industry, scientific and research organisations, and other

jurisdictions. With shared cooperation, research and expertise, partnerships guarantee a better future for the protection of NSW's valuable assets.

To build stronger partnerships across the biosecurity spectrum, NSW DPI continues to participate in national biosecurity arrangements and engage with diverse stakeholders. Some key examples of these partnerships are noted below.

- Participation in national biofouling exercise *Scelus* with Commonwealth and state/territory jurisdictions and workshopped marine pest response capabilities for internationally arriving risk on vessels.
- Ongoing active participation on the Plant Health Subcommittee on Domestic Quarantine and Market Access.
- The development of an online portal for horse certification.
- Assisting in the development of national surveillance plans for khapra beetle responses, involving transport, warehouses, retail, domestic residential and waste site assessments, methods, and protocols.
- Participation in foot and mouth disease ready projects held by CSIRO and Charles Sturt University (CSU) that involved projects around community surveillance.
- Development and implementation of generic Biosecurity Management Plans (BMP) for abattoirs and knackeries that addressed baseline biosecurity activities, and emergency animal disease preparedness and complemented existing food safety and animal welfare controls.
- Freight and logistics behavioural insights research to inform ongoing training needs for port-based staff.
- Biannual training programs in the management of biosecurity risks associated with established/new incursion pests for LLS, NSW EH staff and private contractors.

In 2021, NSW DPI hosted an online forum for the Preliminary Consultation on the National Biosecurity Strategy. This forum was an interactive event that included a wide range of industry associations, professional bodies, and community organisations.

The *New South Wales Invasive Species Plan 2018-2021* is another example of the collaborative work between NSW DPI, industry, stakeholders, and the community. This Plan outlines the roles and responsibilities of key parties involved in invasive species management in NSW. 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 the active involvement of industry, private landholders, and the general community.



Case Study: Cattle Tick Program

NSW DPI delivers the cattle tick program across northern NSW. The program manages tick infestations on private property, surveillance activities at saleyards in Casino, Lismore, Murwillumbah and Grafton and the fixed-camera system for overseeing livestock movements across the NSW and Queensland border.

NSW DPI, in conjunction with Local Lands Services, responds to reports of tick fever. Early detection and reporting is vital in managing tick fever outbreaks. Six incidents have been managed, including one large-scale tick fever outbreak in the Kendall region where 84 cattle died from the disease.

The program manages the decommissioning of former cattle dip sites, on both private and public land. Annually, six dips are identified for decommissioning, based on a joint NSW DPI/NSW Environment Protection Authority risk assessment, and 30 dips were decommissioned between 2018 and 2021. An average of 15,062 cattle were physically inspected at the four saleyards each month, with an average of 13,480 cattle being treated to eradicate the presence of cattle tick and prevent their spread*.

*based on 2020/21 data

Between 2018 and 2021, some 2,745 properties were quarantined due to cattle tick infestation, including neighbouring properties. A total of 202 warnings were issued for undeclared border crossings, breaching biosecurity undertakings or individual biosecurity directions, and failing to discharge the general biosecurity duty (at saleyards and abattoirs). Six penalty notices were issued for failing to comply with mandatory measures (related to border crossings) or failing to discharge the general biosecurity duty (at an abattoir).

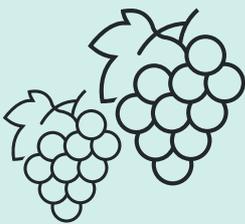
Cattle tick and tick fever advisory material and information packs were provided to property owners, saleyards and other stakeholders. The information was published on the NSW DPI website and via social media.

Jurisdictions working together for biosecurity



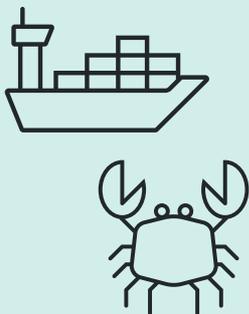
2018:

Queensland and NSW worked together on a cross-border biosecurity emergency exercise known as Exercise Border Bridge. Implemented in March 2018, it involved a simulated plant and/or animal biosecurity response.



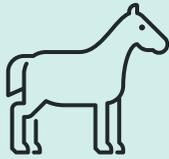
2019:

Exercise Sour Grapes brought together biosecurity and industry experts from across NSW and Australia to examine the preparedness of the wine grape industry to manage biosecurity incursions. As a result of the exercise a significant body of work is now in play, including the development of an industry biosecurity induction package and plans to manage further detections of phylloxera in the State.



2020:

NSW DPI was involved in Exercise Scelus, which was a cross-jurisdictional exercise that tested response capabilities relating to international arriving vessels with marine invasive species present within biofouling communities on the hull/niche areas. This exercise will support ongoing discussion across Australia about how best to approach management of biofouling on international vessel arrivals that travel around the jurisdictions, with a view to harmonised, consistent policy approaches to support the global industry's understanding of Australian biosecurity obligations.



2021:

NSW DPI was involved in Exercise Gammalite that brought government, animal disease specialists, and industry bodies together to prepare the broader horse industry's response to a future outbreak of equine influenza. The exercise consisted of practical activities to ensure all industry stakeholders understand the role they play in responding to an outbreak, should one occur.

How Biosecurity Contributes to Sustainable Economic Growth, and Protects the Environment and Community



Goal 2 - Biosecurity Contributes to Sustainable Economic Growth

Goal 3 - Biosecurity Protects the Environment and Community

The management of biosecurity risks contributes to sustainable economic growth (*Goal 2, NSW Biosecurity Strategy (2013-21)*), and protecting the environment and improving community wellbeing (*Goal 3, NSW Biosecurity Strategy (2013-21)*). NSW has made major inroads into the delivery of both these goals, with a range of programs and activities in place.

Improved biosecurity management action: Improved identification, diagnostics, surveillance, reporting and tracing systems for pests, diseases and weeds

Free

of 10 target exotic
plant pests in State or
regional NSW



80%

reduction in office
administration



20%

reduction in laboratory
time resulting from digital
surveillance app



950,000+

diagnostic tests delivered to
support surveillance outcomes



225,000+

biosecurity inspections
and audits



Improved biosecurity management actions

Preparedness and timeliness are two elements critical to the success of biosecurity incident management. The rapid and accurate identification of a new incursion allows it to be treated at the time of smallest impact and cost. To improve identification, diagnostics, surveillance, reporting and tracing systems for pests, diseases, and weeds, NSW DPI has invested in the latest technologies and diagnostics tools, improved surveillance capabilities through innovative technologies, and expanded national livestock tracing systems to include additional species. It also continues to develop more efficient ways to demonstrate proof of freedom from pests, diseases, and weeds.

Achievements include:

- completion of a three-year project to deliver proof of freedom from Pacific oyster mortality syndrome (POMS) in estuaries with 95% confidence;
- enhanced diagnostics and surveillance with a 5% increase in surveillance activities across government and private veterinary services;
- monitoring and surveillance of honey packers for treatment of American foulbrood;
- maintained the National Association of Testing Authorities accreditation at Wollongbar and Wagga Wagga analytical laboratories, providing stakeholders assurance on technical competencies in undertaking testing and inspection activities of their products;
- joint tracing exercise held between NSW DPI and LLS to improve tracing systems to meet national standards;
- confirmed state/regional Area Freedom of 10 targeted exotic plant pests within NSW;
- completed a review of the NSW trapping grid for exotic fruit flies to optimise effort and intelligence;
- digitisation of biological specimens to enable faster accurate diagnosis;
- implemented the Nodavirus Coastal Surveillance Project;
- adopted improved technology in information sharing, surveillance and engaging in responses through a centralised ICT platform (MAX) for managing responses to biosecurity and food safety incidents and surveillance programs;

- rollout of Trapbase, a digital application within MAX, to support plant biosecurity surveillance and response integration. The tool has been successfully deployed at 150 sites in the Sydney, Riverina, and Wollongong regions for the surveillance of fruit fly and has provided an 80% reduction in the time spent on office administration, and a 20% reduction in laboratory time spent entering samples; and,
- Border surveillance at the Queensland and NSW border for compliance with livestock movement controls contributes to preventing cattle tick incursions. Early detection leads to eradication and enables NSW to remain largely cattle tick free.

Recent audits by the NSW Auditor-General on biosecurity risk management (2019) and the Natural Resources Commission's audit of emergency management capability in NSW DPI and LLS (2018) made recommendations to improve existing processes. NSW DPI has delivered a range of strategic projects in support of the recommendations, including:

- a Memorandum of Understanding (MOU) developed by NSW DPI with Agriculture Victoria on Cross Border Biosecurity, Animal Welfare and Emergency Management Arrangements; and,
- An MOU signed in July 2019 with Local Land Services (LLS) to formalise its working relationship with the agency.

The formal arrangements with these two partner agencies will enable effective biosecurity compliance activities and emergency responses. Several actions have also been taken to improve emergency response costings, including the development of the Emergency Management Operations Reporting Framework, the creation of Emergency Management Incidents and Response activities and Exercises Registers, and a newly created Business Officer position within Emergency Management. Furthermore, NSW DPI has developed and implemented a range of actions to enhance its emergency response practices, introducing:

- an Emergency Response and Recovery Manual with Schedules;
- a cost-benefit analysis framework;
- a toolkit to support a cost-benefit analysis framework;
- an Emergency Management Lessons Management Framework;
- an Emergency Operations Learning and Development Strategy 2021-23, including delivery of introductory eLearning modules, Field Operations Responder and Logistics Assistance modules, and workshops and Australasian Inter-service Incident Management System, aviation, incident management workshops;
- the MAX system used by Victoria, South Australia, Western Australia, Northern Territory and Queensland for biosecurity case management, the benefit of which is national level sharing, coordination, and collation of data; and,
- several compliance and emergency response practices to address risks to the environment and community; such as
 - work instructions to support the management of non-indigenous animal incursions;
 - work instructions to support the management of vertebrate pests; and,
 - guidelines for the management of weeds (cut flowers) and support for a public-facing communication campaign.

Prevention and preparedness

Identifying exotic pests and diseases and their entry pathways, and assessing their potential impacts, allows for a targeted approach to managing the serious risks they may pose. A coordinated early intervention system is critical, since biosecurity impacts and associated economic costs become much higher, and efforts to contain or eradicate pests become more costly and difficult once they are established widely. Currently, more than 75% of the total NSW government expenditure on biosecurity is directed to containment and asset protection measures, rather than on prevention and eradication, where returns on investment are up to 100 times greater. The early detection of pests, diseases and weeds will help to shift future biosecurity investment into the initial phases of the invasion curve. Biosecurity activities such as surveillance, entry pathway analysis, compliance audits and inspections, stakeholder education, and industry and farm-specific biosecurity management plans all help increase the chance of detecting, identifying, containing, and successfully eradicating pests should they arrive.

Modelling estimates a 42% probability that Australia will experience an internationally notifiable major animal disease outbreak in the next five years. A priority focus area will be continuing to lead prevention and preparedness activities, such as current approaches concerning African swine fever and lumpy skin disease – two major animal-related diseases on Australia’s doorstep.

Wildlife is part of the epidemiology, cause, maintenance and spread of many major livestock diseases of concern in Australia. The 2022 outbreak of the exotic mosquito-borne virus, Japanese encephalitis, emphasises the heightened risks of insect-borne disease incursions originating from more northerly areas and the critical importance of an integrated approach across NSW to detect and understand emerging diseases in livestock, wildlife, and human health.

While the nature and frequency of interaction between feral animal populations and points of exotic disease incursion into domestic populations are difficult to quantify, the ability of wildlife and feral populations to act as reservoirs for known and emerging diseases, including zoonotic diseases, is well known. These risks are increasing with changing land use, climate change, and wildlife, livestock and people being brought into closer contact.

Australia has long undertaken planning for the management of Emergency Animal Disease (EAD) events, with jurisdictions undertaking disease surveillance of domestic and wildlife populations and implementing management strategies to reduce the potential spread of certain exotic and endemic diseases.

There are opportunities to strengthen these arrangements through partnerships with industry groups, research bodies, other governments and the private sector through a One Health approach. This recognises that the health of humans, domestic animals and wildlife, plants and the wider environment and ecosystems are intricately linked and inter-dependent. Such an approach will bolster NSW’s and Australia’s capacity, capability and reputation, and limit the impact on trade, market access, and livestock and aquatic production systems.

NSW DPI, in collaboration with Local Land Services and other agencies, has delivered a range of significant projects to prevent and prepare for biosecurity threats. These included:

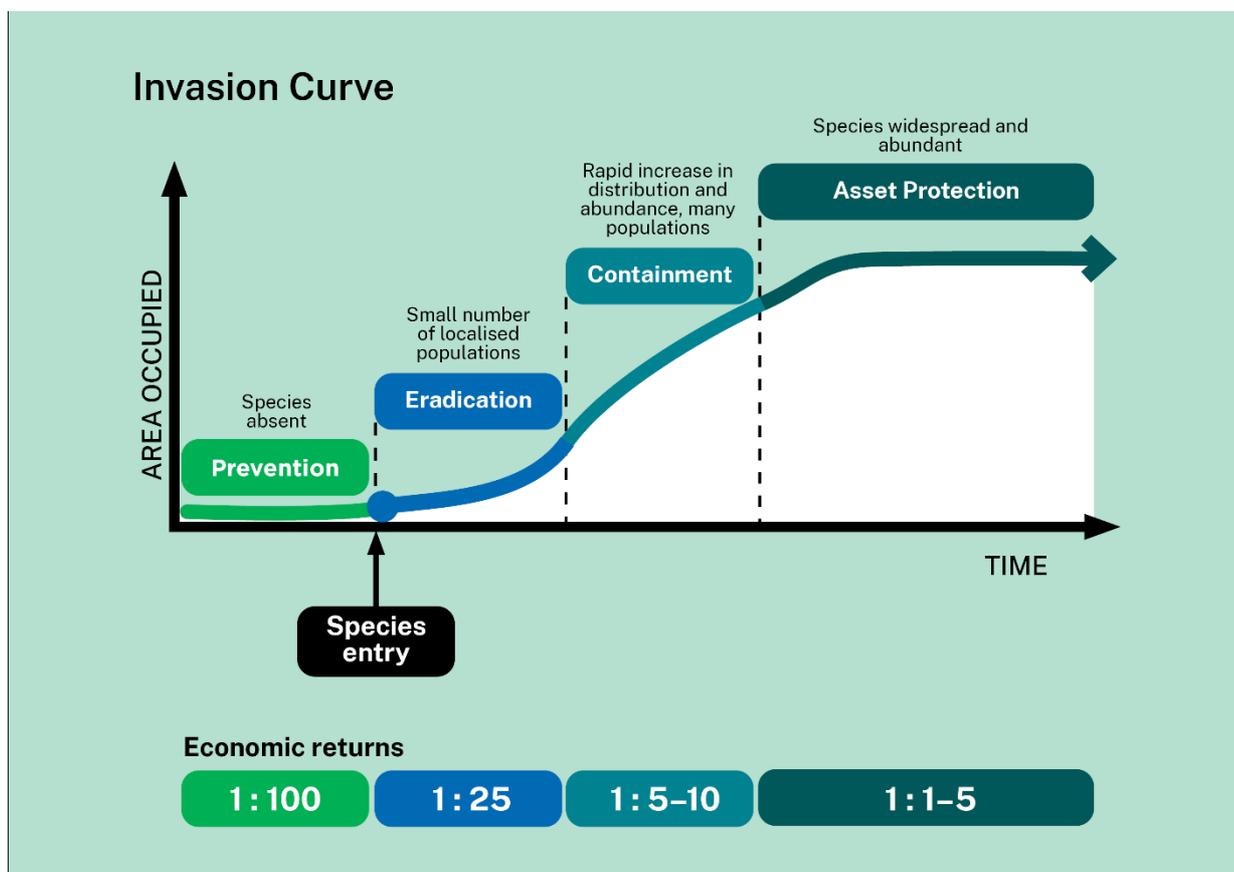
- African swine fever social media campaign, workshops and eLearning modules; pig biosecurity planning project; African swine fever and swill feeding resources developed;
- NSW blueberry, coffee, rice, melon and grains industry biosecurity preparedness project (production of materials and resources);

- targeted industry engagement – viticulture biosecurity officer program; AgSkills training for viticulture; and induction videos. Berry industry preparedness project (production of materials and resources for high-priority pests and general biosecurity management); pest management (serpentine leaf miner) through engagement and collaboration;
- over 3,600 activities supported a skilled, qualified workforce and trained stakeholder groups and volunteers in weeds issues. Each year over one million viewers access weeds information through the NSW WeedWise smartphone and web apps; and,
- active surveillance program to determine the status of significant pests, diseases and weeds in the environment-restricted animal matter/transmissible spongiform encephalopathies program; national arbovirus monitoring program; *Ehrlichia canis* surveillance; Pacific oyster mortality syndrome surveillance to underpin oyster translocation from Tasmania; One Health-Australian bat lyssavirus surveillance; Hendra surveillance; and nodavirus surveillance work.

Further work will look for opportunities to bolster NSW’s animal disease surveillance, response, and invasive animal management capacity to improve biosecurity and the control of exotic and endemic diseases emerging from wildlife. These efforts will look to reduce the economic, agricultural, community and environmental impact, and prevent, where possible, future disease risks emerging from the human-animal-environmental interface.

A complete list of major activities undertaken in prevention and preparedness, with their implications, is provided in Appendix 7.

Figure 1: Invasion curve



Source: Biosecurity Victoria, Department of Primary Industries, Victoria



Case Study: African Swine Fever

After spreading throughout China in 2018 and decimating the Chinese pork industry, African swine fever (ASF) has continued to spread throughout Southeast Asia and the world and is one of the most significant threats to the Australian pork industry. An economic analysis of an ASF incursion into Australia in domestic pigs estimated costs of between \$1.6 billion and \$2 billion, but this report did not consider the costs if the feral pig population was also affected.

NSW DPI has been working nationally with other jurisdictions and the pork industry since 2018 on prevention and preparedness for ASF. Objectives for the NSW DPI ASF program include:

- creating awareness to reduce the risk of ASF entering and spreading amongst NSW pig producers in all communities
- improving biosecurity across the pork supply chain
- preparing operational documents and policy directions to enable a rapid response
- to enhance preparedness by developing partnerships and collaborating with government, industry, and producer groups.

Even though these objectives have been largely achieved, it is a continual process of improvement and refinement to ensure NSW DPI is adapting and improving on its ability to respond. There have been many achievements in the ASF preparedness program, such as:

- biosecurity management planning resource toolkit for pigs
- creation of the NSW State Disposal Plan for African Swine Fever
- exploration of alternative carcass disposal techniques
- preparation of NSW response-ready documents, including the initial Emergency Animal Disease Response Plan, surveillance, tracing guidelines, legal orders, and the development of an online movement permit system.



Vineyard biosecurity induction video and register are now live!

NSW DPI and NSW Wine have created a short Vineyard Biosecurity Induction video for use on all vineyards that outlines some best practice biosecurity management practices. The aim of the video is to increase vineyard staff and visitor awareness of their biosecurity obligations whilst on a vineyard.

Using this video to induct staff ensures that everyone working on the vineyard has basic biosecurity knowledge. An induction register is also available for download so that every time someone watches the video, can sign to confirm that they have seen it and are aware of their biosecurity obligations.

NSW DPI aims to assist in protecting the NSW wine industry through the early detection and identification of pests and diseases. All stakeholders can assist us in this by reporting anything unusual.

Surveillance

Surveillance-focused activities detect and record the presence or absence of pests and diseases and are key to the early detection of biosecurity threats. Early detection minimises the spread and impact of biosecurity material and allows for rapid response to the incursion of a pest or disease.

NSW DPI, LLS, Local Government Authorities and NSW Environment and Heritage continue to participate in surveillance activities at state and national levels, along with industry and the community. Active surveillance programs are in place for priority plant pests and diseases, animal pests and diseases, aquatic pests and diseases, weeds and invasive pests and animals.

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 stock movements;
 - collecting disease and pest samples for analysis and diagnosis;
 - using image and data collection technology; and,
 - aerial mapping, and on-ground identification, mapping, and reporting.
-

Animal health surveillance

During the period from January 2018 to September 2021, NSW DPI's Veterinary Diagnostic Laboratory received 7,302 diagnostic submissions relating to domesticated species under the Nationally Notifiable Animal Pests and Diseases program during the period from January 2018 to September 2021, resulting in 63 pest/disease investigations. In addition, there were 575 diagnostic submissions on the top five priority Terrestrial Priority Animal Diseases (African horse sickness, African swine fever, highly pathogenic avian influenza, foot and mouth disease, and lumpy skin disease).

Of the 7,302 diagnostic submissions on Nationally Notifiable Animal Pests and Diseases, 11% (802) were positive for the disease/pests tested. There were no positive tests noted from the 575 submissions on the five Terrestrial Priority Animal Diseases.

The most common occurrences of the 802 positive samples of Nationally Notifiable Animal Pests and Diseases were:

- American foulbrood (43% of positives);
- European foulbrood, (25% of positives);
- *Brucella suis* (17% of positives);
- Equine herpesvirus-1 (5% of positives); and,
- Hendra virus (<1% of positives).

Plant health surveillance

NSW DPI contributes to the National Plant Health Surveillance Program for exotic fruit flies and gypsy moths through trapping networks targeting high-risk pathways around the NSW ports of Sydney, Newcastle, and Wollongong. Targeted visual surveillance is also undertaken in these port areas for 16 high-priority species, including brown marmorated stink bugs, exotic ants, glassy winged sharpshooters and several exotic citrus diseases. In addition, under the National Bee Pest Surveillance Program early detection of exotic bee pests and diseases, such as varroa mites and braula fly, occurs at high-risk pathways. These program activities provide a mechanism for the early detection of exotic pests and diseases, as well as evidence that NSW is free from key pests, particularly fruit flies, that could jeopardise market access. Over the last few years (2018-21) 220,694 flies were submitted for diagnostic identification, with zero exotic detections.

Under the American foulbrood minimisation strategy, 373 samples were tested with 174 testing positive. Appropriate enforcement and biosecurity directions were applied to eradicate the bee disease.

To support market access for an industry that contributes \$5 million to the NSW economy, a total of 8.0 Ha (equivalent to approximately 19 football fields) of seed onion was surveyed for white rot, onion smut and onion rust disease on Riverina seed producer properties to protect NSW onion smut pest freedom status.

During the 2020-21 financial year, NSW DPI ran programs in partnership with LLS that included:

- fall armyworm surveillance through trapping networks, webinars, training sessions, diagnostics, and data sharing;
- area freedom surveillance to validate tomato yellow leaf curl virus absence in NSW to support market access from NSW into Western Australia; and,
- lupin anthracnose surveillance, with no symptoms of the highly visual and crop-specific disease reported from inspections of 2,000 ha of commercial lupin crops at 39 sites across four LLS regions, providing further support for ongoing freedom claims.



Surveillance Hives After Lockdown

The National Bee Pest Surveillance Program has resumed full-time after COVID-19 lockdowns restricted our access to the Port of Newcastle, Port Botany and Port Kembla. Most of the sentinel hives needed maintenance and a considerable amount of honey had built up over time which needed to be removed. All hives are in good strength, even with swarming season occurring in lockdown, with only one queenless colony and no disease found, while 18 sentinel hives had adult bee samples taken for virus diagnostics by the Australian Centre for Disease Preparedness (CSIRO). Catch boxes had no colonies (feral bees or exotics) take up residence during the extended time. Floral sweeping was also conducted, and no exotic bees sighted.

Invasive species surveillance

NSW DPI with Local Land Services and Local Control Authorities conducted 242,433 inspections of land for state and regional priority weeds over the period 2018-21. These included inspection of land for infestation of parthenium weed, frogbit, Mexican feather grass, alligator weed, orange and mouse ear hawkweed and regional-specific weeds as identified by the individual Regional Strategic Weeds Management plans and data captured with the Biosecurity Information System – Weeds portal.

Over 2015-20 the Weed Action Program spent \$14.6 million to prevent the establishment of new weeds, avoiding \$1.5 billion in potential lost production and control costs to NSW communities.

NSW DPI also conducts targeted surveillance for invasive non-indigenous notifiable species, such as cane toads. Table 3 lists the total number of non-indigenous notifiable vertebrates' incursions and interceptions at the borders over the 2018-21 period. A biosecurity zone has been established for cane toads and more coordinated surveillance in the affected region commenced in 2019. There have been 282 sightings of cane toads reported since 2019. There were 73 confirmed cases of cane toads, of which 58 are being actively managed.

Table 3: Non-indigenous notifiable vertebrates 2018-21

Non-indigenous notifiable – vertebrates	Total reported	Total confirmed	Total negative (misidentified/unconfirmed/hoax, etc.)	Total (confirmed reports effectively managed)
Prohibited dealing incursion cases detected in the open environment (at large)	429	272	157	165
Prohibited dealing interception reports (advertised/seized/surrendered/stowaway)	153	102	51	71
Cane toad incursion in NSW biosecurity zone	282	73	209	58

A prohibited dealing includes any dealing with a non-indigenous vertebrate animal listed in Schedule 3, Division 2 of the NSW Biosecurity Act 2015.

Source: NSW DPI

An exotic invasive ant incursion in NSW, such as red imported fire ants or yellow crazy ants could substantially impact the agricultural sector. Since 2021 there have been 172 community reports of suspected invasive ants – 17 of these specified suspected yellow crazy ants and 28 specified suspected red imported fire ants. Only three reports were confirmed to be yellow crazy ants (all from the Lismore area). No reports were confirmed to be red imported fire ants, or any other high-risk invasive ants. The yellow crazy ant incursion in Lismore is being actively managed with the intention of eradication in the near future.

Traceability

Traceability is the ability to track and trace products along the supply chain system. An effective traceability system can increase trust in traded products and address supply chain vulnerabilities.

Property Identification Codes (PIC) and the National Livestock Identification System (NLIS) are schemes for the identification, tracing and controlling disease and residue programs and are crucial in protecting and enhancing Australia’s reputation as a producer of quality products. Australia exports to over 100 markets and is one of the world’s largest red meat exporters.

Nationally, NSW is participating in four key priorities to ensure industries and the environment are protected from the threat of incursions and to minimise the impact through rapid and effective response activities:

- **Plant property identification:** pilot testing of a nationally harmonised plant property identification system for the Australian plant sector to support emergency response activities for disease outbreaks, natural disasters, and food safety recalls, and to improve market access and supply chain management.
- **Horse identification and traceability:** following the 2019 Senate Rural and Regional Affairs and Transport References Committee Inquiry, *Feasibility of a National Horse Traceability Register*

for all Horses, national harmonised horse traceability standards and systems are being developed, including a potentially national horse traceability register.

- **Sheep and goat electronic identification:** following the 2020 SAFEMEAT Report on reforms to Australia's livestock traceability system, *NLIS (Sheep & Goats) Traceability Evaluation: A Comparison and Evaluation of Traceability of Electronic and Visual Identification in NLIS (Sheep & Goats) in a Segment of the Supply Chain*, options for the implementation of an individually identified electronic system and improved governance arrangements are being explored.
- **Food standards code:** rolling program of standards reviewed each year, the current focus is on horticultural high-risk products (berries, leafy vegetables, and melons); caffeine; composition of infant and toddler foods; and alcohol (carbohydrate and sugar claims, energy labelling).

Research and diagnostics support rapid responses

The Elizabeth Macarthur Agricultural Institute (EMAI) is NSW DPI's leading biosecurity diagnostics laboratory with the responsibility to ensure animal and plant disease diagnosis or exclusion is rapid and accurate. The laboratory averages 20,000 sample submissions per year with 240,000 animal and 17,000 plant diagnostic tests (submissions can have multiple tests).

District Veterinarians, Local Land Service Officers and private veterinarians submit over 2,500 submissions annually. Since the initial State of Biosecurity reporting period there has been an increase in testing to diagnose or exclude notifiable diseases. The remainder of the submissions is provided by artificial intelligence centres – commercial enterprises which need to exclude notifiable diseases of animals and plant products ready for export. Between 2018 and 2021, there were over 950,000 diagnostic tests analysed. Over 950,000 diagnostic tests were conducted between 2018 and 2021, of which 73,500 related to plants, with the bulk of the remainder animal tests for cattle and sheep.

Compliance

NSW DPI is responsible for ensuring compliance with the legislation that aims to protect NSW producers and consumers from biosecurity threats. NSW DPI has strong partnerships with industry, other government agencies and the community to encourage greater understanding of biosecurity and food safety practices and support for innovation. Additionally, it plays a major role in communicating and engaging with peak industry bodies and stakeholder groups (e.g.: Meat and Livestock Australia, Australian Eggs, NSW Apiarists). This includes developing policies and sharing information about compliance activities to support and drive shared responsibility and improve overall compliance.

A risk-based approach is applied to programs that promote voluntary compliance and minimise the regulatory burden for compliant businesses, sectors, industries, and the community. Part of the approach focuses on targeted, preventative operations. Compliance teamwork with partner agencies, such as Local Land Services, NSW Police, and other national and state regulators, drives consistent compliance services for stakeholders operating across multiple jurisdictions.

Table 4 highlights the breadth of activities undertaken by DPI and LLS to manage biosecurity risks.



Apiary Industry Biosecurity Management In NSW

NSW DPI maintains an ongoing program of advisory and compliance activities within the beekeeping industry, enhanced by the introduction of the *NSW Biosecurity Act 2015* (the Act). From 2018 to 2021, sixteen targeted apiary operations were conducted. Most of these operations were undertaken during pollination seasons for high-value horticultural produce and primarily focused on the blueberry industry on the NSW North coast and almonds in the Greater Sunraysia and Northern Riverina areas. Up to 100,000 hives from NSW, Victoria, South Australia, and Queensland participate in these pollination events.

During these operations, officers inspected hives for disease or pests and whether beekeepers managed biosecurity risks. Weak and diseased hives have the potential to be invaded by healthy bees who steal the stored honey (known as ‘robbing’). This increases the risk of brood diseases such as American foulbrood (AFB), which is a notifiable disease under the Act, spreading to other hives. These operations are also used as an opportunity to educate beekeepers on the requirements under the Act and their general biosecurity duty. Compliance operations were also focused on amateur beekeeping, inspecting hives for disease status and promoting compliance with the Australian Honeybee Industry Biosecurity Code of Practice.

The targeted operations resulted in 49 warning letters, 53 individual biosecurity directions, 11 biosecurity undertakings, 27 penalty notices, two seizures, and two prosecutions. The most common breaches related to the failure of beekeepers to register their hives and failing to report notifiable pests and diseases such as AFB.

NSW DPI continues to promote recommend a range of strategies to beekeepers to manage biosecurity risks, including ongoing disease surveillance programs, regular suspect brood sample and honey tests, removing and culling weak hives from pollination events, and implementing management plans with the NSW DPI Bee Biosecurity Officer.

Table 4: Biosecurity compliance activities

Compliance elements	Total completed	2017-18	2018-19	2019-20	2020-21
Audits Interstate Certification Assurance/Certification Assurance (hemp, stock feed manufacturer, goat depots, alkaloid poppies, non-indigenous animals, desktop, on-property)	6,701	1,024	1,742	2,037	1,898
Inspections (stock feed end-users and stock feed retailers, fruit fly traps, Australian gypsy moth traps, tomato potato psyllid (TPP), piggeries, Restricted Animal Material, saleyards, tips, other)	29,559	4,274	8,274	8,977	8,034
Complaints (plant, animal, bee, cattle tick operations)	2,220	274	459	538	949
Permits/certification (bee, PHC (Plant Health Certificates), plant, animal, export, health, interstate, vaccination, other)	28,245	13,319	3,113	5,409	6,404
Properties Quarantined (cattle tick program)	3,372	627	796	903	1,046
Quarantines (anthrax, animal bio, footrot, Hendra, Johne's disease, residue and food safety, Salmonella enteritidis, surveillance)	14,204	3,227	5,140	2,786	3,051
Beehives verified	60,212	8,358	15,678	19,612	16,564

Source: NSW DPI

Compliance activities undertaken in 2020-21 were limited due to the COVID-19 pandemic, with compliance resources being redirected to assist NSW Health with COVID-related activities. Compliance officers inspected 5,931 NSW retail food businesses to assess compliance with COVID-19 Safety plans and NSW Public Health Orders.

Priority weed inspections are undertaken by Local Control Authorities. Between 2017 and 2021 there were 188,549 inspections undertaken. As a result of the inspections undertaken, there were 4,935 biosecurity compliance activities (inspection of directions, undertakings, permits or certificates).

Table 5: Biosecurity enforcement activities for 2017-21

Biosecurity enforcement activities	Total issued	2017-18	2018-19	2019-20	2020-21
Warning/advisory	7,255	1,999	2,375	1,578	1,303
Directions/orders/undertakings	4,091	797	984	1,107	1,203
Penalty notice issued	262	27	60	44	131
Seizures	14	0	2	6	6
Prosecutions (number of charges)	6	1	1	1	3

Source: NSW DPI

Compliance activities are designed to change behaviours as a result of interactions. Most enforcement actions (62%) between 2017 and 2021 listed in Table 5 above were low-level. An audit or inspection of a business (or an individual) may identify the need to undertake corrective actions to achieve compliance with biosecurity obligations. Individuals and businesses were supported with advice to assist future voluntary compliance and may have been issued a warning to fix the identified problems. Some individuals or businesses may have been subject to several enforcement actions from one audit or inspection (for example, they may have received an advisory, a written warning and a direction or order). This means the total number of enforcement actions are not directly attributable to the number of compliance activities completed.



Case Study: Apiary Industry Biosecurity Management In NSW

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Threats from invasive species

Invasive species can significantly affect infrastructure and cause significant 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 invasive species, combined with habitat modification, contributing to much of this loss.

Invasive species represent one of the greatest threats to biodiversity in Australia. Management of invasive species will need to change to adapt to rapidly evolving global circumstances, trade practices and climate. It is estimated that invasive vertebrates cost the Australian economy over \$1 billion annually, with the cost to NSW estimated to be \$170 million (*State-wide review of pest animal management, Natural Resources Commission, 2016*). Managing the impact of invasive species requires sustained coordinated effort across all land tenures, which is a key focus of the *NSW Biosecurity Act 2015*.

NSW DPI, in conjunction with a wide range of stakeholders, developed the *NSW Invasive Species Plan 2018-2021*, which identified four goals and key deliverables to help prevent new incursions, eliminate or contain existing populations and effectively manage widespread invasive species. The scope of the Plan includes weeds, vertebrate, and invertebrate pests in terrestrial, freshwater, and marine environments. To monitor progress against the Plan, a monitoring, evaluation, reporting and improvement framework has been developed. A copy of the full Plan is available on the NSW DPI website.

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 \$110 million for projects (since 2010) at the local level that supports the control and eradication of weed species from NSW. Table 6 provides a breakdown of the funds committed through the NSW Weeds Action Program since 2017.

Table 6: NSW Government Weeds Action Program funding (2017-22)

Year	NSW projects (\$)	Regional projects (\$)
2021-22	1,613,500	11,046,500
2020-21	1,639,970	11,046,500
2019-20	1,616,000	11,046,500
2018-19	1,618,200	10,881,800
2017-18	1,498,800	10,234,800

Source: NSW DPI

An external review undertaken by the Natural Resources Commission into pest animal and weeds management highlighted some of the gaps that existed in invasive species management and made a range of recommendations. NSW DPI has since:

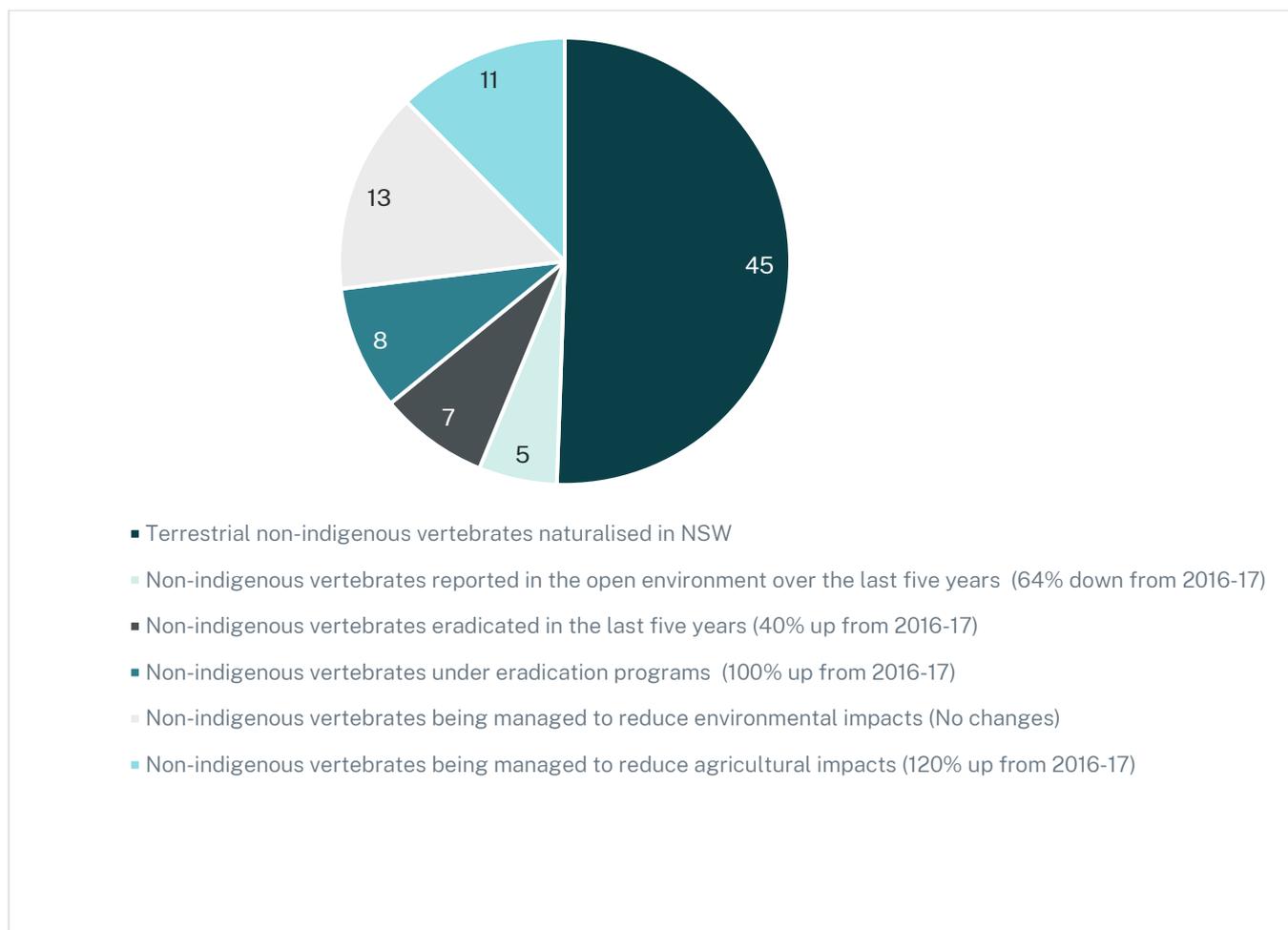
- developed the *NSW Invasive Species Plan 2018-2021*;
- developed and implemented Regional Strategic Pest Animal Management plans and Weed Management plans;
- identified risk-based regional priorities for pests and weeds;
- appointed NSW DPI Fisheries Compliance Officers as Authorised Officers and Weeds Officers trained under the *NSW Biosecurity Act 2015*;
- developed state MERI Framework to enable consistent state-wide data collection and to evaluate the Regional Pest and Weed Management plans;
- implemented a Biosecurity Zone for cane toads and notification requirements for non-indigenous animal sightings, such as the red-eared slider turtle;
- developed strategies and implemented ongoing community education around the keeping and release of exotic freshwater species;
- contributed to *National Carp Control Plan*;
- published and implemented *NSW Wild Dog Management Strategy*; and,
- enhanced FeralScan reporting tool, a free resource for the community and landowners to record pest animal activity, pest damage and control actions.

Invasive species metrics

It is considered that a total of 45 terrestrial non-indigenous vertebrates have established naturalised populations on mainland NSW and its offshore islands (for more details see Appendix 4). Particularly problematic species include feral cats and wild dogs; feral pigs; commensal rats and mice; and starlings and pigeons. NSW DPI has worked to ensure the eradication of new non-indigenous vertebrate species from NSW, including species that have been intercepted and removed from the open environment or were previously considered as established in NSW. Ongoing work to maintain and continue improving data sets is required in the future.

As outlined in Figure 2 below, between 2018-2021 eight terrestrial non-indigenous vertebrate species were managed under eradication programs including: Black rat Lord Howe Island (LHI), House mouse (LHI), Canada geese (LHI), Raccoon and Cane toad (in the NSW Biosecurity Zone). Additionally, 11 species including wild dogs, foxes, feral pigs, wild rabbits, and deer were managed to reduce agricultural impacts. Thirteen (13) species including foxes, feral pigs, deer and cane toads were managed to reduce their environmental impacts.

Figure 2: Terrestrial non-indigenous invasive species metric 2018-21



Source: NSW DPI

The number of non-endemic plant species recorded in NSW increased by 12% between 2016-2017 and 2021. This is based on specimens lodged with the National Herbarium of NSW and does not necessarily represent a sudden increase of new arrivals of exotics into NSW. New incursions of prohibited matter have been detected and reported early to ensure eradication can be achieved. This increase in detections and reporting is primarily due to the significant stakeholder engagement and awareness programs delivered by NSW DPI in raising awareness of biosecurity and the general biosecurity duty for industry, primary producers, and the public. Refer to Appendix 5 for comparison data.

Presently, there are eight prohibited matter weeds under eradication programs with no species eradicated in the last four years. NSW DPI has increased its response to prohibited matter with a 167% increase in the number of weeds under eradication responses. For weeds to be declared eradicated, seed banks must be fully exhausted, so the process can take many years to complete.

The NSW Weeds Action Program 2015-2020 implemented the weeds component of the *NSW Invasive Species Plan 2018-21* by supporting increased weed surveillance, detection, reporting, and compliance activities. Weed inspections conducted on public and private land and any associated compliance activities are now reported by local control authority staff through the Biosecurity Information System (Weeds) where the data can be analysed by NSW DPI staff. A strong emphasis has been placed on training land owners and occupiers as well as staff employed by local control authorities to undertake weed control functions under *the NSW Biosecurity Act 2015*. As the lead organisation for the NSW Weeds Action Program regional sub-programs, Local Land Services report annually to NSW DPI on the achievements of the program partners through the Weeds Information Database. These reports are reviewed annually and then combined into a five-year report.

Twenty-one confirmed exotic aquatic species and 10 aquatic diseases have been established in NSW waterways since 2017 (Table 7), a rise of 50% and 200% respectively from the last reported figures. A five-year aquatic surveillance plan has been approved and will be implemented to better understand the impacts and make tools available to enable early detection and effective management action. Aquatic biosecurity focuses heavily on prevention of pest and disease incursions through surveillance, early detection and extensive stakeholder education and engagement as, once established in aquatic environments, eradication of aquatic pests and diseases is rarely feasible.

Table 7: NSW invasive fish and aquatic disease data currently available for NSW (2018-21)

Invasive species: aquatic	Number	Description
Exotic species naturalised in NSW	21 (50% up from 2016-17)	21 exotic species with confirmed establishments in NSW, 10 aquatic diseases.
New exotic species detected in the wild over the last five years	3 (200% up from 2016-17)	Pachymeniopsis lanceolata, Grateloupia turuturu (Botany Bay), Japanese sea bass (Hunter River).
Species eradicated in the last five years	2	Abalone viral ganglioneuritis (abalone live holding facilities in Metropolitan Sydney), Infectious spleen and kidney necrosis virus-like viruses (aquarium facilities in Metropolitan Sydney).
Species for which risk assessments have been undertaken	2	Carp; tilapia.
Species being managed to reduce environmental impacts (2018-21)	0	No change
Species/diseases being managed to reduce aquaculture impacts (2018-21)	5 (67% up from 2016-17)	Aquatic pests/diseases – Pacific oyster mortality syndrome; QX in oysters; white spot syndrome virus in prawns; nodavirus; abalone viral ganglioneuritis.

Source: NSW DPI

Exotic invasive ants, once introduced, could spread rapidly threatening the environment, agriculture and way of life. Table 8 lists the number of invasive ants incursions since 2018 and the number that are currently being managed for eradication. It presents a new baseline report for non-indigenous invasive ants. Reporting on changes is expected to occur in future reports.

Table 8: Invasive species metrics – invasive ants (2018-21)

Invasive species: animals (invasive ants)	Number	Description
Invasive ant species naturalised in NSW	0	
New invasive ant species reported and confirmed in the wild over the last five years	1	Yellow crazy ants.
Species under eradication programs	2	Yellow crazy ants (Lismore); African big-headed ants (Lord Howe Island).
Participation in national eradication programs	4	National Red Imported Fire Ant Eradication Program (QLD), National Browsing Ant Eradication Program (WA, and NT), National Electric Ant Eradication Program (WA).

Source: NSW DPI



The Farm Biosecurity Attitudes and Awareness survey (2020) revealed some positive changes in attitudes to practising on-farm biosecurity and greater awareness about farm biosecurity programs. Notably, ‘monitoring crops and/or livestock’, and ‘controlling crop and/or livestock pests and diseases’ increased from 44% and 58% in 2017, to 96% and 97% in 2020.⁶

Activities that increase the risk of translocating pest fish 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, and for new and significant incursions, the feasibility of eradication is considered.

NSW DPI has a program of survey, research, education, signage and where possible, eradication of pest fish. A range of surveys and research projects are underway for introduced marine and freshwater pests in NSW, with data on the distribution and population dynamics used to help manage these pests (Table 9).

Table 9: Aquatic pests and disease reports from community and industry surveillance (2018-21)

	Disease reports	Pest reports	Confirmed outbreaks
2021 (January-June)	34	45	QX was detected by oyster farms in Port Stephens estuary (first detection in the estuary) – after June. QX reconfirmed in Macleay River. Abalone viral ganglioneuritis detected in Sydney seafood live holding facilities (May). Epizootic ulcerative syndrome (EUS) – red spot disease of fish reconfirmed in northern regions of NSW and detected in Bega River (southern-most detection indicating range extension).
2020	31	91	QX was detected in Macleay River (reconfirmed after approximately 13 years). Perna canaliculus. Confirmation of megalocytivirus (ISKNV – infectious spleen and kidney necrosis virus-like viruses) in ornamental fish.
2019	19	32	Confirmed Grateloupia turuturu in Botany Bay.
2018	19	52	Nodavirus detected in commercial aquaculture facility at Port Stephens.

Source: NSW DPI

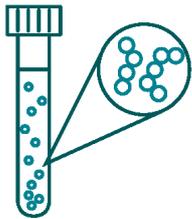
⁶ KG2 (Animal Health Australia and Plant Health Australia), 2020 Farm Biosecurity Producer Survey Research Report



State-Wide Marine Biosecurity Awareness Survey

As part of a Marine Estate Management Strategy funded social research project, NSW DPI and Charles Sturt University developed a questionnaire for owners of small to medium sized recreational vessels that stay moored in the water while in NSW. Outcomes of the project have provided the team with a better understanding of the barriers, benefits, and drivers of biofouling management on these vessels. Data gathered from this survey is now being used to inform a communications and behaviour change campaign to improve management of biofouling and reduce the spread and impact of marine pests and aquatic disease from movements of these vessels about NSW.

Improved response to biosecurity emergencies



7500+

reports of pests,
weeds and diseases



New

State Emergency
Response Command
Centre



New

State Emergency
Response and Recovery
Manual



150

complex
emergency
responses



Improved response to biosecurity emergencies

NSW DPI is the lead agency for managing responses to pests, diseases, weeds, and other biological incursions in NSW. Under the Intergovernmental Agreement on Biosecurity (IGAB), NSW DPI plays a leading role in national decision-making and supports responses under the plant, animal, and environmental deeds of agreement.

Being prepared and responding quickly are the keys to avoiding or limiting the devastating impact of an emergency pest, disease or weed outbreak. NSW DPI has a sound reputation as a leader in emergency response management, responding to more than 7,500 reports, including management of 150 complex emergency pests, and weeds disease incidents from 2018-2021.

Under outcome 4 of the NSW Biosecurity Strategy 2013-2021, 'Improved response to biosecurity emergencies', NSW DPI has developed and implemented tools to improve cross-jurisdictional collaboration and to identify and prioritise biosecurity threats with a continued focus on research into decision-making frameworks. Some of the key achievements are:

- developing an MOU and schedule of responsibilities and activities (e.g.: Emergency Management, Animal Biosecurity, Plant Biosecurity, Forestry), signed by NSW DPI and LLS in December 2018;
- developing the Emergency Response and Recovery Manual – funding arrangements and management of responses between NSW DPI and LLS have been clarified in the emergency response schedule;
- publishing a procedure for 'Non-indigenous Animal Incursion Management' in October 2020;
- completing an MOU between Agriculture Victoria and NSW DPI on Cross border biosecurity, animal welfare and emergency management arrangements;
- enhancing NSW foot and mouth disease (FMD) preparedness – specific plans and protocols developed that enhance the capacity and capability of NSW DPI to initiate a timely and effective response to an FMD incursion;
- NSW Disease Disposal and Destruction Preparedness – NSW-specific plans and protocols developed to enable fast and efficient implementation of a national livestock standstill in NSW;
- conducting a biosecurity incursion simulation in the viticulture industry and implemented recommendations from the outcomes;
- managing over 7,500 reports of pests, weeds, and diseases, including responses to abalone viral ganglioneuritis, salmonella, avian influenza, serpentine leaf miner, yellow crazy ants, cane toads and multiple weed incursion; and,
- opening a new State Emergency Response Command Centre at Orange Agricultural Institute.

Between 2018 and 2021, a total of \$232 million has been spent combating national biosecurity incursions in Australia under the national biosecurity response deeds. Of that, NSW has contributed \$31 million, and the cost-sharing component provided by the Commonwealth and other jurisdictions has amounted to over \$201 million. Under the deeds, NSW has received 87% of the total cost of incursions in NSW from cost-sharing and contributed to 14% of the cost of incursions in other jurisdictions in the same period. See Table 10 for a breakdown of the total expenditure.

Table 10: NSW financial arrangements for biosecurity response under cost-sharing arrangements 2018-21 (\$)

Year	Cost-shared response occurring in NSW with NSW DPI being the lead combat agency (\$)		Cost-shared response that occurred in other states and territories to which NSW made a financial contribution (\$)	
	NSW	Other	NSW	Other
2020-21	104,031	617,429	9,475,748	51,151,742
2019-20	5,738	47,543	8,501,236	47,447,407
2018-19	8,379	123,589	7,105,993	55,333,959
2017-18	-	-	6,598,380	46,038,692

Source: NSW DPI

Eradication

For the period 2018-21, NSW DPI handled over 7,500 notifications of biosecurity concerns of pests, weeds and diseases.

Of the more than 7,500 notifications received, 150 resulted in a complex emergency response. Some of the significant emergency incidents and responses included:

- management of khapra beetle incursion;
- management of *Salmonella enteritidis* (SE) outbreak in poultry and egg production;
- successful response to the outbreak of QX disease in Macleay River in 2020-21, the first time in 10 years it was detected in that estuary;
- cross-border response to an outbreak of highly pathogenic avian influenza in Victoria;
- parthenium weed and frogbit infestations engaging resources from NSW DPI, LLS and local government to handle 34 infested premises in 2020 and 16 in 2021;
- black knapweed in Tenterfield in 2018 involving resources from NSW DPI, LLS and local government to delimit, treat and monitor an infested area of seven hectares over eight infested premises;
- abalone viral ganglioneuritis (AVG) response – NSW DPI confirmed infection with AVG in a Sydney live abalone holding facilities involving 30 infected premises; and,
- yellow crazy ants at two sites (Lismore CBD and Terania Creek) on the NSW North Coast.

Working together in response to a biosecurity emergency

The NSW Government works collaboratively within its agency framework and with other jurisdictions and non-government organisations to deliver strong biosecurity for NSW. Collaboration with the other jurisdictions delivers critical capability and capacity that would otherwise limit NSW's ability to manage biosecurity incidents.

Cross-jurisdictional collaboration allows for rapid and effective responses. NSW DPI 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 has led the ongoing response to two post-border incursions of khapra beetle since mid-2020, managing 297 sites across NSW and the ACT. It conducted surveillance and diagnostics to demonstrate that Australia's second most unwanted plant pest has not been established, thereby protecting a \$100 million industry. Khapra beetle is one of the world's most economically damaging stored product pests and has been identified as the number two National Priority Plant Pest for Australia. NSW initiated a two-year national ongoing demonstration of freedom from khapra beetle which protects the \$100 million grains industry.

The total cost of implementing control measures in response to an incursion of khapra beetle is estimated at \$8.5 million over 20 years. By contrast, the avoided costs, or net benefits of avoiding a widespread incursion of khapra beetle impacting NSW grain producers is estimated at approximately \$11 billion over the same 20-year period. This value assumes that the maximum avoided cost would be reached in the tenth year.

Serpentine leaf miner poses a serious threat to Australian agriculture and horticultural industries. NSW DPI has effectively minimised the economic impact of the arrival of serpentine leaf miner in NSW. NSW DPI led the response to delimit and manage serpentine leaf miners in the Greater Sydney region following detection and successfully ensured horticultural, cut flower and nursery industries were equipped to manage the pest with minimal impact on business continuity and market access.

Lupin anthracnose poses a potentially devastating risk to commercial cropping for Australian farmers. A significant milestone was reached when NSW was able to claim State Freedom from lupin anthracnose. NSW DPI worked with LLS to respond to the exotic lupin anthracnose detection in NSW in October 2016. After two years of incursion response, surveillance was conducted during the

2019-20 season to prove that the disease was no longer present in NSW. NSW's claim to State Freedom has been accepted nationally.

For the period 2018-21, over 72,000 surveillance inspections were conducted to monitor the eradication and containment of weeds such as orange and mouse-ear hawkweed and tropical soda apple. Eradication programs were conducted for 78 weeds identified as targets for eradication in all or parts of NSW and there were over 2,600 responses to new incursions of highly invasive, high-impact weeds like parthenium weed (found in crops and grazing properties), kidney-leaf mud plantain (found in rice crops), black knapweed (found on grazing properties) and Mexican feather grass (found in formal gardens).

In 2021, NSW DPI coordinated a successful disease response to QX in the Macleay River, the first time it had been detected there in 10 years. The response included strong collaboration with stakeholders across NSW to ensure the industry had appropriate information and support to minimise the impacts of this endemic aquatic disease.

Containment

Under the national biosecurity deeds, containment is the initial response phase after the 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 uses 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. 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 the size and cost of eradication programs.

In certain cases, where pests and diseases have spread economically or practically beyond the feasibility of control, containment practices can be used to keep outbreaks within defined areas to maintain disease-free status in uninfected areas. Such programs can be described as transitioning to management.

NSW DPI is continually implementing containment programs in response to new or emerging pests and diseases. There were several key programs over the period 2018-21:

- The spread of footrot on NSW properties can have a devastating impact following several wet seasons. Recent appointments to the Footrot Steering Committee are focusing efforts on a strategic review of the NSW footrot program in 2021-22. The new Committee has equal representation of sheep producers, LLS and NSW DPI to deliver an updated and reinvigorated strategic control program.

- Movement restrictions were introduced to prevent the spread of phylloxera to disease-free vineyards from phylloxera-infested zones (Albury/Cowra and Sydney Basin).
- The management of the red-eared slider turtle is another successful example of programs and outcomes driven by NSW DPI. Aiming for a containment approach, this program aims to bolster community engagement, create identification processes, implement management tools, and overseeing compliance strategies.
- To control and contain the spread of a 2018 *Salmonella enteritidis* (SE) outbreak, NSW DPI runs an ongoing management program with local and interstate agencies at affected properties involving increased surveillance and monitoring. A biosecurity control order was issued, which includes a requirement for all licensed egg businesses in NSW to undertake mandatory SE testing.



Case Study: Brown Marmorated Stink Bug

Brown marmorated stink bug (BMSB) was detected in imported non-agricultural cargo at two sites in Western Sydney in January 2018. NSW DPI began a response to eradicate the pest.

Brown marmorated stink bug is a high-priority plant pest that is known to stow away in cargo coming out of the northern hemisphere between September and April each year. This pest can cause major damage to agricultural crops, nursery stock and ornamental plants. The bug is not a risk to human health, but it is regarded as a nuisance pest as it seeks sheltered places during the winter months, such as inside homes, vehicles, machinery, or sheds, often in large numbers. It produces a foul-smelling odour when disturbed.

The response mounted by NSW DPI included comprehensive, on-ground surveillance combined with trapping activities on susceptible plant hosts and a public awareness campaign. Over 180 traps were deployed and inspected weekly by staff. The communications plan included flyers delivered to all premises within 2 km of the detection, and a public awareness campaign through local press and direct engagement with schools and community groups. The timely delimitation, containment and insecticide treatment at the sites and the surveillance undertaken during the response was vital in providing evidence that BMSB had not established. The National Management Group confirmed the eradication of this pest in June 2018 and the response was closed.

Reduced impacts from established pests, disease and weeds



\$360+ million

forecasted savings from current programs to reduce impacts of established pests, disease and weeds



100,000+

insects produced for biocontrol purposes

Over
290,000

actions to manage widespread weeds



Reduced impacts from established pests, diseases, and weeds

An asset-based approach to managing an invasive species is implemented once a species has become so widespread that it would be inefficient to control the species everywhere it occurs, and containment would provide a low return on investment. The asset-based approach is undertaken only where reducing the adverse effects of invasive species provides the greatest benefits for specific high-value assets. Invasive species such as weeds and feral animals negatively impact the environment and primary industries. NSW DPI has identified several priorities from 2020-23 that will seek to address the impacts of established weeds, pests, and diseases.

The 2020-21 Budget measure, 'Boots on Ground', is a program aimed at boosting biosecurity. A total investment of \$43.5 million over three years, commencing in the 2020-21 financial year, aims to manage biosecurity threats and bolster the long-term viability of the primary industries sector, benefiting primary producers and the economy with savings of \$364 million. The program intends to support drought recovery efforts, by suppressing the weed and pest animal populations, which have increased following widespread rain in 2020 and enable the State to respond to increasing biosecurity threats.

Some of the key activities undertaken in the management of invasive weeds, endemic diseases and pests have included:

- managing footrot to limit its spread in NSW;
- developing enforcement strategies to support the implementation of local pest management;
- making readily available updated technical farm chemical information and tools to NSW stakeholders;
- mass-rearing and releasing over 100,000 biocontrol insects by NSW DPI laboratories at Grafton and Orange into infestations across NSW and establishing mass-rearing facilities at Lightning Ridge;
- carrying out over 4,500 planning activities with landholders to help them prioritise and manage widespread weeds that have the greatest impact on their properties; and,

- conducting over 46,000 effective and targeted control activities to reduce the impact of widespread weeds on priority agricultural and environmental assets, where benefits are greatest and where weeds have the greatest impact on primary industries, the environment, human health, or infrastructure.

The Western RESET Project is a control program to tackle endemic pests, weeds, and diseases. The RESET program reduces the triple-bottom-line impacts, with multi-species predator control across 1 million square kilometres of north-east NSW. The plan is to expand this landscape-scale program to western NSW, targeting wild dogs and feral pigs to protect goat and sheep production. Landholder support for the program has been established through the existing Western Tracks program.

The Western Riverina Pest Project has been awarded a national Froggatt Award for undertaking the largest feral pig control program in Australia. The project was recognised for its innovative use of emerging technologies across 1.4 million hectares of privately and publicly owned lands. Between June 2016 and June 2021, a total of 43,080 feral pigs were removed from the program area and the population density was reduced from a peak of 11.2 pigs per square kilometre in 2017 to 0.88 pigs in 2020.

Replication of the successful northeast program in western NSW is set to target wild dogs to protect goat and sheep production. Tools and techniques to be employed in the Western RESET program include GPS collars and DNA testing to monitor dogs in specific locations. In the north, this program is delivering \$328 million in savings to producers and the economy.

NSW DPI implemented advanced DNA technologies to support criminal and compliance investigations into stock theft and animal cruelty/welfare, providing services that will assist our agricultural industries to combat rural crime and maintain compliance for market access. This also builds new relationships with NSW Police and other state agencies, and with the Australian Government Department of Agriculture, Water, and the Environment (DAWE).

Natural disasters

NSW DPI has two roles under the *New South Wales State Emergency Management Plan (EMPLAN)* as the combat agency to strategically lead biosecurity animal and plant responses and recovery, and also as a supporting agency in natural disasters to other combat agencies during bushfires, floods, and other emergencies (such as marine pollution).

Climate change, as evidenced by the devastating 2019-20 Australian bushfires, and the extensive 2022 flooding event across NSW and Queensland, is creating an increased risk for certain pests and diseases, particularly the movement and distribution of existing endemic pests and diseases as their population expands into other areas. Working in partnership with relevant agencies, there will be a focus on continuing to monitor and model climate change to quantify vulnerability and opportunities, combat climate change and support adaptation.

NSW DPI as the Agriculture and Animal Services Functional Area (AASFA), supported by key agencies including Local Land Services, provides assistance to landholders and communities where animals and agriculture are impacted. AASFA works with affected land managers and communities to deliver on-ground response and recovery programs. Since 2018 NSW DPI's contribution to natural disasters has included:

- supporting the NSW Government 2019-20 Black Summer bushfire response, a five-month response campaign across multiple Local Government Areas (LGA's), coordinating the rescue,

evacuation, and emergency care of animals, and the assessment, humane euthanasia and burial of affected animals, and provision of emergency fodder and water;

- implementing the Natural Disaster Assessment Survey and using it effectively in the 2021 floods. Data from live natural disaster agricultural damage is collected via an online survey submitted by landholders; and,
- as well as publishing information and awareness materials for primary producers preparing for and experiencing dry seasons and drought conditions.

Apart from attending to natural disasters and other biosecurity emergencies, NSW DPI provided a framework and system to enable hundreds of staff to contribute to contact tracing, venue risk assessments, and data management related to COVID-19. NSW DPI's involvement was lauded by NSW Health and was an exemplar of how other agencies from across NSW contributed to the NSW Health response.

Strengthening biosecurity science and research capacity and capability



Adoption

of innovative technology and approaches to maximize surveillance outcomes and responses
e.g remote sensing

New

NSW DPI Epidemiology Strategy - to better target responses and surveillance activities



Enhanced

laboratory capability to undertake weed biocontrol testing



Strengthening biosecurity science and research capacity and capability

Research and science collaboration with other jurisdictions and the Commonwealth underpins NSW's expertise and capability in managing 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, animal welfare and food safety provide the next generation of tools required for the 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 to leverage their skills to identify and resolve biosecurity risks. This work is regularly being acknowledged through international, peer-reviewed publications.

To strengthen biosecurity science and research capacity and capability, NSW DPI has partnered with the Australian Government, other jurisdictions, and industry bodies. Together they develop innovative approaches for managing biosecurity risks, such as using tracking collars to manage feral animals. NSW DPI has invested heavily in biological control programs for key pests and weeds. NSW DPI achievements include:

- supporting agricultural industries of NSW to be productive and profitable by reducing diseases with approaches such as pest-resistant varieties of grains;
- increasing use of biocontrol agents - mass-reared and released to manage key pests and weeds, such as the Hudson pear;
- NSW DPI, partner agencies and stakeholders using new technology such as remote sensing, aerial surveillance, DNA sequencing, algorithms, and a range of innovative approaches to maximise surveillance outcomes and responses;
- developing the NSW DPI Epidemiology Strategy (internal document) for veterinarians to enhance evidence-based decision-making in biosecurity, emergency operations, and food safety; and,
- upgrading the Orange Agricultural Institute facility to enable weed biocontrol research.

The Elizabeth Macarthur Agricultural Institute's (EMAI) high bio-containment laboratories and animal facilities are the only state-owned PC3/QC3 and PC2/QC2, ISO and NATA accredited laboratories in NSW. PC2/QC2 and PC3/QC3 are physical containment levels where the buildings are reinforced with additional features to minimise the risk of infection or release of harmful microorganisms into the environment. EMAI also accommodates weed biocontrol quarantine facilities while delivering world-class diagnostics and research to the industry on a cost-recovery basis. Over the past 10 years, NSW has developed key partnerships with leading research facilities, including the Australian Centre for Genomic Epidemiological Microbiology (AusGEM).

Extension of the Insectary section at Orange Agricultural Institute has increased the capacity of NSW DPI to undertake necessary host-testing of potential weed biocontrol agents. Upgrades continue at the state weed biocontrol mass-rearing facility at Grafton. Additionally, the opening of a satellite mass-rearing centre, NSW DPI's Don Mackenzie Weed Biocontrol Facility at Lightning Ridge, will increase the rate agents can become available for landholders to reduce the impacts of weeds.

Increased numbers of well trained and well-resourced people

↑ Capability

enhanced emergency response planning capability



600+

staff trained



1900

(approx.) courses completed

New

centralized emergency case management system implemented



\$34 million+

invested by NSW DPI and partners to build capacity to manage weeds



Increased numbers of 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 the 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.

People, technology, and an excellent information management system such as MAX are critical tools for achieving biosecurity outcomes. In the past several years, NSW DPI has increased the number of well-trained and resourced people to meet biosecurity needs. Some of the key achievements have been:

- delivering an education program for land managers to bolster biosecurity planning and action;
- delivering online modules for *NSW Biosecurity Act 2015* training;
- training for NSW Police to develop skills and knowledge in the delivery of biosecurity activities within government;
- managing 100% of natural disasters through the biosecurity case management system, MAX, using Natural Disaster templates;
- developing in collaboration with key beekeeping bodies a nationally accredited first responders training program for the bee industry;
- training Weeds Officers and regional weed coordinators; a
- building people's capacity to manage weeds (\$18.9 million or 33% of total Weeds Action Program 2015-2020 funds invested went toward this objective, attracting \$28.1 million in partner contributions⁷)

⁷ NSW DPI Weeds Action Program 2015-2020, https://www.dpi.nsw.gov.au/_data/assets/pdf_file/0004/1290082/NSW-Weeds-Action-Program-Report-2015-2020.pdf

- developing and making available educational modules in (the National Livestock Identification System (NLIS) through the Livestock Production Assurance Integrity Systems to raise stakeholder awareness of livestock traceability and how to achieve compliance in accordance with the regulatory framework;
- obtaining a 3-year licence to Vessel-Check, a risk management tool used to perform biosecurity risk assessments on incoming internationally arriving vessels that use the tool to upload risk management documents;
- developing new emergency management role training pathways and completing a significant upgrade of the EMtrain learning management system to improve user experience and provide clarity on role pathways; and,
- releasing a Learning and Development Strategy for 2021-23, underpinned by plans for the development and delivery of a range of new training courses, delivery of an exercise program, and coaching and professional development activities.

Nationally accredited biosecurity training

Total College has partnered with biosecurity agencies across all jurisdictions to coordinate the delivery of biosecurity emergency response training for over 10 years. Biosecurity Emergency Response Training Australia (BERTA) is an initiative that enables a national and consistent approach to all areas of biosecurity emergency response training. Total College hosts the accredited biosecurity training course materials, comprised of four components with eight biosecurity emergency response skill sets.

NSW Emergency Management training

The NSW DPI emergency training focuses on training specific to the emergency role. The EMtrain platform currently hosts three foundation-level e-learning modules – ‘Working in Agricultural Emergencies’, ‘Induction into NSW DPI Response’ and ‘Information and Communications Management’ – that will continue to expand. The e-learning modules are available to all staff, so they are trained and ready to respond to biosecurity emergencies.

NSW DPI has developed new emergency management role training pathways and completed a significant upgrade of the EMtrain learning management system to improve user experience and provide clarity on role pathways. The commitment was to train 400 LLS and NSW DPI staff by June 2020 and to have had 200 LLS and NSW DPI staff participate in a response or exercise by June 2020. Both commitments have been achieved.

Also developed and delivered were biosecurity emergency management training programs in field operations, locust operations, aviation, logistics support, planning support, incident control, and other incident management team functions, such as the Australasian Inter-service Incident Management System (AIIMS). A total of 1,850 eLearning courses covering foundation modules and liaison officer training have been completed as of 31 December 2021. There were several face-to-face training courses offered between 2018 and 2021 to build capacity in attending to emergencies, as outlined in Table 11 below.

Table 11: Face-to-face emergency response courses delivered 2018-21

	Total courses offered	Total learners trained
Australasian Inter-service Incident Management System Principles	23	351
Field Operations	18	254
Locust Operations	9	95
Incident Controller	9	24
Planning Officer	9	29
Operations Officer	8	30
Logistics Officer	9	31
Design and Manage Exercises	6	35
Aviation (work safely with aircraft)	2	18
Mission Crew (incorporates WSA and CRM)	9	140

Source: NSW DPI

Nineteen simulated and or/face-to-face exercises were held between 2018 and 2021 (Appendix 3) by NSW DPI, covering terrestrial and aquatic animals, plant biosecurity and emergency management to test response plans, tracing operations, collaboration between agencies, and use and robustness of the technology. Some of the exercises, such as Exercise Razorback, involved multiple workshops spanning over two years exploring issues around destruction, movement of pigs and semen, and transition to management in an African swine fever-related outbreak.

The Emergency Management Lessons Management Framework has been implemented to provide the emergency management sector with a mechanism to learn from experience and scope collaborative and adaptive changes to improve the efficiency and effectiveness of responses. An Emergency Management Lessons Management Committee has been established to review and prioritise recommendations from After Action Reviews (AAR) and implement the findings. This was one of the Audit Office’s recommendations on the review of Biosecurity Risk Management. To date, five lessons have been developed after the review of recent AARs to improve the biosecurity emergency management sector.

NSW DPI developed a nationally accredited training program to build preparedness and capacity to respond to exotic bee pest incursions. NSW DPI worked in partnership with key beekeeping industry bodies and collaborators to develop nationally accredited emergency response training for beekeepers that will greatly increase the number of trained skilled operators available to participate on-ground during future bee pest responses. This is critical to ensuring response capacity to protect Australia’s \$140 million bee product industry and the \$14 billion in pollination services this industry provides to Australia’s agricultural, horticultural and tree nut sectors.

NSW DPI also runs a Vertebrate Pest Management course at least twice a year to provide a broad introduction to pest animal management principles, policy and research for Local Land Services, National Parks and Wildlife Service and Forestry Corporation staff.



NSW DPI has successfully performed an Emergency Animal Disease (EAD) exercise 'Resilience in aquaculture'. The outcomes of the exercise were to practise NSW DPI's response to an EAD event in pond aquaculture in accordance with the 'Aquatic animal disease response and recovery' procedure. The exercise focused on the establishment of a Local Control Centre; sampling of aquatic organisms; destruction, disposal and decontamination of infected animals, ponds, and equipment; and implementation of preparedness, response and recovery within an aquaculture-specific focus, involving different groups within NSW DPI (Aquaculture Management, Aquatic Biosecurity, Fisheries).

Local Land Services

Local Land Services deliver on-ground biosecurity training to landowners, 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, pig and goat eradication, for example, and integrated pest management vertebrate pest control.

Local Land Services also provide informal capacity-building to assist landowners to complete biosecurity plans and activities, required by farmers for trading stock. Farm biosecurity planning workshops are held regionally across NSW to assist landholders with legislation, and industry changes and to improve biosecurity practices.

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. Legislation needs to be responsive and risk-based, harmonise with other jurisdictions and provide protection for industry, community, and the environment from biosecurity threats. The accompanying regulatory system needs to be robust, trustworthy and supportive of growing market access for NSW producers, but at the same time, simple and streamlined so as not to overburden our industries. Since its implementation in 2017, there has been a significant opportunity to assess the impact the *NSW Biosecurity Act 2015* and its supporting instruments have on biosecurity in NSW. Overall, the development and implementation of the Act and its instruments have created a strong and flexible framework that supports biosecurity activities across government, industry, and the community.

A consistent and contemporary legislative framework



Responsive

The Biosecurity Act and the supporting legislation both have stood the test of time with minimal legislative amendments



A consistent and contemporary legislative framework

The *NSW Biosecurity Act 2015* (the Act) provides a framework for the prevention, elimination and minimisation of biosecurity risks posed by biosecurity matter, dealing with biosecurity matter, carriers and potential carriers, and other activities that involve biosecurity matter, carriers, or potential carriers.

Biosecurity Act 2015

The Act has been in operation since 1 July 2017 and has had only minor miscellaneous amendments to align with contemporary national arrangements. The Act is considered a sound and flexible framework that can efficiently respond to biosecurity risks regardless of whether it is an emergency or longer-term management issue. The Act has supported NSW in maintaining its enviable market access and reputation for high-quality, safe, and disease-free food and fibre. The Act is also considered a model piece of legislation and has been drawn upon by other jurisdictions, including South Australia, Victoria, Tasmania, and the ACT.

The concept of a general biosecurity duty was introduced to help underpin the Act's approach to shared responsibility by placing a duty on a person to prevent, eliminate or minimise a biosecurity risk, so far as is reasonably practicable.

Over 2018-21 NSW DPI has developed extensive communication and engagement programs to help support the industry and the community in understanding and meeting this duty. This has included a range of NSW DPI industry and community education material (Primefacts) and Peri-Urban Education in Schools project as part of the Great Peri-Urban Program, in which NSW DPI partnered with *Gardening Australia* to host Costa Georgiadis to live stream biosecurity awareness messages

into schools across NSW. Continuing this work to embed an understanding and awareness of this duty in all industry and community sectors remains a critical area.

The *NSW Biosecurity Act 2015* has removed inconsistencies and duplication, reduced the risk of error and the burden of red tape, and provided cost savings for industry and government through decreased regulatory burden. It has allowed for more industry-based codes of practice, and accreditation and compliance schemes that can be audited by third parties, while retaining government oversight required by domestic and overseas markets.

There are three statutory instruments made under the Act:

- Biosecurity Regulation 2017;
- Biosecurity (National Livestock Identification System) Regulation 2017; and,
- Biosecurity Order (Permitted Activities) 2019.

The **Biosecurity Regulation 2017** covers the whole biosecurity spectrum and specifies actions and mandatory measures that a person is required to take to prevent, eliminate or minimise a specific biosecurity risk. A range of amendments have been made to the Biosecurity Regulation 2017 since it commenced. The amendments deal with minimising the likelihood of biosecurity impacts or risks and improving the effectiveness and efficiency of the Regulation; as well as including additional provisions around biosecurity management plans.

The **Biosecurity (National Livestock Identification System) Regulation 2017** supports the National Livestock Identification System (NLIS), which is Australia's scheme for identifying and tracing livestock and is crucial to protecting and enhancing Australia's reputation as a producer and high-volume exporter of quality meat and meat products. The NLIS also enhances Australia's ability to respond quickly to a major food safety or disease incident using the NLIS database as a critical tracing tool. The NLIS Regulation has only been amended once since commencing to include NLIS for pigs.

The **Biosecurity Order (Permitted Activities) 2019** (the BOPA) permits activities for animal pests and diseases, plant pests and diseases, invasive species, and weeds that are otherwise prohibited by a mandatory measure or by a regulatory measure implemented in relation to a biosecurity zone. A key benefit of the BOPA is that it can easily be amended as required, enabling improved and flexible management of biosecurity risks and threats. There has been a range of changes to the Biosecurity Order (Permitted Activities) 2019 to improve and include additional provisions. For example, in 2020, to manage the risk that cattle ticks and the associated movement of livestock posed, additional provisions were placed in the BOPA regarding the movement of potential cattle tick carriers.

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

- implementing codes of practice and industry standards, for example, in relation to disinfecting equipment;
- vaccinating animals;
- creating weed-free buffer zones; and,
- adhering to stock movement protocols and approved pest management practices.

NSW DPI has also developed an extensive training program that 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 stakeholders. This training has also been made available to industry groups and interested community groups.

Reduced red tape and improved market access



100 days

of administration saved by NSW businesses since digitising certification of plant products



Streamlined interactions

between business and government through a digital beekeeper portal

New

Digitised horse export certification established





Reduced red tape and improved market access

In 2020-21, NSW's primary industries sector Gross Value of Production was \$20.9 billion, with NSW primary industries exports reaching almost \$6.6 billion. This sector requires ongoing biosecurity support, providing for safe and secure food and agricultural products and promoting trade in both national and international markets.

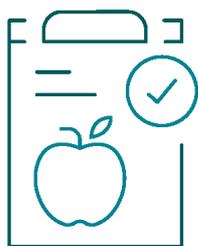
Maintaining a strong agricultural industry is vital to protecting the NSW food industry, which is worth over \$100 billion. The seafood sector alone (including commercial fisheries and aquaculture) was worth an estimated \$202.5 million in 2020-21 and employs more than 4,000 people. The wild harvest commercial fishing component was worth \$109.2 million in 2019-20, while NSW aquaculture production for both freshwater and marine species was valued at \$89.5 million in 2019-20.

In 2020-21, NSW DPI continued to deliver improved market access arrangements for NSW businesses. NSW DPI continued to support the least restrictive domestic trade across Australia by issuing individual and group permits to facilitate domestic trade of a range of plants and plant products, including cut flowers, nursery stock and lupins. These permits include appropriate conditions to continue to protect NSW from significant plant pests while also optimising domestic trade in plants and plant products.

NSW DPI contributed to the national proof of freedom surveillance for white spot syndrome virus (WSSV) over the last two years, with no evidence of WSSV in NSW over these two years. This national program, which was implemented following the detection of the white spot syndrome virus in South East Queensland in December 2016, will soon be finalised and will underpin ongoing access to trade across borders.

Despite the detection of cucumber green mottle mosaic virus in NSW, the melon exports to New Zealand continued. NSW DPI assisted growers seeking export to New Zealand by requiring them to meet Pest Free Place of Production Standards through on-field surveillance and property-specific biosecurity risk management protocols throughout the growing season.

Greater self-management of biosecurity risks by industries, businesses and other stakeholders



Enhanced

self-certification of produce for domestic markets



↓ 1700+

reduced plant health certificates per annum certifying domestic and export products



Greater self-management of biosecurity risks by industries, businesses, and other stakeholders

Voluntary compliance practices and schemes are actively supported as low-impact ways of achieving positive biosecurity outcomes. 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.

In 2020-21, NSW DPI continued to deliver improved market access arrangements for NSW businesses. This included the negotiation of three new certification assurance arrangements and six revised arrangements that allowed NSW businesses to self-certify produce destined for inter-jurisdictional markets. NSW DPI issued 45 area freedom certificates to support both domestic and international trade and negotiated numerous alternative domestic trade arrangements that removed the need for over 1,700 Plant Health Certificates to be issued by authorised officers.

Improved best practice guidelines promoted by the industry, Animal Health Australia and Plant Health Australia continue to contribute to improved biosecurity practices and reduced biosecurity risks. Biosecurity Management plans were adopted into the Biosecurity Regulations in 2019 to provide additional protection against biosecurity risks caused by the unauthorised entry of people and vehicles onto properties, and to allow property owners to assess and develop appropriate risk-mitigation strategies for their property.

Increasing awareness and industry leadership help mitigate the risks to market access if requirements are breached, as do the regulatory framework and associated penalties for breaches under the Act.

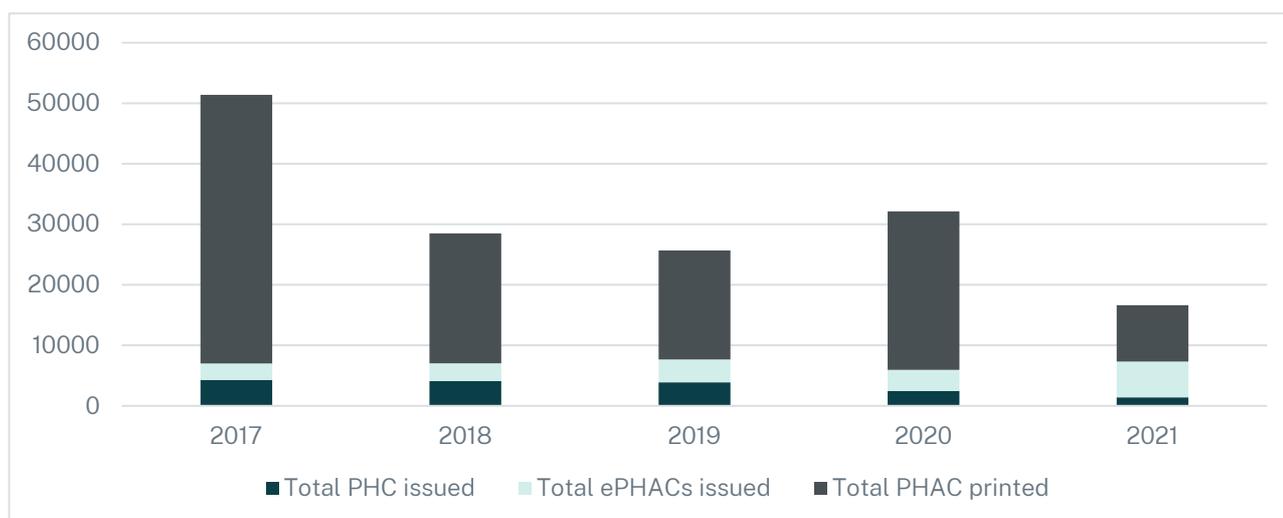
A review of the *NSW Biosecurity Act 2015* and its supporting legislation will be undertaken throughout 2022.

Trade and market access

NSW businesses save 100 days of administration per year now that domestic trade in plant products is simpler than ever. Through innovative process changes, Plant Health Certificate (PHC) and Plant Health Assurance Certificate (PHAC) numbers are down and electronic PHACs numbers are up. NSW DPI has made trade easier through the following:

- Blueberry growers now include all their Biosecurity Certificate details on a delivery docket, saving the issue of almost 10,000 PHACs in 2021 compared with 2020.
- NSW DPI estimates NSW businesses saved at least 30 days in 2021 organising Plant Health Certificates. This has been achieved through the Subcommittee on Domestic Quarantine and Market Access to decrease unjustifiable entry conditions interstate, and increase self-certification using the Interstate Certification Assurance Scheme. The 1,411 Plant Health Certificates issued in 2021 represent 32% of the number issued in 2017.
- Over the same period, thanks to NSW DPI working closely with the Australian Government and other jurisdictions, NSW businesses doubled their use of electronic certification to almost 6,000 consignments in 2021 (estimated to now cover over one-third of all trade from NSW). If electronic completion of certificates saves a business five minutes per consignment, that is over 70 days of savings in administration in 2021.
- Further work by NSW DPI in 2022-23 should see all PHCs issued electronically, and a further increase in the number of ePHACs issued.

Figure 4: Total Biosecurity Certificates issued 2018–21



Source: NSW DPI

Planning for the Future



Goal 5 - Planning for the Future

Outbreaks across biosecurity sectors are continuing to rise in volume and complexity, due to a range of factors including growing levels of trade and travel, urbanisation, climate change and biodiversity loss.



Future trends and unforeseen changes to the economy, environment, and social and political issues can all influence biosecurity, as well as: ⁸

- urbanisation
- growing trade and travel
- antimicrobial resistance
- biodiversity loss
- climate change
- agricultural intensification and land-use changes
- data sharing and system connectivity
- resourcing
- commercialisation of new solutions
- social license of emerging technology
- increasing biosecurity risks from overseas
- COVID-19 pandemic.

How biosecurity in NSW is managed will need to evolve to meet the challenges of the future. Modelling shows that even an almost tripling of investment in interventions out to 2025 will still result in increased residual biosecurity risk compared to 2014-15 levels, suggesting the system requires more transformational change in approaches and responsibilities to generate greater efficiencies and effectiveness.⁹ Maintaining current investment levels will create increased government responsibility and reduce industry resilience and sustainability into the future, requiring weighty industry support packages, and reduced market access through loss of reputation.

While immediately ‘scaling up’ current approaches is the first step; additional actions must be taken to reshape and improve the system so that it will meet the challenges of the future. Scaling up should be focused on elements where returns on investment are highest and will give the most immediate benefit. Of particular focus should be the surveillance, diagnosis and response to biosecurity threats:

- Strengthening and improving current surveillance, diagnostics and response techniques is critical to improving the prediction, detection, and response management of biosecurity risks within NSW. New risk pathways are emerging because of increased and changed cross-border movements as the freight and logistics sector adapts to the COVID-19 pandemic, which has made track and trace operations more challenging.

⁸ Commonwealth Scientific and Industrial Research Organisation (CSIRO), *Australia's Biosecurity Future: Unlocking the Next Decade of Resilience* (Australia's Biosecurity Future Report), (Canberra: CSIRO, 2020); Australian Government

⁹ [National Biosecurity Strategy – Have Your Say](#), Department of Agriculture, Water and the Environment website.

- Faster detections, enhanced analysis, and better risk assessments by adopting emerging techniques and technologies will minimise the spread of pests and diseases and maximise the opportunities for containment and eradication. Returns on investment (ROI) for prevention measures in biosecurity are approximately 1:100, while ROI for containment and protection measures once a pest or disease has become established is approximately 1:5 to 1:10.

However, NSW should have a view of the future by investing in techniques and technologies that can be used to detect threats sooner (such as modelling and prediction technologies) and respond to and contain threats more efficiently. There must be a focus on harnessing the collective knowledge and capability of all stakeholders and working in partnership to further mature the concept of shared responsibility. Finally, there must be an emphasis on building capability, capacity, and the resilience of the NSW system to meet the challenges of the future.

The ability of NSW to scale up investment and reshape and improve the system will ultimately determine how effectively it can respond to emerging priority policy areas, such as:

- **Climate change** – Climate change is a significant emerging risk that will likely cause changes in natural boundaries for weeds, pests and diseases as new conditions modify spread patterns. Climate variability (including extreme weather events), changes in weather patterns and temperature increases can create favourable conditions for some invasive species which are often hardier and more adaptive than native flora and fauna. Increases in air temperatures have resulted 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 have also affected the distribution of native and invasive species in both marine and freshwater environments. Working in partnership with relevant agencies, there should be a focus on continuing to monitor and model climate change to quantify vulnerability, maximise opportunities to combat changes and support adaptation.
- **Traceability** – With increasingly global supply chains and channels to market, it is essential NSW DPI supports industry by ensuring Australia's product conformity systems remain relevant. Trade systems must be developed to enable the rapid digital verification of product credentials and the detection of fraudulent or erroneous claims. Increased focus in this area across the agricultural spectrum will support emergency response activities for disease outbreaks, natural disasters, and food safety recalls, and improve market access and supply chain management.
- **Zoonotic diseases** – Globally, 70% of all emerging diseases are zoonotic. Roughly 71% of these zoonotic diseases are emerging from wildlife, including feral animals. Current systems and processes for animal health, human health, and the environment are singular and individually targeted. In response to global trends in disease emergence and biodiversity loss, consideration should be given to adopting a One Health approach, as suggested by the World Organisation for Animal Health (OIE).
- **Diseases in wildlife** – Wildlife are hosts and reservoirs of diseases that can have devastating effects on trade and market access, including our domestic livestock and aquatic production systems. Modelling estimates that there are 1.7 million undiscovered viruses in mammal and bird hosts in Australia. Many major livestock diseases of concern in Australia involve wildlife as part of their epidemiology, cause, maintenance and spread. While the nature and frequency of interaction between feral animal populations and points of exotic disease incursion into domestic populations are difficult to quantify, the ability of wildlife and feral populations to act as reservoirs for known and emerging diseases, including zoonotic diseases, is well known. These risks are increasing with changing land use, climate change and the bringing of wildlife, livestock, and people into closer contact. There is a critical need to implement an integrated approach across NSW to detect and understand emerging diseases in livestock, wildlife, and human health.

- **Population growth** – Australia’s population and migration have been steadily increasing for many years. By 2031, it is anticipated around 9.2 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, the focus should be given to improving public understanding of biosecurity and the risk factors posed by urbanisation and the movement of people into agricultural and natural land. Recent social research undertaken by NSW DPI will assist in tailoring practical, informative and targeted engagement material for industry and community stakeholders.



Unlocking Australia's biosecurity future

Key research shaping the future direction of biosecurity in Australia is detailed in the report *Australia's Biosecurity Future – Unlocking the Next Decade of Resilience*. This Report has been delivered by the CSIRO in conjunction with its project partners and builds on an earlier 2014 publication by describing an ideal 2030 future state and identifying actions that should be taken to get there.

This Report highlights that scaling current approaches will not be enough to mitigate the growing biosecurity risks and that while investments are being made towards some of these challenges, more needs to be done.

The Report suggests that the system requires more transformational change in approaches and responsibilities to generate greater efficiencies and effectiveness.¹⁰ It recommends that to pursue this transformational trajectory, cross-disciplinary action and investment needs to occur in the following key areas:

- system connectivity – digitising processes, enhancing partnerships and greater data sharing,
- shared responsibility – harnessing the collective knowledge and capability of all stakeholders, and
- innovation in science and technology – creating national innovation platforms for developing and commercialising next-generation technologies and services.



Commonwealth Biosecurity 2030

Biosecurity is critical to supporting the health of Australians, their environment, and the competitiveness of key industries through biosecure trade networks. Australia is considered to have one of the strongest biosecurity systems across the globe. However, a range of factors including growing levels of trade and travel, urbanisation, climate change, and biodiversity loss are resulting in outbreaks across human, agriculture, environment, and marine health, which continue to rise in volume and complexity.

To ensure that our biosecurity system continues to protect our interests and way of life, the Australian Government has developed a strategic roadmap through to 2030, the Commonwealth Biosecurity 2030.¹¹

This roadmap sets out an overarching goal to protect Australia from current and future biosecurity risks, as detailed below:

A risk-based biosecurity system that effectively, efficiently and sustainably protects Australia's health, economic, environmental, and national security interests against the threats of today and tomorrow, consistent with the Appropriate Level of Protection.

Further details are available at www.awe.gov.au.

¹⁰ Commonwealth Scientific and Industrial Research Organisation (CSIRO), *Australia's Biosecurity Future: Unlocking the Next Decade of Resilience* (Australia's Biosecurity Future Report), (Canberra: CSIRO, 2020).

¹¹ Australian Government, *Commonwealth Biosecurity 2030*, (Canberra: Department of Agriculture, Water and the Environment, 2021).



National Biosecurity Strategy

Australia's biosecurity depends on a wide range of stakeholders, all with specific roles to play, working collaboratively and proactively towards a common goal. That collaboration is essential to harnessing everyone's strengths and capabilities, to shape and deliver a national biosecurity strategy.¹² Biosecurity risk cannot be totally mitigated at our border. Responding to emerging biosecurity threats will require a strong and resilient national system.

The National Biosecurity Strategy is a key deliverable of Commonwealth Biosecurity 2030. The National Biosecurity Strategy will align current and future efforts of key stakeholders across the system with a common purpose, enhancing the long-held commitment to shared responsibility with a clear and transparent commitment to action and investment.

Further details are available at www.awe.gov.au.

¹² Australian Government, '[National Biosecurity Strategy](#)', Biosecurity website.

Appendices



Appendix 1: Top five behaviours nominated by primary producers to improve biosecurity in NSW

NSW primary producers 2017	NSW primary producers 2021	2020 farm Biosecurity Survey (Australian primary producers) ¹³
<ol style="list-style-type: none"> 1. Take steps to eradicate known diseases, weeds, or pests. 2. Regularly monitor plants and/or livestock for disease, weeds, or pests. 3. Investigate and/or report any instances or sightings of an unusual disease, weeds, or pests. 4. Ensure feed/grain/plant matter is stored in an optimal environment. 5. Routinely consult with experts. 	<ol style="list-style-type: none"> 1. Take steps to eradicate known diseases, weeds, or pests. 2. Regularly monitor plants and/or livestock for disease, weeds, or pests. 3. Use all chemicals in accordance with Australian Pesticides and Veterinary Medicines Authority or manufacturer guidelines. 4. Ensure feed is stored in an optimal environment. 5. Recording movement of livestock (eg: NLIS/PigPass). 	<ol style="list-style-type: none"> 1. Control weeds. 2. Control visitor movement on the property. 3. Restrict access to the property. 4. Control cropping pests and diseases. 5. Control livestock pests and diseases.

¹³ KG2 (Animal Health Australia and Plant Health Australia), 2020 Farm Biosecurity Producer Survey Research Report

Appendix 2a: Comparison of findings from Biosecurity Attitudinal Surveys conducted in 2020-21

Issue	NSW general population 2021	NSW primary producers 2021	2020 Farm Biosecurity Survey (Australian primary producers) ¹⁴	Australian Government survey of primary producers 2016 (no comparison available)
Understand biosecurity as a term (%)	59 (up 9% since 2017)	81 (as reported in 2017)	60 (as reported in 2017)	78 (as reported in 2016)
Biosecurity is regarded as important (%)	55 (up 7% since 2017)	82 (equal to 2017)	N/A	88 (as reported in 2016)
Define biosecurity as controlling pests and weeds (%)	14 (up 1% since 2017)	83 (up 37% since 2017)	57 (up 1% since 2017)	53 (as reported in 2016)
Define biosecurity as controlling diseases (%)	25 (up 4% since 2017)	49 (as reported in 2017)	57 (up 1% since 2017)	60 (as reported in 2016)
Top five behaviours	<ol style="list-style-type: none"> 1. Keep garden weeds under control to stop the spread. 2. Be vigilant about meeting all quarantine requirements at the airport. 3. Ensures all fruit is picked/not left to rot. 4. Use bait purchased from fishing store/dedicated bait supplier. 5. Have animals checked by the vet regularly. 	<ol style="list-style-type: none"> 1. Take steps to eradicate known diseases, weeds or pests. 2. Regularly monitor plants and/or livestock for disease, weeds or pests. 3. Use all chemicals in accordance with APVMA or manufacturer guidelines. 4. Ensure feed is stored in an optimal environment. 5. Recording movement of livestock (eg: NLIS/PigPass). 	<ol style="list-style-type: none"> 1. Control weeds. 2. Control visitor movement on the property. 3. Restrict access to the property. 4. Control cropping pests and diseases. 5. Control livestock pests and diseases. 	<ol style="list-style-type: none"> 1. Monitor crops. 2. Monitor livestock. 3. Consult experts. 4. Control livestock pests and diseases. 5. Spraying.
Individuals are responsible for biosecurity (%)	59 (up 6% since 2017)	80 (down 1% since 2017)	N/A	N/A

¹⁴ KG2 (Animal Health Australia and Plant Health Australia), 2020 Farm Biosecurity Producer Survey Research Report

Issue	NSW general population 2021	NSW primary producers 2021	2020 Farm Biosecurity Survey (Australian primary producers) ¹⁵	Australian Government survey of primary producers 2016 (no comparison available)
Government, industry and community responsible for biosecurity (%)	70 (up 6% since 2017)	75 (up 23% since 2017)	N/A	92 (as reported in 2016)
Believe they have sufficient knowledge to respond to biosecurity issues (%)	60 (up 9% since 2017)	66 (no change since 2017)	N/A	N/A

¹⁵ KG2 (Animal Health Australia and Plant Health Australia), *2020 Farm Biosecurity Producer Survey Research Report*

Appendix 2b: Comparison of findings from Biosecurity Attitudinal surveys conducted in 2021

Issue	NSW general population 2021	NSW primary producers 2021	2020 Farm Biosecurity Survey (Australian primary producers)	Australian Government survey of primary producers 2016
Have a biosecurity Farm Plan (%)	N/A	67 (up 20% since 2017)	-	38 (as reported in 2016)
Drivers of biosecurity importance in the priority	<ol style="list-style-type: none"> 1. Agricultural industry. 2. Protection of native flora and fauna. 3. Environmental protection. 4. Protection of marine life and waterways. 5. Food and safety. 	<ol style="list-style-type: none"> 1. Preventing the introduction of diseases, pests and weeds. 2. Business sustainability. 3. Controlling or managing the spread of diseases, pests and weeds through plants, livestock, and waterways. 4. Animal welfare. 5. Maximising quality and prices. 	<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, and weeds. 2. Protection of industry. 3. Protection of livelihood. 4. Continue to maximise/improve market access. 5. Continue to improve/maximise production/yield.
Biosecurity strategies to prioritise	<p>(2017 results)</p> <ol style="list-style-type: none"> 1. Increased biosecurity surveillance at international borders. 2. Increased focus at the state government level. 3. Increased focus at the federal government level. 4. Increased focus on the primary industry. 5. Increased awareness/understanding among the general population as to biosecurity issues/risks. 	<ol style="list-style-type: none"> 1. Increased biosecurity surveillance at international borders. 2. Increased awareness/understanding of biosecurity among hobby farmers. 3. Increased government support to primary industry in managing biosecurity. 4. Increased focus on reducing contamination or pollution of waterways and oceans. 5. Increased focus on sharing biosecurity issues between industry groups. 	N/A	N/A

Appendix 3: Emergency exercises conducted 2018-21

Year	Exercise	Species\pathogen\ diseases	Issues addressed
2017-18	Border Bridge	Plant and animal pest/disease	Joint NSW and Qld exercise to assess how both jurisdictions would respond to a biosecurity incident. Scenarios were based on a pest and disease incursion affecting livestock and a threat to plant production industries. The focus of the exercise was to use legislation, IT systems and existing arrangements to respond to a biosecurity incident.
2018-19	Orange Juice	Exotic plant disease, citrus canker	This exercise was designed to review and evaluate NSW's preparedness, emergency response plans and response capacity to the detection of the exotic plant disease citrus canker.
2019-20	Blueprint	Exotic plant disease, cotton blue	A cotton industry exercise initiated by industry and facilitated by Plant Health Australia, based on the detection of exotic cotton blue disease. Planning assistance was provided by the Qld and NSW state governments. The focus was on the roles and responsibilities of the cotton industry in a biosecurity emergency response.
2019-20	Sour Grapes	Endemic plant pest, grapevine phylloxera	NSW DPI, NSW DPI Viticulture, NSW Wine and Vinehealth Australia hosted the exercise with over 60 people in attendance. The focus of the exercise was on the repercussions of a possible phylloxera incursion in the Orange Wine Growing region, which is currently a phylloxera free zone.
2019-20	This Little Piggy Went to Market	Exotic animal disease, African swine fever	Tracing/learning exercise in pig tracing, as part of African swine fever or any other emergency disease preparedness that involves pigs. It involved an assessment of the ability to test pig tracing reports across NSW.
2019-20	Waratah	Exotic animal disease, African swine fever	A three-day session with the Department for Environment, Food and Rural Affairs (DEFRA) in the UK to practise undertaking rapid risk assessments in response to African swine fever.
2020-21	Razorback Destruction workshops	Exotic animal disease, African swine fever	Explored issues around the destruction of pigs in African swine fever outbreak, leading to the development of a plan to destroy pigs on a large piggery. The final workshop will involve discussion on how to progress the best methodologies.
2020-21	Argonaut	Exotic animal disease, foot and mouth disease	Discussion exercise to explore challenges to the management of wool post-farm gate in an emergency animal disease outbreak using a foot and mouth disease scenario.
2020-21	Silk Purse	Exotic animal disease, African swine fever	Evaluation of new guidance on the valuation of pigs in an emergency animal disease.
2020-21	Piggyback	Exotic animal disease, African swine fever	State Emergency Management Committee level exercise of support for African swine fever response.

Year	Exercise	Species\pathogen\ diseases	Issues addressed
2020-21	Regina	Aquatic pests and disease	Assessment of biosecurity preparedness in NSW aquaculture industries, and response capabilities of NSW DPI for notifiable aquatic pest and disease outbreaks. The exercise enabled NSW DPI to practise essential planning skills and field operations in an incident response exercise.
2020-21	Scelus	Marine biofouling	NSW DPI participated in a recent cross-jurisdictional exercise led by the Commonwealth that tested response capabilities relating to international arriving vessels with marine invasive species present within biofouling communities on the hull/niche areas. This exercise will support ongoing discussion across Australia on how best to approach the management of biofouling on international vessel arrivals that travel around the jurisdictions, with a view to harmonised, consistent policy approaches to supporting the global industry to understand the Australian biosecurity obligations.
2020-21	Razorback Movement workshops	Exotic animal disease, African swine fever	Workshops and out-of-session work to explore issues around the implementation of declared areas and movement of pigs and semen in a simulated African swine fever outbreak.
2021-22	Popsicle	Exotic animal disease, lumpy skin disease	Desktop exercise with the objective for NSW DPI to stand up an Incident Management Team structure as per the Australasian Inter-service Incident Management System and identify appropriate data capture within two hours of notification of an animal biosecurity response.
2021-22	Bertie Beetle	Exotic plant pest, khapra beetle	Exercise to consolidate preparedness and reporting of suspect invasive exotic beetles such as khapra beetle and to test the capability and capacity of Local Land Services in plant pest emergency responses.
2021-22	Rice	Test Local Control Centre	To test the set-up and operation of NSW DPI Yanco Local Control Centre.
2021-22	Razorback Transition to management workshops	Exotic animal disease, African swine fever	The ability of the Consultative Committee on Emergency Animal Diseases and the National Management Group to explore the application of (the then) new transition to management clauses in the emergency animal disease response agreement (EADRA) using an African swine fever scenario.
2021-22	Seek and Find	Emergency animal diseases (EAD)	Enhance the capacity and capability of NSW DPI and Local Land Services to stand up effective and timely tracing in an EAD response.
2021-22	Gammalite	Endemic animal disease, equine influenza	A two-day virtual workshop with the national horse industry and jurisdictional representatives to discuss the role of the former in a national response to a significant horse disease, such as equine influenza.

Appendix 4: Invasive species metrics – non-indigenous terrestrial vertebrates (2018-21)

	Number	Description
Non-indigenous vertebrate animals naturalised in NSW	45	<i>Rattus rattus</i> (brown rat) <i>Axis axis</i> (chital deer) <i>Canis familiaris</i> (dingo/feral dog) <i>Lepus capensis</i> (European brown hare) <i>Oryctolagus cuniculus</i> (European rabbit) <i>Vulpes vulpes</i> (European red fox) <i>Dama dama</i> (fallow deer) <i>Camelus dromedarius</i> (feral camel) <i>Felis catus</i> (feral cat) <i>Bos taurus</i> (feral cattle) <i>Equus asinus</i> (feral donkey) <i>Capra hircus</i> (feral goat) <i>Equus caballus</i> (feral horse) <i>Sus scrofa</i> (feral pig) <i>Ovis aries</i> (feral sheep) <i>Axis porcinus</i> (hog deer) <i>Mus musculus</i> (house mouse) <i>Cervus elaphus</i> (red deer) <i>Cervus timorensis</i> (rusa deer) <i>Cervus unicolor</i> (sambar deer) <i>Streptopelia (Spilopelia) roseogrisea</i> (barbary dove) <i>Ardea (Bubulcus) ibis</i> (cattle egret) <i>Turdus merula</i> (common blackbird) <i>Carduelis carduelis</i> (European goldfinch) <i>Sturnus vulgaris</i> (European starling) <i>Chloris chloris</i> (European greenfinch) <i>Passer domesticus</i> (house sparrow) <i>Acridotheres tristis</i> (Indian myna) <i>Psittacula krameri</i> (Indian ringnecked parrot) <i>Anas platyrhynchos</i> (mallard) <i>Lonchura punctulata</i> (nutmeg mannikin) <i>Struthio camelus</i> (ostrich) <i>Pavo cristatus</i> (peafowl) <i>Pycnonotus jocosus</i> (red whiskered bulbul) <i>Columba livia</i> (rock dove/domestic pigeon) <i>Alauda arvensis</i> (skylark) <i>Streptopelia (Spilopelia) chinensis</i> (spotted turtle dove) <i>Passer montanus</i> (tree sparrow) <i>Gallus gallus</i> (red junglefowl) <i>Turdus philomelos</i> (song thrush) <i>Hemidactylus frenatus</i> (Asian house gecko) <i>Trachemys scripta elegans</i> (red-eared slider turtle) <i>Hemidactylus garnotii</i> (Indo-Pacific gecko) <i>Rhinella marina</i> (cane toad)

	Number	Description
New NIA reported in the open environment over the last five years	5 (64% down from 2016-17)	<ol style="list-style-type: none"> 1. Panther chameleon 2. Indo-Pacific gecko 3. Raccoon 4. Hermann's tortoise 5. Golden flying snake
NIA species eradicated in the last five years	7 (40% up from 2016-17)	<ol style="list-style-type: none"> 1. Raccoon 2. Panther chameleon 3. Hermann's tortoise 4. Golden flying snake
In part of NSW, at Lord Howe Island: Black rat, House mouse, and Canada geese.		
Species under eradication programs	8 (100% up from 2016-17)	<ol style="list-style-type: none"> 1. Panther chameleon 2. Hermann's tortoise 3. Golden flying snake 4. Raccoon
In part of NSW, at Lord Howe Island: Black rat, House mouse, and Canada geese; and Cane toad in the NSW Biosecurity Zone.		
NIA species being managed to reduce environmental impact	13 (no changes)	<ol style="list-style-type: none"> 1. Cane toad 2. Fox 3. Rabbit 4. Feral pig 5. Feral deer (six species) 6. Red-eared slider turtle 7. Feral goat.
In part of NSW, at Lord Howe Island: Canada geese.		
NIA species being managed to reduce the agricultural impact	11 (120% up from 2016-17)	<ol style="list-style-type: none"> 1. Wild dog 2. Fox 3. Feral pig 4. Rabbits 5. Deer (six species).
In part of NSW, at Lord Howe Island: Canada geese.		

Appendix 5: Invasive species metrics – plants 2018-21

Invasive species: plants (weeds)	Number	Description
Non-endemic plant species recorded in NSW	1,961 (12% up from 2016-17)	Based on specimens lodged with the National Herbarium of NSW. Data Source: PlantNET.
State Priority Weeds in NSW	84	From Biosecurity Information System (BIS) database – State Priority. This has increased by one species between 1 July 2021 and the publication of this report.
New exotic species detected in the wild over the last five years	84	Detection over four years. Average of 21 per year, with only six detected in 2016-17.
Species eradicated in the last four years	0	Nil for the last four years. State Priority weeds are under eradication and seedbanks are being reduced.
Species under eradication programs	8 (167% up from 2016-17)	Prohibited matter only
Species with a defined containment zone	3	
Species where the containment zone has decreased in the last five years	0	No change to regulations for zones
Species where the containment zone has increased in the last five years	0	No change to regulations for zones
Species for which risk assessments have been undertaken	509 (61% up from 2016-17)	Data sourced from Weeds Information Database
Species being managed to reduce environmental impacts	350 (11% up from 2016-17)	Sourced from WeedWise
Species being managed to reduce agriculture	350 (11% up from 2016-17)	Sourced from WeedWise
Regional Weed Management plans in place	11	No change
Policies and procedures completed	3	Weed Action Program Guide; BIS Guide; MOU with LLS

Invasive species: plants (weeds)	Number	Description
Weeds inspections on properties	242,433	From the BIS database for four years (average 60,608 per year). Note that 2016-17 data was incomplete, as the BIS (Weeds) was in development.
Notifiable reports	130	Over four years (32.5 per year). Note that the <i>Noxious Weeds Act 1993</i> operated to 30 June 2017, before it was replaced by the <i>NSW Biosecurity Act 2015</i> which came into force 1 July 2017.
Compliance activities	5,013	From BIS average of 1,253 per year. Note that 2016-17 data was incomplete, as the BIS (Weeds) was in development.
Training and capability improvement activity	9,662	From BIS average of 2,415 per year. Note that 2016-17 data was incomplete, as the BIS (Weeds) was in development.

Appendix 6: Top 10 priority focus of surveillance and response activities for NSW biosecurity threats

	Animal	Aquatic	Plant	Invasive plants and animals
1	Foot and mouth disease	Abalone viral ganglioneuritis	Exotic fruit flies, including Mediterranean fruit fly and spotted wing Drosophila	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>)	<i>Xylella fastidiosa</i> and confirmed and unconfirmed vectors	Hawkweeds (prohibited matter – active eradication of all infestations)
4	African swine fever	Pacific oyster mortality syndrome	Internal and external mites of bees	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	Citrus canker	Wild dogs (pest control order in place)
9	Lumpy skin disease	Redfin perch	Brown-marmorated stink bug	Foxes (pest control order in place)
10	African horse sickness	European fan worm	Exotic gypsy moth	Feral pigs (pest control order in place)

Appendix 7: Prevention and preparedness activities 2018-21

Element	Activities	Service provision
Policy and legislation	<p>Traceability – NLIS Working Group/committee, compliance implementation.</p> <p>Destruction and movements policies and procedures. Salmonella enteritidis (SE) management – NSW SE Control Order; abalone control order; translocation protocols for aquatics.</p> <p>Enhancing AUSVETPLAN documents: avian influenza; foot and mouth disease; bluetongue; Australian bat lyssavirus.</p> <p>Implement legislation in harmony with other jurisdictions in response to emerging plant, animal pest/pathogen threats.</p> <p>Snowy 2.0 Main Works for biosecurity risk management.</p>	<p>NSW DPI continues to develop measures to prevent the entry of high-risk pathogens into NSW from other Australian jurisdictions and facilitates research and trade while maintaining protection for the NSW environment, industries and community.</p> <p>Better livestock traceability in case of disease outbreaks; proof of freedom for market access through tracing.</p>

Element	Activities	Service provision
Education	<p>African swine fever (ASF) social media campaign; workshops and eLearning modules; pig biosecurity planning project; ASF and swill feeding resources.</p> <p>Collaborative abattoir and knackery biosecurity planning and material development addressing baseline biosecurity activities; emergency animal disease preparedness and complementing existing food safety and animal welfare controls.</p> <p>Government veterinary service workforce capability project.</p> <p>Traceability – NLIS e-learning for NSW DPI/LLS.</p> <p>Reporting non-indigenous species campaign.</p> <p>Emergency response training.</p> <p>Peri-urban utility provider biosecurity industry and community education material (Primefacts) and engagement. NSW National Bee Biosecurity Program delivery.</p> <p>NSW blueberry, coffee, rice, melon and grains industry biosecurity preparedness project (production of materials and resources).</p> <p>Exotic bee and invasive ant identification resources (brochures and web content).</p> <p>Targeted industry engagement – viticulture biosecurity officer program; AgSkills training for viticulture; induction videos. Berry industry preparedness project (production of materials and resources and general biosecurity management); pest management (serpentine leaf miner) through engagement and collaboration.</p> <p>Industry Liaison Officer Training (for emergency response coordination – a collaboration with PHA and NSW DPI Emergency Management).</p> <p>Over 3,600 activities supported a skilled, qualified workforce and trained stakeholder groups and volunteers.</p> <p>Over one million viewers access weeds information annually through the NSW Weedwise smartphone and web apps.</p>	<p>Raises awareness and supports early detection and response to diseases of interest, as well as demonstrating freedom of disease for trade.</p> <p>Supports national collaboration and engagement in biosecurity surveillance goals and activities.</p>

Element	Activities	Service provision
Market access	<p>Export property of origin certification.</p> <p>Collection, validation, and provision of National Animal Health Data System (NAHIP) data.</p> <p>NSW Phylloxera Surveillance Strategy.</p>	<p>Improved liaison with industry about the importance of ongoing surveillance for diseases, such as phylloxera, to maintain area freedom claims across the NSW Phylloxera Exclusion Zone area.</p> <p>To support domestic and international market access and Australia's World Organisation for Animal Health reporting obligations.</p>
Surveillance	<p>Collection, validation, and provision of National Animal Health Data System (NAHIP) data and other surveillance information and documents.</p> <p>Aligned terrestrial and aquatic biosecurity with national surveillance detection.</p> <p>Chemical residues in livestock detection, investigation, and management (eg: lead, chemical residues).</p> <p>Participation in the National White Spot Syndrome Virus surveillance program since 2018. NSW remains free from WSSV, despite disease presence in Queensland.</p> <p>American foulbrood Minimisation Strategy NSW National Bee Pest Surveillance Program Sugar Shake Month (varroa mite surveillance).</p> <p>Area Wide Management of vegetable diseases (viruses and bacteria).</p> <p>Active surveillance program to determine the status of pests, diseases and weeds in the environment program; national arbovirus monitoring program; E. Canis surveillance; POMS surveillance to underpin oyster translocation from Tasmania; One Health – Australian bat lyssavirus surveillance; Hendra surveillance; nodavirus surveillance work.</p>	<p>Early warning system to detect new incursions of exotic bee pests and diseases. Involves a range of surveillance methods conducted at sea and airports throughout Australia that are considered to be the most likely entry points for bee pests and pest bees.</p> <p>Surveillance for key viruses and bacterial pests of vegetables to catalogue existing endemic populations; develop new diagnostic and disease management strategies; ongoing engagement with NSW vegetable industry.</p> <p>Reduced impact of American foulbrood on the NSW beekeeping industry and plant industries that benefit from pollination.</p>
Compliance	<p>Traceability activities including industry engagement with the Integrity Systems Company, and related Livestock Production Assurance program; engagement with/monitoring of red meat supply chain participants' NLIS compliance; specialised sale yard compliance reporting; monitoring and reporting of NLIS in NSW and initiating investigations and audits in circumstances of non-compliance.</p> <p>Attended zone compliance meetings to raise awareness of Fisheries Officers of the top biosecurity issues in their local area.</p>	<p>Ensures relevant government agencies can monitor and support the industry to comply with Transported Stock Statement (TSS) and NLIS movement document requirements, resulting in optimal traceability for this livestock.</p>

Element	Activities	Service provision
Emergency	<p>Risk assessment on high priority pests/diseases.</p> <p>2019-21 Aquatic Biosecurity Capital Works Preparedness Project funding endorsed for NSW DPI Aquatic Biosecurity.</p> <p>NSW DPI contributed to the development of the Aquatic Deed in collaboration with other jurisdictions.</p> <p>Multiple exercises such as Bee Prepared; Orange Juice; Blueprint; Sour Grapes; Bertie Beetle; Scelus.</p> <p>Operation Pepper Pig; Piggyback; Razorback; This Little Piggy Goes to Market; Border bridge; Argonaut.</p>	<p>Preparation for and participation in a training exercise in the tracing of pigs ensures greater confidence in government, industry and the community that pigs can be traced effectively when necessary, such as in a disease outbreak.</p> <p>Biosecurity training and simulation exercises involving key actors (NSW DPI, LLS and Police, Transport NSW, EPA) enhance engagement and capability to act in the event of an incursion.</p>

Appendix 8: NSW biosecurity eradication and control activities 2018-21

Element	Activities	Service provision
Compliance	<p>During Abalone viral ganglioneuritis (AVG) response, 82 Individual Biosecurity Directions were issued to infected premises.</p> <p>During the 2020 QX disease response, a General Biosecurity Direction was issued, stopping all movements of oysters from Port Stephens estuary.</p>	<p>The successful eradication of AVG from Sydney live-holding facilities to protect NSW wild abalone populations and the associated NSW abalone industry. To manage the potential risk of impacts of AVG on NSW wild abalone, an AVG control order (no. 4) was issued, which is valid from 7 December 2021 for two years.</p> <p>Prevention of QX disease spread to low-risk classified estuaries in NSW. Biosecurity QX disease control order came into effect on 22 October 2021 and is valid for two years.</p>
Surveillance	<p>Evidence of absence surveillance for lupin anthracnose (the final year 2018, following eradication program 2016-18), and 2021 to support the claim of freedom.</p> <p>Nodavirus surveillance in the upper reaches of six coastal estuarine systems, to better understand the extent of nodavirus in the wild (2021).</p> <p><i>Salmonella enteritidis</i> (SE):</p> <ul style="list-style-type: none"> development of a Control Order plain English guide for producers regular Industry meetings for ongoing SE management ongoing work to resolve infected properties. <p>Over 72,000 surveillance inspections were conducted to monitor the eradication and containment of weeds, such as hawkweed and tropical soda apple.</p>	<p>The successful eradication of lupin anthracnose from NSW was declared on 28 June 2019 following a successful eradication program and three years of surveillance after the initial detection.</p> <p>Increased understanding of the prevalence and spread of nodavirus to inform policy and disease management considerations.</p> <p>Ongoing SE management is reducing the risk of SE originating from egg production facilities in NSW, giving consumers confidence in these products. The SE Control Order also enhances the biosecurity of all licenced egg facilities, providing additional disease prevention benefits beyond <i>Salmonella enteritidis</i>.</p> <p>Weed surveillance activities allow for the timely detection of new weeds and rapid responses to eradicate or contain them.</p>
Policy and legislation	<p>Management of endemic diseases using the <i>NSW Biosecurity Act 2015</i> to protect industries: virulent footrot of sheep and goats, anthrax.</p> <p>Changes in the Control Order for AVG to manage different levels of risk, both before, during and following the 2021 AVG response.</p> <p>NSW Footrot Steering Committee.</p>	<p>Ensuring management of these endemic diseases keeps them at very low levels to reduce the impact on NSW producers.</p> <p>Re-established NSW Footrot Steering Committee in preparation for a strategic review of the NSW footrot program to ensure it is relevant and meeting the needs of the sheep industry.</p>

Element	Activities	Service provision
Education	<p>In 2021 AVG response advisory materials for abalone wholesalers, processors, and retailers (including materials for distribution to the public).</p> <p>Updated anthrax suite of industry and community education material (Primefacts).</p>	<p>Ensuring up-to-date and relevant information is available for the management of anthrax in NSW.</p>
Emergency	<p>2021 detection, response and eradication of AVG in abalone live holding tanks around the Sydney area. Total of 278 premises inspected, 30 IPS – all resolved; 20 DCPS – all cleared.</p> <p>Confirmation and eradication of megalocytivirus (ISKNV-like virus) in ornamental fish.</p> <p>Nodavirus detected and eradicated in commercial aquaculture facility at Port Stephens 2018.</p> <p>QX disease in oysters was reconfirmed in the Macleay River in 2020 and controls remain in place to restrict its spread to low-risk estuaries.</p> <p>Marine pest <i>Perna canaliculus</i> detected on ANL 'Emora'</p> <p>Khapra beetle; fire and flood; Highly pathogenic Avian Influenza; COVID-19 responses.</p>	<p>Protection of NSW wild abalone stocks, with benefits to abalone industry, recreational and cultural fishers, and access by community to fresh local seafood.</p> <p>Eradication of exotic aquatic diseases and pests.</p>
Market access	<p>Proper cleaning and decontamination of affected abalone live holding premises during the AVG emergency response, preventing the spread of wild stocks and ongoing losses on restocking live holdings.</p>	<p>Protection of NSW freshwater fish through eliminating disease risk in the bass stocking. Containment of QX disease from the known affected area to other medium and low-risk estuaries within NSW.</p>

Appendix 9: Asset-based protection activities 2018-21

Element	Activities	Service provision
Compliance	Over 46,000 effective and targeted control activities to reduce the impacts of widespread weeds.	These activities reduced the impact of widespread weeds on priority agricultural and environmental assets, prioritising programs where benefits are greatest and where weeds have the greatest impact on primary industries, the environment, human health or infrastructure.
Surveillance	<p>Fall armyworm (FAW) early detection and diagnostic support 2020-21.</p> <p>Trapping for endemic pests.</p> <p>Trapping for exotic pests.</p>	A network of more than 70 pheromone traps set up across the State by NSW DPI in collaboration with LLS and industry was first to detect the arrival of FAW in NSW in September 2020 and its subsequent spread to new regions of the State. More than 2,100 positive identifications were shared with industry every week. Detections were supported by 22 COVID-safe, face-to-face events, including information sessions, identification workshops, and control and resistance management workshops held across the State between October and December 2021.
Policy and legislation	Biosecurity zones and control orders.	<p>Monitoring data to enable pest-free places of production.</p> <p>Monitoring data to enable Area Freedom and underpin trade arrangements.</p> <p>Development and maintenance of regulatory controls to prevent the introduction of pests into areas free from such pests.</p>
Education	Education programs across multiple plants and animal industries, and landholders for managing weeds.	Prevention based activities, such as 'Come clean, go clean'.
Emergency	Facilities at Orange and Grafton mass-reared and released over 100,000 biocontrol insects into infestations across NSW, and mass-rearing facilities at Lightning Ridge were seed-funded.	Biocontrols for weed management to lower the impact on agricultural industries.
Market access	Certification assurance arrangements for plants and plant products.	Development of new arrangements and improving existing arrangements in consultation with other jurisdictions and industry to allow business continuity while protecting NSW.

