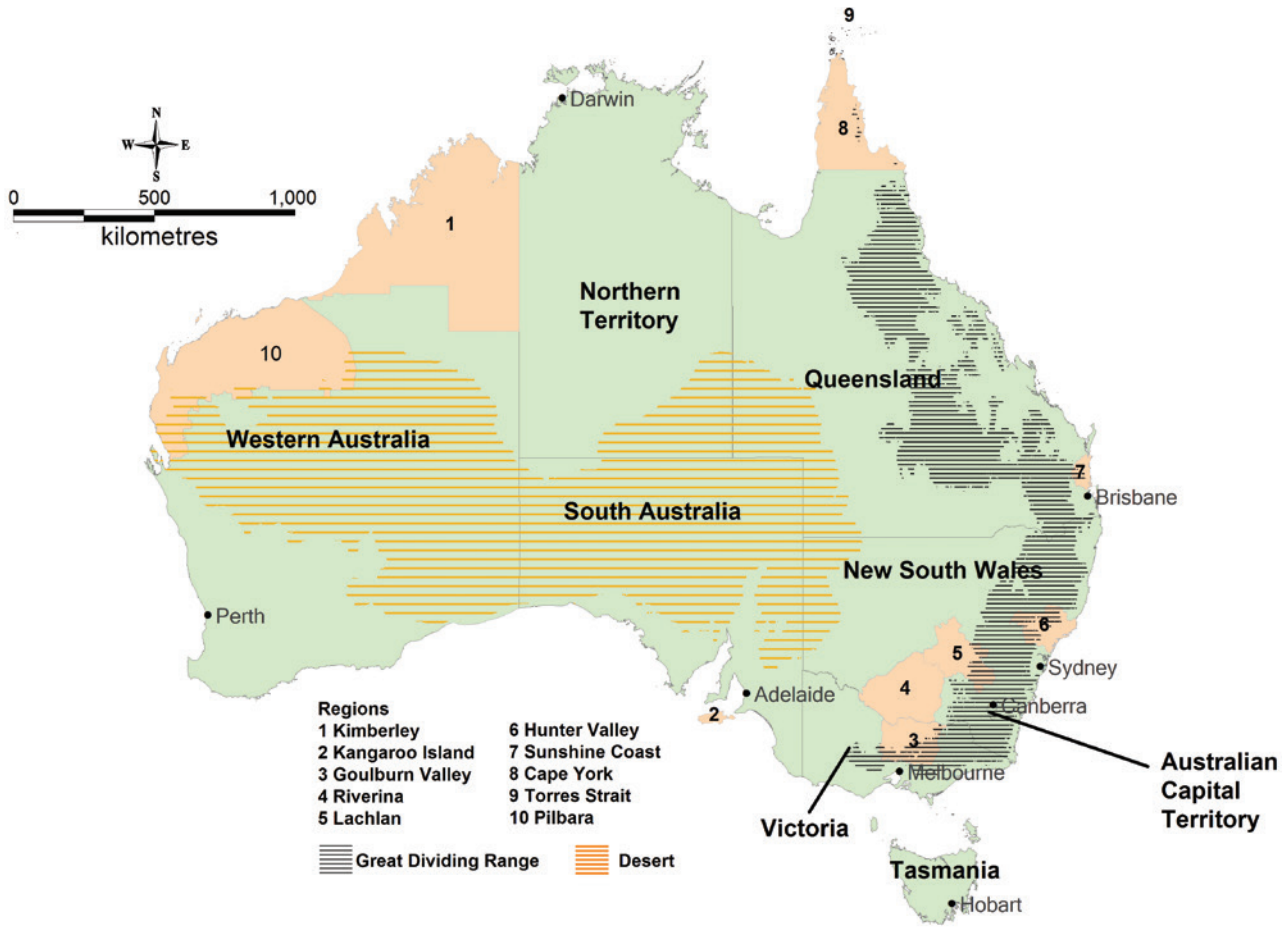
ANIMAL HEALTH IN AUSTRALIA 2015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Feedback

Comments and suggestions regarding the *Animal Health in Australia 2015* report are welcomed. Please forward all correspondence to the Communications and Partnerships Manager, Animal Health Australia, via email at aha@animalhealthaustralia.com.au.

FOREWORD

This 19th volume in the *Animal Health in Australia* series of annual reports presents a comprehensive summary of Australia's animal health status and system. It includes insights into new initiatives during 2015, ongoing programs, and nationally significant terrestrial and aquatic animal diseases.

A number of key national developments in 2015 will position Australia to better manage future biosecurity challenges. These developments include progress in updating Commonwealth legislation, the release of the Australian Government's White Paper on Developing Northern Australia and the Agricultural Competitiveness White Paper, the opening of Australia's new post-entry quarantine (PEQ) station, Australia's World Organisation for Animal Health (OIE) Performance of Veterinary Services (PVS) evaluation and the release of the first National Antimicrobial Resistance Strategy.

The Commonwealth Biosecurity Bill 2014 and supporting legislation received royal assent from Australia's Governor-General on 16 June 2015 and became the *Biosecurity Act 2015*. The new legislation will come into effect on 16 June 2016. Replacing the *Quarantine Act 1908*, the *Biosecurity Act 2015* represents a comprehensive modernisation of Australian biosecurity legislation. It has been designed to be flexible, and responsive to changes in technology and future challenges. The development of a modern and responsive legislative framework and improved underpinning processes will result in a more robust biosecurity system that supports Australia's farmers, economy and broader community. Delegated legislation, and supporting policies and procedures are being developed to facilitate a smooth transition to the new regulatory arrangements.

The year also saw a review of agricultural export regulation to identify ways to better meet the contemporary needs of Australian farmers and exporters. Resulting improvements to agricultural export legislation will be implemented by April 2020, to establish a contemporary, flexible and efficient export legislative framework.

Mid-2015 saw the release of the Australian Government's White Paper on Developing Northern Australia and the Agricultural Competitiveness White Paper. These white papers describe the initiatives and commitments by the Australian Government to enhancing Australian agriculture, including in northern Australia, over the coming years. Management of animal health in Australia will particularly benefit from proposed enhancements to infrastructure, support for capability to eradicate emergency pests and diseases, and improved biosecurity surveillance and analysis. Australia will also expand its network of agricultural counsellors overseas to pursue international market access in important and emerging markets for Australian agricultural industries.

Australia's new PEQ facility on a Commonwealth-owned site in Mickleham, Victoria, has begun accepting animals, plants and commodities. The new PEQ facility will consolidate all the current PEQ operations of the Australian Government Department of Agriculture and Water Resources into a single site in two phases. Phase 1 was officially opened on 26 October 2015 by the Hon. Barnaby Joyce MP, Minister for Agriculture and Water Resources. Construction of phase 2 of the facility will be completed by 2018. After this, all imported animals and plants will have to complete PEQ at the new facility.

In October and November 2015, Australia hosted an expert team to conduct its OIE PVS evaluation, involving meetings and visits to more than 60 field sites in every jurisdiction. Preliminary results are highly positive, while still providing scope to further strengthen Australian veterinary services. Australia's OIE PVS engagement speaks highly of our willingness to open our animal health system to external scrutiny to gain both validation and self-awareness, based on international standards.

During the year, the Australian Government released its first National Antimicrobial Resistance Strategy to guide Australia's response to the threat of antibiotic misuse and resistance. The strategy will bring together efforts across the human and animal health, food and agriculture sectors to provide a comprehensive and coordinated response to this increasingly important global public health issue. The development of an implementation plan for the strategy is advanced, and will help ensure that progress under the strategy is reviewed and reported on.

In 2015, our established emergency animal disease (EAD) preparedness arrangements were enhanced with the

release of a number of new and revised AUSVETPLAN and AQUAVETPLAN manuals. Exercise Odysseus, the national livestock standstill exercise program, was completed, and a plan to implement its key findings is now being developed. The exercise reinforced confidence in many aspects of Australia's EAD preparedness arrangements, but also highlighted areas where improvements would be valuable. With continued engagement from Australia's governments and livestock industries, adoption of the implementation plan will help ensure that these issues are addressed and that the exercise results in lasting improvements to our national EAD preparedness arrangements.

Substantial progress was also made in the development of arrangements between aquatic animal industries and governments for aquatic animal disease responses. The initial focus is on developing principles and methodological approaches to apportion public and private benefits for responses to aquatic EADs.

Many more developments in Australia's animal health management took place in 2015 than those outlined above. In reviewing these reports each year, I am always impressed by the commitment evident from such a diverse range of stakeholders to making Australia's animal health system one of the best in the world.

I commend this report to you.

Dr Mark Schipp
Australian Chief Veterinary Officer

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OVERVIEW

Australia's animal health system comprises the government agencies, commercial companies, organisations, universities and individuals that are involved in animal health and the livestock production chain. Together, they maintain Australia's high standard of animal health.

This report describes Australia's animal health system, the current status of animal health in Australia, and significant events in 2015.

Organisation of the animal health system

Chapter 1 describes the roles of government and non-government participants in the national animal health system, and the consultative mechanisms that link them. The Australian Government Department of Agriculture and Water Resources is responsible for international animal health matters, including biosecurity, export certification and trade, and disease reporting to the World Organisation for Animal Health (OIE). Animal Health Australia (AHA) coordinates national livestock animal health programs in Australia. Wildlife Health Australia complements livestock health activities by investigating, and managing reporting on, the health of native and feral animals.

Reform of Australia's biosecurity system continued during 2015. The National Biosecurity Committee, which operates under the Intergovernmental Agreement on Biosecurity, identified six priority areas requiring further focus: national decision making and investment, emergency preparedness and response, management of established pests and diseases of national significance, surveillance and diagnostics, information management, and communications and engagement.

New biosecurity legislation – the *Biosecurity Act 2015* – was passed by parliament and will commence on 16 June 2016. The Act replaces the *Quarantine Act 1908* as the primary legislative means for the Australian Government to manage biosecurity risks. It reflects contemporary practices and changing risks and priorities, and will allow biosecurity risks to be managed in a more modern and flexible way.

Australia's OIE Performance of Veterinary Services (PVS) evaluation comprised a major undertaking during 2015 targeting Australia's animal health system. Following a decision to engage by Animal Health Committee and industry leaders, OIE PVS training for more than 40 participants was held in Canberra in July 2015, followed by Australia hosting four OIE experts to conduct an OIE PVS evaluation from 26 October to 13 November 2015. The PVS team held meetings and visited more than 60 field sites in every jurisdiction. At the time of writing, the final PVS report is still pending. Preliminary findings are highly positive, while still identifying some scope for improvement. Australia's response to its PVS report will be developed and implemented during 2016.

The Department of Agriculture and Water Resources, state and territory governments, AHA and the livestock industries collaborated to develop a National Animal Health Surveillance and Diagnostic Strategy and a draft business (work) plan, and determine surveillance priorities and actions.

Terrestrial animal health status

Chapter 2 provides information on Australia's reporting system for animal diseases, Australia's status for nationally significant terrestrial animal diseases, and control programs for endemic diseases of national significance in terrestrial animals.

Australian, state and territory governments are obligated by legislation to determine the occurrence and prevalence of certain diseases deemed notifiable because of their significance in Australia and internationally. Some data from a range of government and non-government surveillance and monitoring programs are collated in the National Animal Health Information System (NAHIS). Australia uses these data to provide regular reports on diseases of interest to the OIE. The information in NAHIS is also essential for supporting trade in animal commodities.

The first national survey for honey bee pathogens using modern molecular tools was completed and published in 2015. It outlines the current prevalence of honey bee viruses, and reports on the distribution of endemic pests and diseases of bees in Australia.

Asian honey bees have gradually spread in Queensland since they were first detected in 2007. Australia moved from eradication to management of this pest under the Asian Honey Bee Transition to Management program. Although this program ended in 2013, several of its research and development projects, aimed at reducing the incidence and impact of bee pests and diseases, and building capacity to apply research findings through extension and education, continued in 2015.

Several significant notifications were made during the year:

- Three anthrax incidents occurred in New South Wales and one in Victoria. The affected properties were in the known anthrax endemic area, and the incidents were managed according to the anthrax policy of the relevant state departments.
- Abortion caused by equid herpesvirus 1 was diagnosed in three mares: one in Western Australia and two on separate properties in Victoria. A neonatal foal that died in Victoria at three days of age was also infected with equid herpesvirus 1.

Terrestrial animal disease surveillance and monitoring

Chapter 3 describes disease surveillance and monitoring activities under government and non-government programs that operate at the national level. These programs are in place to identify and treat risks from notifiable, emerging and exotic diseases, including zoonotic diseases, and are managed by AHA, Wildlife Health Australia, and the Australian, state and territory governments.

In 2015, Australian governments and livestock industries collaborated to develop a National Animal Health Surveillance and Diagnostics Strategy and draft an accompanying business plan. These documents detail objectives and activities for 2016–18 that will maintain and strengthen Australia's animal health surveillance system, including improving the collection, management and effective use of animal health surveillance information; and strengthening the knowledge, attitudes and practices of people involved in surveillance.

General surveillance by a range of people in contact with livestock animals and wildlife is important for the detection and investigation of animal diseases. A number of achievements in this area are provided.

Events involving disease investigations in wildlife are held in a national database maintained by Wildlife Health Australia. More than 810 events were added in 2015. Approximately 43% of these events were bats submitted for exclusion testing for Australian bat lyssavirus (ABLV), and another 37% related to wild bird mortalities. During the year, 353 bats were tested for ABLV; of these, 22 tested positive.

In 2015, no wild bird mortality events were attributed to avian influenza or West Nile virus. Surveillance activities in wild birds continue to find evidence of a wide range of subtypes of low pathogenicity avian influenza viruses.

A mortality event involving snapping turtles (*Myuchelys georgesi*) in New South Wales was investigated. A number of diseases were excluded, but a novel virus detected in tissues of affected turtles is being studied to determine its significance to the clinical signs seen.

During 2015, the Screw-worm Fly Freedom Assurance Program was reviewed. Previously considered a very high priority for targeted surveillance in Australia, Old World screw-worm fly has now been determined as a moderate priority. A revised program was initiated that involves training entomologists to detect the insect and promoting awareness of the fly, as well as continued surveillance and monitoring the risk profile for screw-worm fly in Australia.

A major focus of the National Bee Pest Surveillance Program, which is an early warning system to detect new incursions of pest bees and exotic bee pests, has been the development of a risk-based statistical method for the early detection of exotic bee pests, particularly varroa mite. Another improvement to the program was the issue of a permit allowing the miticides Bayvarol (flumethrin) and Apistan (tau-fluvalinate) to be used in sentinel hives, and longer use of the miticides.

Northern Australia is vulnerable to pest and disease incursions of significance to animal health, production and trade. As a result, the Australian and relevant state and territory governments have surveillance and awareness activities that focus on early detection and reporting of exotic pests and diseases.

Managing terrestrial animal health emergencies

Chapter 4 describes Australia's arrangements for preparing for, and responding to, terrestrial emergency animal diseases (EADs), including planning, training and communication. The chapter also describes EAD responses during 2015.

The Department of Agriculture and Water Resources, states and territories, livestock industry groups and AHA have continued work to strengthen Australia's preparedness for an outbreak of foot-and-mouth disease (FMD) through specific programs and activities. In 2015, this included:

- Exercise Odysseus, in which government agencies and industry organisations took part in a series of discussion exercises and field-based activities based on simulation of the early days of an FMD outbreak
- continuation of an arrangement with the European Commission for the Control of Foot-and-Mouth Disease to train Australian veterinarians and stock handlers, in Nepal, to detect and control FMD
- involvement in a multicountry FMD modelling study to test the usefulness of information that is available early in an outbreak to estimate the subsequent size of the outbreak, and hence determine the control measures to deploy.

Australia continues to collaborate with other countries on epidemiology and disease modelling. In 2015, this included the Australian Animal Disease Spread model, a new modelling platform that offers full national-scale modelling capability for complex disease epidemiology, regional variability in transmission and different jurisdictional approaches to control, to support EAD planning and preparedness in Australia.

Although avian influenza was not detected in commercial poultry flocks in Australia during 2015, Australia continues to maintain its preparedness for an outbreak of highly pathogenic avian influenza (HPAI). Australia provides ongoing assistance with control of HPAI and other zoonotic and emerging diseases in neighbouring countries. At a national level, Australian governments and AHA work with the poultry industries to strengthen preparedness and response capacities for avian influenza on a continuous basis, and to maintain awareness of biosecurity among poultry owners.

In April 2015, industry representatives endorsed the development of a biosecurity manual specifically targeting higher-risk free-range farms. In parallel, the Poultry Cooperative Research Centre began a research project to mitigate the risk of avian influenza in the free-range sector of the Australian poultry industry. Outputs from this project will be used to update industry biosecurity manuals.

Revisions were made to a number of Australian Veterinary Emergency Plan (AUSVETPLAN) manuals; these manuals set the response guidelines for an EAD outbreak. Updated manuals were published for anthrax, Aujeszky's disease, bluetongue and classical swine fever (disease strategies); disposal and destruction of animals (operational manuals); and control centres (management manuals). Also published were a new enterprise manual for the wool industry and a new resource document with a decision matrix for a national livestock standstill in the case of an outbreak of FMD.

The Biosecurity Incident National Communication Network launched the Outbreak website in September 2015. The website is a central portal for information about exotic pests and diseases that are subject to national eradication programs, and has information on preventing and reporting outbreaks, how government and industry respond, and how property owners should respond to an outbreak.

EAD responses in 2015 involved incidents of Hendra virus infection in horses in Queensland and New South Wales, and anthrax in a dairy cow on a property in Victoria and on three properties in New South Wales, involving 1 bull, and 9 and 19 cattle, respectively.

Aquatic animal health

Chapter 5 provides details of the status in Australia of aquatic animal diseases of national significance, and the system for responding to and preparing for aquatic animal disease events.

Australia's strategic plan for aquatic animal health – *AQUAPLAN 2014–2019* – outlines the priorities to strengthen Australia's arrangements for managing aquatic animal health, and to support sustainability, productivity and market access for Australia's aquatic animal industries. The plan covers aquatic animal health issues relevant to aquaculture, commercial fisheries, recreational fisheries, the ornamental fish industry, the tourism industry and the environment.

In 2015, as part of AQUAPLAN, a model aquaculture enterprise health accreditation scheme was developed, and aquatic animal production issues relevant to the development of the National Antimicrobial Resistance Strategy 2015–2019 were determined.

During the year, the Department of Agriculture and Water Resources continued to focus on managing the biosecurity risks associated with imports of live ornamental fish, and made changes to quarantine requirements for gourami, cichlid and poeciliid fish that will come into effect on 1 March 2016.

Several guidance documents aimed at managing the risk of disease transmission from translocation of animals within and between jurisdictions have either been published (*National policy guidelines for translocation of domestic bait and berley*) or are being revised (*National policy guidelines for translocation of live aquatic organisms*).

Work continues on developing a formal arrangement for industries and governments to share the responsibilities and costs for managing aquatic EAD incidents that affect aquatic animal industries (wild-caught sector, aquaculture and ornamental fish). This corresponds with the emergency response agreements that Australia has in place for terrestrial animal and plant diseases.

In April, a new Australian Aquatic Veterinary Emergency Plan (AQUAVETPLAN) disease strategy manual for ostreid herpesvirus 1 (OsHV-1) microvariant was published, and the revised *Enterprise manual* was published in June. Revisions of four manuals commenced in 2015 for the diseases viral encephalopathy and retinopathy, whirling disease, withering syndrome of abalone, and crayfish plague.

Disease events and investigations during the year included:

- confirmation of *Perkinsus olseni* in native flat oysters (*Ostrea angasi*) for the first time in Australia; *P. olseni* is considered endemic to Australia, and has been reported previously in other molluscs
- research into the cause of chronic mortalities of farmed prawns (*Penaeus monodon*) in Queensland; testing excluded acute hepatopancreatic necrosis disease
- research indicating that OsHV-1, which causes Pacific oyster mortality syndrome in farmed oysters, occurs seasonally in several rivers in New South Wales. The virus was first reported from the Georges River in late 2010 and was again reported in the river estuary in February 2015.

Trade

Chapter 6 describes the Department of Agriculture and Water Resources' activities in controlling imports and exports of animals and animal products, including food. The Australian Government adopts a risk-based approach across the biosecurity continuum to manage the pest and disease threat from imports.

Part of the new post-entry quarantine station at Mickleham in Victoria was opened in October, and the bee facility, plant compounds, horse compounds, and the first stage of the dog and cat compounds were operational by the end of the year. The new facility will consolidate all current quarantine operations for high-risk plants and animals at one site.

Australian exporters have benefited from reduced or eliminated tariffs in 2015 as a result of free trade agreements between Australia and the Republic of Korea, Japan and China. In addition, the Trans-Pacific Partnership Agreement, agreed in October, will open up new opportunities for Australian agriculture.

The Department of Agriculture and Water Resources has negotiated new market access for a range of animal, animal product and food exports, and maintained access to significant trading partner countries. The department has provided export certification and other export documentation that underpins the Australian export system to ensure that the requirements of trading partners are met.

Recommendations from a review of agricultural export legislation during the year have been endorsed by the Australian Government and will be implemented by 2020. The improvements will establish a contemporary, flexible and efficient export legislative framework that will facilitate market access for farmers and exporters.

During the year, the Department of Agriculture and Water Resources released a report on its examination of Australia's import risk assessment process; a draft of the Biosecurity (Biosecurity Import Risk Analyses) Regulation 2015 under the *Biosecurity Act 2015*, which will replace the *Quarantine Act 1908* in 2016; and draft guidelines for biosecurity import risk analyses.

Consumer protection – food

A number of Australian agencies at the national, and state and territory levels cooperate to ensure the safety of the Australian domestic food supply and the safety of Australian food exports. Chapter 7 describes activities to ensure that locally produced foods are safe for consumers.

The Australian Government Department of Health monitors communicable diseases, including foodborne diseases, to provide early warning of any potential microbiological contamination.

Antimicrobial resistance (AMR) is a global risk that poses a threat to human and animal health. Australia already has strict regulations for the use of antimicrobials in animals, and release of Australia's first National Antimicrobial Resistance Strategy in June 2015 and the forthcoming implementation plan for the strategy will provide guidelines for further limiting AMR.

Food Standards Australia New Zealand has a major role in ensuring the safety of Australian foods, from developing food standards, assessing food-related health risks, setting and monitoring levels of contaminants in foods, and undertaking risk assessment and risk analysis, to collaborating with international scientific and regulatory bodies.

The safety of Australian food exports is controlled through hazard analysis and critical control points (HACCP) systems to ensure that meat, dairy, seafood, eggs and the products made from these commodities are safe for human consumption in Australia's export and domestic markets.

Animal welfare

Chapter 8 reports on Australia's animal welfare activities.

Each state and territory is responsible for implementing and enforcing its own animal welfare legislation. During 2015, all jurisdictions made a number of amendments to legislation and administrative arrangements for animal welfare, with the aim of improving animal welfare outcomes.

Organisations in the livestock, zoo and aquarium industries also have arrangements in place to manage and improve animal welfare.

At a national level, the Animal Welfare Task Group is continuing to develop nationally consistent standards and guidelines for the welfare of livestock, based on the model codes of practice for the welfare of animals. Cattle and sheep standards and guidelines are now being implemented by state and territory governments. Public consultation and a review of comments on the draft national standards and guidelines for exhibited animals have been completed, and amendments to off-exhibit holding requirements for exhibited animals were finalised. The post-consultation version of the standards and guidelines for the care and management of livestock during their transition through saleyards and depots is nearly final. In June, development of Australian animal welfare standards and guidelines for poultry began.

A number of projects took place under the National Primary Industries Animal Welfare Research, Development and Extension Strategy during 2015. The strategy encourages co-investment and collaboration to improve the efficient use of research, development and extension resources in animal welfare. Several new projects commissioned under the strategy include a literature review on advances in the measurement of pain in animals and humans, and development of a business contingency planning toolkit to assist livestock businesses to develop a single plan encompassing all risks and hazards to their business.

The Australian Government works with international organisations such as the OIE to support the development of scientifically based international animal welfare guidelines. The OIE Collaborating Centre for Animal Welfare Science and Bioethical Analysis, a partnership between several New Zealand and Australian research organisations, is cooperating with partners in Southeast Asia to build animal welfare science capacity in the region through a training program: the OIE Standards & Guidelines (Slaughter & Transport) Collaborative Project South East Asia. In 2015, 40 training workshops were held across China, Malaysia, Thailand and Vietnam.

Regional animal health initiatives

Chapter 9 describes Australia's activities in collaborating with developing countries in the Asia–Pacific and African regions to improve the health of their livestock. These activities occur in three main categories:

- Pre-border surveillance and capacity building – Australia assists its near neighbours Papua New Guinea and Timor-Leste with field surveillance for significant animal diseases. In 2015, joint animal health surveys took place in regions of both countries. Various other activities were aimed at developing skills in animal disease surveillance and response, and raising public awareness.
- Overseas aid – Australia's aid program focuses on the Indo-Pacific region. In 2015, $2.3 million was directed to Ebola preparedness in Papua New Guinea and the Pacific. The Australian Government released its Health for Development Strategy 2015–2020 in June 2015, which has two strategic outcomes: building country-level systems and services that are responsive to people's health needs, and strengthening regional preparedness and capacity to respond to emerging health threats. The strategy acknowledges the need to strengthen links between the human and animal health systems to prevent, promptly detect, and respond to emerging diseases that can pass from animals to people.
- Research – Australian research activities in the region are primarily resourced through the Australian Centre for International Agricultural Research and the Australian Government Department of Foreign Affairs and Trade. Many research projects by organisations in Australia and partner countries use multidisciplinary approaches to solve problems in smallholder animal health and production. The focus of many projects is on Indonesia, the Mekong region, Papua New Guinea, the Philippines, and eastern and southern Africa.

Research and development

The National Animal Biosecurity Research, Development and Extension Strategy, which was published in 2013, promotes collaboration among research organisations in supporting biosecurity in Australia's animal industries, wildlife and recreational sectors. Chapter 10 provides background to this strategy and a snapshot of Australian research in livestock health during 2015.

The Commonwealth Scientific and Industrial Research Organisation, cooperative research centres, universities (including veterinary science faculties), and industry-based research and development corporations are all involved in research relating to livestock health.

Image credit: Caroline Wardrop

Image credit: DL Stapleton

CHAPTER 1

Organisation of the animal health system

This introductory chapter describes the organisation of Australia's animal health system, including the roles of government and non-government organisations.

Effective national surveillance and control of animal diseases in Australia requires cooperative partnerships among government agencies, organisations, commercial companies and individuals involved in animal industries. The Australian Government advises on and coordinates national animal health policy. It is responsible for international animal health matters, including biosecurity, export certification and trade, and disease reporting to the World Organisation for Animal Health (OIE). Under the Australian constitution, individual state and territory governments are responsible for animal health matters within their boundaries. Such matters include disease surveillance and control, emergency preparedness and response, chemical residues in animal products, livestock identification and traceability, and animal welfare. National decision making and coordination for animal health matters occurs through Animal Health Committee (AHC), which includes the Australian Chief Veterinary Officer, and chief veterinary officers from all states and territories.

Australian governments have a close association with livestock industries. This allows effective consultation between government and industry to determine national animal health priorities. The livestock industries are active partners in policy development, support targeted animal health activities and contribute to veterinary emergency responses. Australia's livestock industries are described in Appendix A.

Australia's animal health system includes all organisations, government agencies, commercial companies, universities and individuals involved in animal health and the livestock production chain. Links are maintained with human health agencies, particularly for zoonoses (diseases that are transmissible between animals and humans), antimicrobial resistance, One Health issues and food safety issues. The Australian Government Department of Agriculture and Water Resources is represented on the Communicable Diseases Network Australia, a key public health network. Links are also maintained with environmental agencies, particularly for wildlife health. The Australian Government Department of the Environment is represented on AHC. Wildlife Health Australia (WHA) complements livestock health activities by investigating and reporting on the health of wild native and feral animals.

More than 13 000 people are directly involved in animal health in Australia (Table 1.1).

Animal Health Australia (AHA) is an incorporated, not-for-profit, public company established in 1996 by the Australian, state and territory governments, and major national livestock industries. It is governed by an independently selected, skills-based board.

AHA's members include the state, territory and Australian governments, the major terrestrial livestock industries, and other animal health organisations and service providers.

AHA coordinates and manages more than 50 national projects to assist its members and partners to protect and increase animal health and the sustainability of Australia's livestock industries, and to support market access and trade.[1] These projects span emergency animal disease (EAD) preparedness and response, biosecurity, surveillance and animal welfare.

Information on aquatic animal health management in Australia is provided in Chapter 5.

Table 1.1 Veterinarians and other animal health personnel in Australia, 2015

Registered veterinarians		Auxiliary personnel	
Government	618	Stock inspectors, meat inspectors, etc.	1 047
Laboratories, universities, etc.	878		
Private practitioners	10 520		
Other veterinarians	730		
Total	**12 746**	**Total**	**1 047**

1 For AHA purposes, livestock are animals kept for use or profit, including any class of cattle, sheep, goats, pigs, horses (including mules and donkeys), poultry, emus, ostriches, alpaca, deer, camels or buffalo, and farmed aquatic species.

1.1 GOVERNANCE

1.1.1 Australian Government committees

Consultative committees ensure that all components of the animal[2] health system work together to serve the interests of Australia. AHA links these components by providing information, networks, programs and training to its members. The committees advise and support senior areas of government through national departmental and ministerial forums for agriculture – that is, the Agriculture Senior Officials Committee and the Agriculture Ministers' Forum, respectively.

The relationship between the committees and organisations involved in animal health and welfare management in Australia is shown in Figure 1.1.

National Biosecurity Committee

The National Biosecurity Committee (NBC) provides strategic leadership across jurisdictions and sectors to develop and oversee implementation of national approaches and policies for emerging and ongoing biosecurity issues. NBC membership comprises senior officials from the Australian, state and territory governments. The NBC is supported by four sectoral committees, including AHC, which is the key government committee focusing on national animal health issues.

The NBC was formally established under the 2012 Intergovernmental Agreement on Biosecurity (IGAB).[3] It provides advice to agriculture senior officials and ministers on progress in implementing the agreement. In 2015, the NBC assessed IGAB achievements to date and identified six priority reform areas requiring further focus: national decision making and investment, emergency preparedness and response, management of established pests and diseases of national significance, surveillance and diagnostics, information management, and communications and engagement. The NBC is driving the implementation of the priority reforms, with support from sectoral committees, two expert groups and a project manager.

Animal Welfare Task Group

The Animal Welfare Task Group advises and supports governments on national animal welfare policy issues. The task group focuses on animal welfare issues that support improved long-term and sustainable economic, social and environmental outcomes, informed by community expectations – for example, development of nationally consistent animal welfare standards and guidelines for sheep and cattle.

Image credit: Theresa Robinson

2 Both terrestrial and aquatic animals

3 IGAB is a Council of Australian Governments (COAG) agreement. COAG is the peak intergovernmental forum in Australia and comprises the Prime Minister, state and territory premiers and chief ministers, and the President of the Australian Local Government Association.

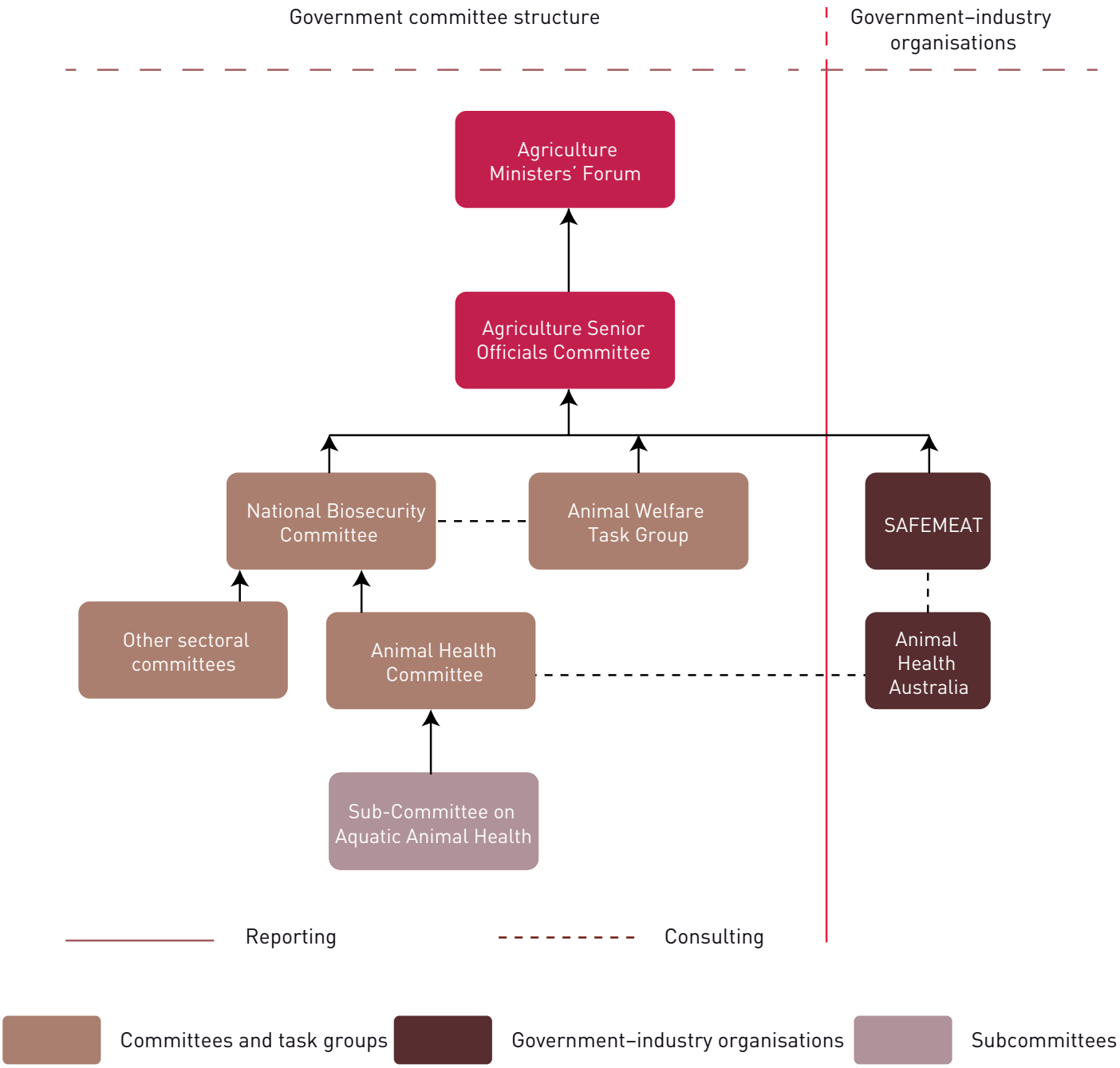

Figure 1.1 Structure of animal health and welfare management committees and organisations in Australia

Animal Health Committee

AHC[4] provides the Australian Government with scientific, strategic and nationally coordinated policy advice on animal health issues through the NBC and the Agriculture Senior Officials Committee. AHC leads the development and implementation of government policy, programs, operational strategies and standards in national animal health, domestic quarantine and veterinary public health.

AHC members comprise the Australian, state and territory chief veterinary officers, and representatives from the Australian Government Department of Agriculture and Water Resources, the Australian Government Department of the Environment, and the Australian Animal Health Laboratory of the Commonwealth Scientific and Industrial Research Organisation (CSIRO-AAHL). AHC observers are from AHA, WHA and New Zealand.

AHC is advised on aquatic animal health issues by its Sub-Committee on Aquatic Animal Health (SCAAH). Specialist ad hoc task groups advise AHC on other technical or policy issues, as required.

AHC communicates and consults with its animal industry stakeholders through its newsletter *Vetcommuniqué*, AHA industry members and industry participation in AHC meetings. Aquatic industries are consulted through the National Aquatic Animal Health Industry Reference Group and the Australian Fisheries Management Forum. Those with an interest in zoo or wild (including feral) animals are consulted through WHA.

Sub-Committee on Aquatic Animal Health

SCAAH provides high-level scientific, technical and strategic advice to AHC to support development of policy and programs on national aquatic animal health affecting the capture and recreational fishing industries, the aquaculture industries and the ornamental fish industry. SCAAH comprises representatives from the Australian, state and Northern Territory governments; the New Zealand Government; CSIRO-AAHL; and Australian universities. It also has an industry observer. Other aquatic animal health experts from both government and non-government agencies – including specialists from academia, industry and the private sector – may be invited to participate.

4 www.agriculture.gov.au/animal-plant-health/animal/committees/ahc

1.1.2 Government–industry committees and organisations

Consultative Committee on Emergency Animal Diseases

The Consultative Committee on Emergency Animal Diseases (CCEAD)[5] is convened in the event of an EAD outbreak. The CCEAD comprises AHC members and technical representatives from relevant industries. Further information about the CCEAD's membership and role is in Chapter 4.

Aquatic Consultative Committee on Emergency Animal Diseases

Chapter 5 provides information on the Aquatic CCEAD.

Animal Health Australia

AHA works with its members to keep Australia free from new and emerging diseases, and to improve animal health,[6] improve market access, and foster the resilience and integrity of the Australian animal health system. The current membership of AHA is shown in Table 1.2, and contact details for these organisations are provided in Appendix B.

Access to international and domestic markets is dependent on Australia's excellent animal health status and reputation, which in turn depends on government, industry and stakeholder commitment to animal health and welfare, biosecurity, surveillance, and EAD preparedness and response. Government and industry partnerships have been successful in delivering a world-class system for the management of livestock biosecurity risks, which helps Australia maintain its enviable disease-free status. AHA plays an active role in maximising the effectiveness of these partnerships and consultative mechanisms.

AHA continues to improve the contribution of agriculture to national policy and national prosperity through the following four strategic priorities:

- Effectively manage and strengthen Australia's EAD response arrangements through successful partnerships with members.
- Enhance the EAD preparedness and response capability of AHA and its members.

5 www.agriculture.gov.au/animal-plant-health/animal/committees/ccead

6 Animal health and welfare are inextricably linked. AHA's role in the animal welfare continuum is contained to issues that may affect animal production, trade and market access, and community social licence.

- Strengthen biosecurity, surveillance and animal welfare to enhance animal health, and support market access and trade.
- Deliver member value, enhancement of organisational performance, and sustainable resourcing.

Table 1.2 Members of Animal Health Australia

Government	Organisation
Australian Government	**Industry**
State and territory governments	Australian Alpaca Association Ltd
Australian Capital Territory	Australian Chicken Meat Federation Inc.
Northern Territory	Australian Dairy Farmers Ltd
State of New South Wales	Australian Duck Meat Association Inc.
State of Queensland	Australian Egg Corporation Ltd
State of South Australia	Australian Honey Bee Industry Council Inc.
State of Tasmania	Australian Horse Industry Council Inc.
State of Victoria	Australian Lot Feeders' Association Inc.
State of Western Australia	Australian Pork Ltd
Service providers	Cattle Council of Australia Inc.
Australian Veterinary Association Ltd	Equestrian Australia Ltd
Commonwealth Scientific and Industrial Research Organisation – Australian Animal Health Laboratory (CSIRO-AAHL)	Goat Industry Council of Australia Inc.
	Harness Racing Australia Inc.
	Sheepmeat Council of Australia Inc.
	WoolProducers Australia Ltd
	Associate members
	Australian Livestock Export Corporation Ltd (LiveCorp)
	Racing Australia Ltd
	Council of Veterinary Deans of Australia and New Zealand
	Dairy Australia Ltd
	National Aquaculture Council Inc.
	Wildlife Health Australia
	Zoo and Aquarium Association Inc.

SAFEMEAT

SAFEMEAT[7] is a partnership between the peak meat industry bodies,[8] the Australian Government, and the state and territory governments. Reporting to the Agriculture Senior Officials Committee and peak industry councils, SAFEMEAT oversees and promotes sound management systems to deliver safe and hygienic products to the marketplace.

The strategic directions of SAFEMEAT are set out in its business plan, which has nine key programs of industry priority:

- standards and regulations
- emergency disease management
- animal diseases
- residues
- pathogens
- systems development and management
- communication and education
- emerging issues
- SAFEMEAT Initiatives Review – implementation of recommendations.

Initiatives developed by SAFEMEAT include:

- targeted residue-monitoring programs – the National Residue Survey conducts testing on behalf of the red meat industries
- the National Livestock Identification System (NLIS), which has been developed for cattle, sheep, goats and pigs; a similar system is under development for alpacas (see Section 1.4)
- a system of National Vendor Declarations (NVDs) about the health of cattle, sheep, goats and pigs that are being traded
- strategies for animal disease issues affecting food safety, including the implications of transmissible spongiform encephalopathies such as bovine spongiform encephalopathy.

Some major activities during 2015 are described below.

The final report of the SAFEMEAT Initiatives Review was delivered in August. The review has the agreed vision of 'a fully auditable and responsive whole-of-chain risk management biosecurity system that maintains market access, food safety and product integrity (including traceability and animal welfare)'. It is supported by a range of principles and initiatives to form a roadmap for the future. The key principles for the SAFEMEAT initiatives are:

- a strengthened on-farm risk management system
- a whole-of-chain risk management approach, encompassing producers, saleyards, feedlots, transporters, live exporters and processors
- strengthened industry assurance programs and improved integration throughout the supply chain
- a revised role for the states and territories in compliance monitoring to reflect the new compliance model – monitor, support, enforce
- an effective communications program to drive uptake and improvement of SAFEMEAT-endorsed industry programs
- a sustainable funding model to ensure that the system remains effective.

An implementation pathway has been agreed, and actions to give effect to the new Integrated Integrity System have commenced.

Through the various NLIS committees, SAFEMEAT:

- continued to work with the Australian, state and territory governments, and industry on monitoring progress in the adoption of strengthened measures to improve NLIS compliance in the meat-processing sector
- endorsed NLIS Cattle Standards to replace previous operational rules
- drafted a business plan to support an improved mob-based NLIS for sheep and goats
- continued to work with the Livestock Production Assurance Advisory Committee to ensure a greater level of scrutiny of producer compliance with NLIS requirements relating to property-to-property movements
- implemented strategies to ensure national consistency in interpreting and applying NLIS rules by the states and territories.

7 www.safemeat.com.au

8 Australian Livestock Exporters' Council Ltd, Meat & Livestock Australia, Sheepmeat Council of Australia, WoolProducers Australia, Cattle Council of Australia, Australian Lot Feeders' Association, Australian Meat Industry Council, Australian Dairy Farmers Ltd, Australian Pork Ltd, Australian Livestock & Property Agents Association, Australian Livestock Markets Association, Goat Industry Council of Australia and Animal Health Australia

SAFEMEAT assisted with residue monitoring activities under the National Organochlorine Residue Management Program, the National Antimicrobial Residue Minimisation Program, the Targeted Antimicrobial Residue Testing Program and the Sheep Targeted Antimicrobial Residue Testing Program.

SAFEMEAT members reached agreement on national assessment criteria and an approval process for determining on-farm food safety program equivalence with the standards set for sourcing livestock under the *Australian standard for the hygienic production and transportation of meat and meat products for human consumption* (AS 4696:2007).[9]

SAFEMEAT concluded a program to phase out previous versions of NVDs to meet market expectations.

1.2 NATIONAL BIOSECURITY REFORMS

Australia has a strong biosecurity system that protects human, animal and plant health, protects our unique environment, and supports our reputation as a safe and reliable trading nation. This reputation has significant economic, environmental and community benefits for all Australians. To ensure that Australia's biosecurity system remains relevant and effective, areas of the system are undergoing reform. This will allow delivery of a more modern system that is even more responsive and targeted, in a changing global trading environment.

Australian governments, primary industries and other stakeholders work closely together to prevent, detect, control and manage pest and disease outbreaks, and minimise impacts on the economy, environment and international trade. To do this effectively, the states and territories, industries and stakeholders use consistent and collaborative approaches. The NBC has overseen a number of policy reforms to improve the effectiveness of Australia's biosecurity system:

- National surveillance and diagnostic frameworks have been developed to improve early detection and accurate, timely diagnosis of pests and diseases.
- A National Biosecurity Information Governance Agreement and national minimum data standards for surveillance and emergency response are being developed. These will improve the sharing of data and information between jurisdictions, and the effectiveness of emergency responses. They will also support market access for Australian agricultural, fisheries, food and forestry industries.
- Research, development and extension (RD&E) strategies have been developed to establish the future direction for RD&E, and improve the focus, efficiency and effectiveness of RD&E for both animal and plant biosecurity. A community and environment RD&E strategy is also expected to be completed shortly.
- A national stocktake of biosecurity investment has been undertaken for two consecutive years, identifying significant investments made by Australian, state and territory governments across a portfolio of biosecurity activities. Understanding how funds are invested will help improve the efficiency and effectiveness of national biosecurity spending and the biosecurity system.
- National arrangements are being developed to fill recognised gaps in the existing emergency response deeds (agreements) – these arrangements will guide decision making and cost sharing for national responses to incursions of weeds affecting agricultural production and aquatic animal diseases.
- A National Framework for Cost Sharing of Biosecurity Programs has been developed to guide cost sharing of biosecurity activities.

In response to an internal review in early 2015, the NBC established two new ongoing expert groups – the National Biosecurity Information Governance Expert Group and the National Biosecurity Emergency Preparedness Expert Group – to address two IGAB priority reform areas. These groups are working to improve the way biosecurity information is collected and shared, and to improve our capacity to respond to biosecurity incidents.

The IGAB requires that Australian, state and territory ministers responsible for biosecurity matters review the implementation and effectiveness of the agreement and its schedules within five years of commencement. Ministers have agreed that this review will take place in 2016. Continuous review of the biosecurity system is essential to ensure that the system is contemporary and flexible, and that resources are allocated appropriately to reflect changing

9 www.publish.csiro.au/pid/5553.htm

risks and priorities. The IGAB review will be led by the Department of Agriculture and Water Resources, in collaboration with the NBC, and will involve extensive stakeholder consultation across all relevant sectors. A final report and recommendations will be provided to agriculture ministers for consideration.

New Commonwealth biosecurity legislation was passed by the Parliament of Australia and received royal assent from the Governor-General of Australia on 16 June 2015. The *Biosecurity Act 2015* will commence on 16 June 2016 (12 months after receiving royal assent). Until the new legislation comes into effect, the *Quarantine Act 1908* remains the primary piece of biosecurity legislation in Australia.

The *Biosecurity Act 2015* allows the Australian Government to manage biosecurity risks in a more modern and flexible way, and reflects contemporary industry practice. It includes:

- additional powers to monitor and manage onshore and marine biosecurity risks
- improved compliance tools that are fit for purpose, modern and useful
- better alignment with a number of international agreements and obligations.

1.3 SERVICE DELIVERY

1.3.1 Australian Government animal health services

Under the Australian constitution, the Australian Government is responsible for quarantine and international animal health matters, including disease reporting, export certification and trade negotiation. It also provides national coordination of EAD response activities, and coordinates and provides advice on national policy on animal health and welfare. In some circumstances, it provides financial assistance for national animal disease control programs. The Department of Agriculture and Water Resources delivers the Australian Government's activities in animal health and welfare.

Image credit: iStock

The Department of Agriculture and Water Resources works to deliver effective, risk-based services across the biosecurity continuum. As discussed in Section 1.1, this structure reflects a national approach to biosecurity and welfare, simplifies domestic and international communications, and improves responsiveness.

The following areas in the Department of Agriculture and Water Resources are responsible for animal health and veterinary public health:

- Office of the Chief Veterinary Officer (OCVO)
- Biosecurity Animal Division
  - Animal Biosecurity Branch
  - Animal Health Policy Branch
  - Animal and Biological Import Assessments Branch
- Exports Division
  - Live Animal Exports Branch.

In the Exports Division, the following branches deal with issues relating to exported animal products:

- Export Standards Branch
- Meat Exports Branch
- Residues and Food Branch.

Office of the Chief Veterinary Officer

The OCVO supports the Australian Chief Veterinary Officer in providing national leadership and direction on priority policy issues relating to animal health in Australia, including for EAD responses. The OCVO also provides executive, technical and administrative support to AHC and the CCEAD.

The OCVO provides links for Australia internationally through the OIE, and domestically through national animal health, human health and wildlife health committees. As Australia's international reference point for animal health and welfare, the OCVO coordinates Australia's commitments to the OIE, animal health intelligence gathering, and communication with other international agencies involved in animal health and welfare.

Biosecurity Animal Division

Animal Biosecurity Branch

The Animal Biosecurity Branch develops biosecurity policy, and provides technical and scientific advice on the safe importation of animals and animal products (including aquatic animals and their products), and on marine vessel biosecurity, using science-based risk analysis. The branch provides scientific and technical support to gain, maintain and improve access for the export of Australian animals and their genetic material. It also contributes to the development and maintenance of international animal health standards.

Animal Health Policy Branch

The Animal Health Policy Branch leads Department of Agriculture and Water Resources activities on national animal health policies and programs for terrestrial and aquatic animals, and marine pests. It also coordinates support provided by the department on animal health matters to Australia's immediate neighbours to the north. The branch manages:

- surveillance, disease prevention and disease preparedness activities
- EAD planning, training and awareness programs
- animal health laboratory strategies
- international offshore surveillance and capacity-building programs with partner countries (Indonesia, Papua New Guinea and Timor-Leste)
- epidemiology and One Health programs, including wildlife health, veterinary public health and antimicrobial resistance issues.

Animal and Biological Import Assessments Branch

The Animal and Biological Import Assessments Branch manages the importation of live animals, animal reproductive material and other animal-derived materials into Australia. Animal-derived materials include veterinary and human therapeutics, pet foods, stockfeed supplements, foods for human consumption, fertilisers, bioremediation agents, laboratory materials, and skins and hides.

The branch works across the entire biosecurity continuum – pre-border, border and post-entry quarantine – to minimise the risk of exotic animal pests and diseases entering Australia. It achieves this by determining appropriate science-based import conditions, assessing and granting import permits, auditing overseas and domestic facilities, providing advice to clients and regulatory officers, and providing technical support for inspection, clearance and quarantine activities.

Exports Division

Live Animal Exports Branch

The Live Animal Exports Branch manages the Australian Government's legislative requirements for the export of

live animals and animal genetic material from Australia. The branch provides export inspection and certification for live animals and animal reproductive material that meet importing country requirements. It contributes to market access assurance for live animals and animal genetic material. Information about the current activities of the program can be found on the Department of Agriculture and Water Resources website.

Export Standards Branch

The Export Standards Branch negotiates technical market access protocols and conditions, including the statements on export certificates for animal products, foods and animal byproducts. It is responsible for updating the Manual of Importing Country Requirements (MICoR) and providing assistance to detained consignments in the event of a food safety or animal health incident. This branch also manages the Package Assisting Small Exporters.

Meat Exports Branch

The Meat Exports Branch is responsible for national certification, verification, audit and inspection requirements for the export of meat (red meat, poultry and game meat), and the delivery and maintenance of export systems.

Residues and Food Branch

The Residues and Food Branch is responsible for operational aspects of exports of dairy, fish and egg products, as well as of non-prescribed food (including organics) and animal byproducts. Responsibility for export documentation, including registration and licensing, the National Residue Survey and the Codex Alimentarius Commission Contact Point also sit within this branch.

1.3.2 Other national animal health services and programs

Wildlife Health Australia

WHA is the peak body for wildlife health in Australia. It is a not-for-profit association initiated by the Australian Government, with funding from the Department of Agriculture and Water Resources, and support from state and territory governments, and stakeholders. WHA extends the work of the Australian Wildlife Health Network, which was established in 2002 as an Australian Government initiative and replaced by WHA in 2013.

WHA focuses on human and animal health issues associated with free-ranging populations of wild animals. It works closely with human health, animal health, agriculture and environment agencies, as well as universities, zoos and wildlife parks.

WHA has more than 550 members, including wildlife health professionals, wildlife carers, private practitioners, and institutional representatives from national, state and territory departments of conservation, agriculture and human health; universities; zoos; hunting groups; wildlife and other industries; and diagnostic pathology services. Australia's OIE Focal Point for Wildlife sits within WHA and provides support for Australia's OIE Delegate.

WHA promotes and facilitates collaborative links in the investigation and management of wildlife health, to support human and animal health, biodiversity and trade. It coordinates national wildlife health surveillance, wildlife health expertise and resources, and research needs and priorities. It collates national data on mass mortalities involving wild fauna, and manages specific datasets, such as those from avian influenza surveillance in wild birds and Australian bat lyssavirus monitoring. As well, WHA monitors for new and emerging diseases in wildlife, particularly those that could affect humans and production animals. WHA provides technical workshops on specific subjects for wildlife health professionals.

WHA's activities include:

- managing Australia's national database of wildlife health information
- organising and providing national communication about wildlife disease and emerging incidents
- participating in the development of regional and national strategies for wildlife health emergency preparedness and response
- facilitating and monitoring field investigations of disease incidents
- advancing education and training in wildlife health
- publishing fact sheets about diseases of national importance in wildlife
- providing information about wildlife health to the community.

These activities are underpinned by One Health principles, through active fostering of interdisciplinary work on wild animal health issues.

Animal health laboratories

Australia's animal health laboratories provide diagnostic and research services for endemic and exotic animal diseases, including transboundary animal diseases and zoonoses. The Australian Government, state and territory governments, CSIRO-AAHL, veterinary schools and the private laboratory

sector maintain a network of world-class animal health laboratories.[10] National laboratory responses to EAD incursions are primarily coordinated by the Laboratories for EAD Diagnosis and Response (LEADDR) network (see Chapter 4).

The Sub-Committee on Animal Health Laboratory Standards (SCAHLS) was dissolved in mid-2015. Coordination of laboratory services, policies and standards relevant to EADs continued under SCAHLS in the first half of 2015. Since then, the Department of Agriculture and Water Resources has provided coordination and administrative support to relevant ad hoc task groups, as needed.

CSIRO-AAHL[11] is a national facility that is one of six major high-containment animal health laboratories in the world. It is an OIE or national reference laboratory for a number of transboundary animal diseases. It develops and improves diagnostic technologies, provides laboratory services for exotic and other major EADs, and provides independent scientific advice. CSIRO-AAHL also plays a key role in transferring testing capabilities for major EADs to other state and territory government animal health laboratories and, if appropriate, other laboratories under controlled quality assurance conditions. CSIRO-AAHL is vital to maintaining Australia's capability to quickly and securely respond to EADs that could threaten Australia's animal industries and public health.

State and territory government laboratories specialise in services for endemic diseases, and are the primary providers of export testing for animals and animal products. Some states have outsourced laboratory testing to the private sector, and a number of private animal health laboratories are therefore also important to Australia's overall EAD testing capacity. Veterinary schools at universities offer diagnostic services and related research in specialty areas and for training purposes.

All government and most private animal health laboratories in Australia are accredited to the ISO/IEC 17025:2005 standard (*General requirements for the competence of testing and calibration laboratories*),[12] which is administered by the National Association of Testing Authorities (NATA) – a member of the International Laboratory Accreditation Cooperation. NATA accreditation is obligatory for laboratories that participate in official EAD testing.

To ensure quality assurance for laboratory services, the Department of Agriculture and Water Resources supported the development and evaluation of new tests for EADs, and the production of a comprehensive series of Australia and New Zealand Standard Diagnostic Procedures (ANZSDPs)[13] for specific EADs. The ANZSDPs reflect the relevant international standards prescribed by the OIE.

The Australian National Quality Assurance Program (ANQAP)[14] provides proficiency testing (PT) programs to support continuous improvement of individual laboratories in EAD testing performance. ANQAP is an international PT provider; it supports a range of PT programs for veterinary serology, virology and bacteriology on a fee-for-service basis. Most PT programs are used by laboratories that perform veterinary tests associated with quarantine, export health certification and disease control programs. About 26 animal health laboratories in Australia, New Zealand, Asia, Europe, Africa and North America currently participate in various ANQAP PT programs. CSIRO-AAHL and AHA, through AHA's Australian Animal Pathology Standards Program, also collaborate with other laboratories in Australia and overseas to develop and implement specific PT programs for quality assurance in diagnostic pathology. The Regional Proficiency Testing Program for Aquatic Animal Disease Laboratories, involving more than 40 laboratories from 12 countries, is discussed in Section 5.6.2.

For professional development, LEADDR and AHC support the activities of the Australian Association of Veterinary Laboratory Diagnosticians and other networks for laboratory specialty areas.

Australia's OIE Performance of Veterinary Services (PVS) evaluation

Australia's OIE PVS evaluation was conducted from 26 October to 13 November 2015.

PVS evaluations are voluntary and involve teams of three or four certified OIE experts using the OIE PVS Tool to systematically evaluate a country's animal health system over several weeks. The PVS Tool is based on OIE standards for the quality of veterinary services. The scope of the PVS evaluation is broad – it covers 47 'critical competencies', including the role of animal health authorities (but also where they intersect with relevant partner agencies or committees, such as in animal product food safety, veterinary drugs regulation, animal welfare, veterinary education

10 www.agriculture.gov.au/animal/health/system/lab-network

11 www.csiro.au/en/Research/Facilities/AAHL

12 www.iso.org/iso/catalogue_detail?csnumber=39883

13 www.scahls.org.au/Procedures/Pages/ANZSDPs.aspx

14 www.anqap.com

and regulation of the veterinary profession) as well as interactions with industry stakeholders.[15]

AHC and industry leaders agreed to request an OIE PVS evaluation after receiving a PVS information session from the OIE. A successful jurisdictional PVS evaluation pilot in South Australia in early 2015 built further confidence in the process. AHC's reasons for undertaking an OIE PVS evaluation are as follows:

- Evaluate and validate – by international standards, Australia has a very high animal health status and high-value export markets that it works hard to protect, including through well-developed animal health and animal product food safety systems across the biosecurity continuum. Australia will benefit from the transparency of having an independent external process that can demonstrate this.
- Self-awareness – despite this confidence that Australia performs to a high level across its animal health system, there may be areas that would benefit from focused attention or investment. The OIE PVS evaluation should help Australia to both identify and communicate these opportunities in a useful way, based on independent evaluation against international standards for the quality of veterinary services.

More than 40 participants from across Australia (and internationally) undertook PVS training in July 2015. This provided Australia with a firm understanding of the PVS system, greatly assisting in the detailed preparations required for a PVS evaluation. Preparations included submission of detailed baseline data to the incoming PVS evaluation team before their arrival. After three days of meetings in Canberra, the OIE PVS evaluation team visited every state and territory. More than 60 field sites were visited, including Australian Government animal health offices, live export facilities, border inspection at airports and seaports, post-entry quarantine stations, state and territory government animal health offices, industry groups, district veterinary offices (or equivalents), private veterinary practices, livestock farms, export and domestic abattoirs, veterinary laboratories, veterinary schools, veterinary boards, and veterinary pharmaceutical companies. At the PVS closing meeting in Sydney on 13 November 2015, the PVS team was highly complimentary of their Australian PVS experience.

At the time of writing, the final OIE PVS report of Australia is still pending. Preliminary indications are that our animal and veterinary public health system has performed to a very high level, with scope for focused attention in a few areas. Australia's response to the final OIE PVS report will be developed by an AHC task group and implemented during 2016.

1.3.3 State and territory animal health services

Under the Australian constitution, state and territory governments are responsible for animal health services within their respective borders (jurisdictions). State and territory animal health services aim to protect the interests of livestock producers and the community by providing world-class biosecurity systems that benefit the economy, the environment and public wellbeing. This is achieved through a combination of legislation and service delivery. Although the mechanisms differ among jurisdictions, AHC ensures a harmonised outcome by coordinating the jurisdictions' approaches to national animal health issues.

The state and territory governments develop and administer legislation relating to surveillance, control, investigation and reporting of diseases; chemical residues and contaminants; and animal welfare. They deliver their services through government-appointed or government-accredited animal health personnel – district veterinarians, regional veterinary officers and local biosecurity officers – who administer the relevant state and territory legislation, and provide extension services to industry and the community. The work of these personnel includes:

- surveying, controlling, investigating and reporting on livestock diseases of interest, including EADs
- contributing to the control of specified endemic livestock diseases, in partnership with relevant livestock industries
- monitoring and ensuring compliance with animal identification systems, and supplying vendor declarations
- maintaining appropriate controls on the movement of livestock to ensure a high level of biosecurity
- investigating reports of chemical contamination in livestock products and implementing response plans to protect consumers from chemical residues

15 www.oie.int/support-to-oie-members/pvs-evaluations

- contributing to producer awareness of best practice in local livestock management systems
- ensuring compliance with national and local standards for livestock welfare
- monitoring the health of feral animals and native wildlife to detect the emergence of new or exotic diseases
- educating livestock producers, industry organisations and service providers (transport and marketing) about their legislative obligations; relevant biosecurity, welfare and market assurance programs; and technological developments.

Notifiable diseases

Under state and territory legislation, jurisdictions proclaim certain diseases as 'notifiable'. Animal owners and veterinarians have a legal requirement to report notifiable diseases to the government animal health authorities when such diseases are suspected or diagnosed.

The National List of Notifiable Animal Diseases[16] lists exotic, emergency and endemic diseases of national significance. Notifiable diseases for each state and territory include diseases on the national list, together with diseases that are of significance in a particular jurisdiction. Government-appointed veterinarians and biosecurity officers monitor notifiable diseases and implement regulatory control programs, where necessary. They are authorised, in defined circumstances, to inspect, quarantine, test, treat and destroy affected livestock as part of regulated disease response or control.

For the past 60 years, the coordinated efforts of state and territory animal health services – often assisted by nationally coordinated arrangements – have eradicated many notifiable diseases. These include classical swine fever (1960–61), contagious bovine pleuropneumonia, contagious equine metritis, bovine brucellosis, bovine tuberculosis, virulent Newcastle disease, equine influenza and highly pathogenic avian influenza.

Surveillance and other collaborative activities

As well as administering legislation, state and territory animal health personnel conduct general surveillance and applied research projects. Authorities are constantly alert to the possible emergence of new infectious diseases, as early detection of disease facilitates more rapid control and eradication. This work requires close links with livestock producers, industry and community organisations, private veterinarians, veterinary laboratories, research organisations, livestock transport and marketing agents, and other stakeholders.

State and territory animal health personnel provide disease diagnostic services, particularly for cases that are not routinely managed by private veterinarians, such as detailed investigations for exotic and emerging diseases. Field staff are supported by government or government-contracted veterinary diagnostic laboratories, which provide reports to government. Many of the advances in Australia in understanding and managing livestock diseases during the past 60 years have come from the partnership between government laboratories and field workers.

Data gathered during these activities are recorded in disease information databases, to maintain disease profiles of districts and individual properties. Information collected and analysed by the state and territory animal health systems is collated through the National Animal Health Information System. This information is used to support the issue of health certificates for domestic and international trade, and to produce reports on Australia's animal disease status for the OIE.

Collaboration with industry strengthens government animal health services and contributes to high-quality policy decisions. It also leads to joint government–industry programs for awareness and improvement of biosecurity and welfare. Such programs have been applied for ovine brucellosis, ovine footrot, Johne's disease, caprine arthritis–encephalitis, feedlot management and poultry production systems. To promote government–industry partnerships, AHA trains livestock industry staff to work in EAD control centres.

Protecting human health from diseases and pests of animals is a key role of state and territory animal health personnel. They work closely with their government public health counterparts in a joint approach to zoonoses such as salmonellosis, chlamydophilosis, avian influenza and Hendra virus infection.

In 2015, collaboration between the Department of Agriculture and Water Resources, state and territory governments, AHA and the livestock industries, including through AHC, led to outcomes on the following national animal health priorities:

- A review of the overall management of bovine Johne's disease (BJD) in Australia resulted in a framework document that provides a national approach to future management of BJD. The document represents the

16 www.agriculture.gov.au/pests-diseases-weeds/animal/notifiable

deliberations of the Australian, state and territory governments, and cattle industries. It also takes into account the numerous submissions made during the consultation process for the review, and discussions arising from four forums held during the review. The BJD Reference Panel met in late 2015 to consider submissions, and has set a pathway for the removal of control measures implemented by jurisdictions to one that is market driven, biosecurity focused and producer orientated. The review will place BJD in the same context as any other endemic disease.

- Under the IGAB, the animal health sector is required to produce a National Animal Health Surveillance and Diagnostic Strategy and business (work) plan. A joint industry–government workshop agreed on surveillance priorities and actions, governance of a national business plan, and the lead agencies that will take responsibility for each of the proposed activities; these decisions have been endorsed by AHC. The revised National Animal Health Surveillance and Diagnostics Business Plan will be finalised in 2016.
- Foot-and-mouth disease (FMD) remains the single greatest EAD threat to the red meat, dairy, wool and pig industries.[17] The priorities for Australia are to prevent the introduction of FMD, and to limit the impact of an FMD outbreak to enable a quick resumption of trade. A number of initiatives relating to FMD preparedness, including issues relating to FMD vaccines, were undertaken in 2015. AHC will now determine the next steps in bolstering Australia's preparedness to respond to an outbreak of FMD.

1.3.4 Private veterinary services and veterinary education

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

Veterinary practitioners must be registered in the state or territory in which they practise. Competence in recognising and diagnosing livestock diseases is an important part of veterinary education in Australia, and a prerequisite for registration as a veterinarian. All veterinary practitioners must be able to recognise the possibility of an EAD and be familiar with the procedures to initiate an immediate response. To maintain this awareness, state and territory authorities conduct awareness programs on notifiable and exotic livestock diseases for private veterinarians, particularly those involved in livestock industries.

The national Accreditation Program for Australian Veterinarians[18] is designed to integrate private veterinary practitioners into the national animal health system, to support the international standing of Australia's animal health capability. The program accredits non-government veterinarians who can use their skills and knowledge effectively to contribute to government and industry animal disease control programs, and export inspection and certification.

Another national program that involves private veterinarians in the national animal health system is the National Significant Disease Investigation Program (see Section 3.1.3).

Australia has seven veterinary schools – at the University of Queensland, the University of Sydney, the University of Melbourne, Murdoch University, Charles Sturt University, James Cook University and the University of Adelaide. All are currently producing graduates. All Australian veterinary courses include strong programs in the health of horses, companion animals, farmed livestock and wildlife, as well as in animal welfare, biosecurity and public health. The veterinary schools also provide research, continuing education and postgraduate training relevant to Australia's livestock industries.

Once every seven years, an accreditation committee – the Australian Veterinary Schools Accreditation Committee – visits each established Australian veterinary school and Massey University in New Zealand to audit against 12 standards, including curriculum, facilities, staffing and outcomes. Since 1999, the Australasian Veterinary Boards Council (AVBC)[19] has audited the veterinary schools. Most site visits include a representative from the Royal College of Veterinary Surgeons (United Kingdom) on the team. All seven Australian veterinary schools are accredited with the Royal College of Veterinary Surgeons and the South African Veterinary Council. In recent years, teams from the United

17 http://data.daff.gov.au/anrdl/metadata_files/pb_pseiFMDd9abbl20131011_11a.xml

18 www.animalhealthaustralia.com.au/training-centre/accreditation-program-for-australian-veterinarians-apav

19 www.avbc.asn.au

States accreditation system have joined AVBC visits to American Veterinary Medical Association–accredited schools at Massey, Melbourne, Murdoch, Queensland and Sydney universities.

Schools must also submit annual reports, which are assessed against the 12 standards for veterinary accreditation.

As well as being responsible for accreditation, the AVBC advises on the standards for veterinary registration in Australia and New Zealand, and on the registration of veterinary specialists. It also assesses the skills of veterinarians who wish to migrate to Australia and administers the National Veterinary Examination for overseas-qualified veterinarians.

1.3.5 Agricultural colleges and other registered training organisations

Universities, agricultural colleges and other registered training organisations in the Australian vocational education and training sector provide training for veterinary nurses, animal technologists, farm managers and others involved in caring for animals. Students can participate in full-time training, mix part-time training with work or begin their program while they are still at school. One of the hallmarks of the system is the active involvement of industry groups and employers in providing training opportunities and work experience. This training meets the requirements of national competency standards and vocational qualifications under the Australian Qualifications Framework. The standards are agreed by industry, professional organisations and each jurisdiction.

In 2012, a suite of vocational qualifications in biosecurity emergency management at the levels of Certificate III, Certificate IV and Diploma was nationally endorsed by the National Skills Standards Council. These provide a training and qualification pathway for people engaged in EAD preparedness and response activities, including government employees and livestock producers.

1.3.6 Livestock Biosecurity Network

The Livestock Biosecurity Network (LBN) is an independent industry initiative funded by the Cattle Council of Australia, the Sheepmeat Council of Australia and WoolProducers Australia. The LBN is currently in the final phase of its pilot period (ending June 2016), and the achievements in strategic operational activities and partnerships have been reviewed.

The LBN has developed key partnerships to boost the delivery of activities that build awareness of the need to manage biosecurity risks on-farm for producers; and for allied animal health workers, such as livestock agents; and workers in saleyards, extension bodies, industry programs and agricultural shows. Targeted extension campaigns have also been held in veterinary and agricultural schools.

Image credit: Bigstock

The partnerships and collaborations with industry programs – such as Making More from Sheep, More Beef from Pastures and Grazing Best Management Practices – have provided opportunities for extension and awareness on biosecurity risk management. They have also enabled feedback to be collected on key areas of extension that are required.

Collaboration with state and territory government animal health authorities, particularly in areas where changes in biosecurity regulation are occurring, highlights the relevance of the LBN in making information and tools accessible to producers, to assist them in meeting their biosecurity obligations.

In 2014, all LBN regional staff participated in events across Australia as part of Exercise Odysseus (the national livestock standstill preparedness exercise). This led to participation in further EAD preparedness activities in 2015, such as development of FMD online training packages by the Queensland Department of Agriculture and Fisheries.

Small lot holders (or hobby farmers) have often been identified as a biosecurity risk to the greater livestock industry. The LBN hosted a forum of participants from around Australia to identify the key groups within this small lot holder sector, identify the key risks, and workshop the most effective channels for communicating pertinent information on their requirements and obligations for keeping livestock.

The LBN has more than 70 active and regularly engaged networks that are used to collect and disseminate information on livestock health, welfare and biosecurity. With the development of corporate partnerships with key industry influencers, such as the OBE Organics company, and the use of producer and organisational advocates, the LBN is building awareness of the importance of these messages.

Practice change at the farm level is being seen as a result of the LBN's work, with increasing uptake of recommendations on better practice for livestock health, welfare and biosecurity. Building on the foundations for awareness, knowledge and attitudinal change in these areas will support ongoing uptake of practices for better biosecurity risk management.

1.4 LIVESTOCK IDENTIFICATION AND TRACEABILITY PROGRAMS

The NLIS is Australia's system for livestock identification and traceability. All cattle, sheep and goat producers must identify their stock, and record their movements onto and off properties on the NLIS database. All movements to and from saleyards and to abattoirs are also recorded. When fully implemented for a type of livestock, the NLIS is a permanent, whole-of-life system that allows animals to be identified – individually or by mob – and tracked from property of birth to slaughter, for the purposes of food safety, product integrity and market access.

Australia's state and territory governments are responsible for the legislation that governs animal movements, and therefore for implementing the NLIS. Jurisdictions monitor compliance with NLIS requirements throughout the livestock supply chain – checking those consigning, receiving and slaughtering stock.

Information on animal movements is recorded on movement documents and submitted to the NLIS database by producers, saleyard operators, livestock agents and processors. NLIS Limited administers the NLIS database on behalf of industry and government stakeholders. This includes managing the development and operation of the database in accordance with stakeholder requirements.

1.4.1 NLIS for cattle

NLIS (Cattle) is an electronic identification system in which each animal is tagged with a radiofrequency identification device and accompanied by movement documentation (NVD) when moved from a property. As well as recording animal movements from properties, the system enables the residue and disease status of animals to be identified.

1.4.2 NLIS for sheep and goats

NLIS (Sheep and Goats) is a mob-based system for tracing mobs of sheep and farmed goats. It uses visually readable ear tags labelled with property identification codes. When mobs are transported, they are accompanied by a movement document, such as an NVD or a waybill. Movements of mobs

are recorded in NLIS, allowing animals to be traced through the central NLIS database.

The performance of NLIS (Sheep and Goats) against the National Livestock Traceability Performance Standards (NLTPS) has been considered by industry and government. In October 2014, Australian, state and territory agriculture ministers decided against national mandatory electronic identification for sheep and goats. They agreed that state and territory governments will make necessary improvements to NLIS (Sheep and Goats) by building on the systems already in place.

1.4.3 NLIS for pigs

Australian Pork Limited is continuing to develop NLIS (Pig). It is a mob-based system based on tattoos and brands to identify the property of birth, along with movement documents. Voluntary movement reporting is now occurring through the PigPass portal.

Draft business rules for NLIS (Pig) were endorsed in July 2014 by the Agriculture Senior Officials Committee (comprising the heads of the Australian, state, territory and New Zealand primary industries government agencies). The business rules include reporting animal movements throughout the supply chain. Consultation is under way on NLIS (Pig) standards – a precursor to state and territory legislation to enable mandatory reporting of movements. NLIS (Pig) is to be presented to agriculture ministers for final approval. Once legislation is implemented, further testing will be undertaken to ensure that NLIS (Pig) meets the NLTPS.

1.4.4 NLIS for alpacas and llamas

The NLIS (Alpaca & Llama) tracing system is under development. The industry is advocating the use of identification tags that incorporate radiofrequency identification. Once implemented, the system will initially be voluntary.

1.5 LIVESTOCK INDUSTRY QUALITY ASSURANCE PROGRAMS

The peak livestock industry associations contribute to national animal health policies and strategies, implement industry biosecurity plans, and promote sound animal health management practices to livestock producers. Quality assurance (QA) programs in the livestock industries are central to on-farm biosecurity and food safety practices. Some livestock industry QA programs are detailed in the following sections.

1.5.1 Livestock Production Assurance for the red meat industry

The Australian red meat industry (cattle, sheep and goats) has developed and implemented integrity systems to verify and assure food safety and other quality attributes of livestock.

Livestock Production Assurance (LPA), which commenced in 2004, is an on-farm food safety certification program for cattle, sheep and goats. It was developed by Meat & Livestock Australia, in conjunction with industry peak councils and stakeholders. The LPA program (including LPA QA) is managed on behalf of the red meat industry by AUS-MEAT through the LPA Advisory Committee. This committee includes representatives from industry sectors, including cattle, sheep, goat and dairy producers, processors and livestock agents. The Australian Government participates through representation from the Department of Agriculture and Water Resources.

The LPA program is associated with on-farm food safety guidelines, which underpin food safety declarations on NVDs displaying the LPA logo. The LPA food safety program (Level 1) standards follow hazard analysis and critical control points (HACCP)[20] principles and comprise five elements:

- property risk assessment – ensures that livestock are not exposed to areas on a property that are contaminated with organochlorides or other persistent chemicals
- safe and responsible animal treatments – ensures that livestock intended for human consumption do not contain unacceptable chemical residues or physical hazards
- stock foods, fodder crops, grain and pasture treatments – ensures that livestock are not exposed to feeds containing unacceptable contamination, especially animal products or unacceptable chemical residues

20 HACCP is a systematic preventive approach to food safety that addresses physical, chemical and biological hazards by prevention, rather than inspection of the finished product. HACCP is used in the food industry to identify potential food safety hazards, so that key actions, known as critical control points, can be taken to reduce or eliminate the risk of the hazards being realised.

- preparation for dispatch of livestock – ensures that livestock to be transported are fit for the journey and not unduly stressed, and that contamination is minimised during on-farm assembly and transport to the destination
- livestock transactions and movements – ensures that the movement of livestock can be traced, if necessary, and that the livestock are accompanied by information on their status with regard to exposure to chemical residues.

A key focus of the program during 2015 was the phase-out of older versions of the LPA NVD, to ensure that all LPA NVDs accurately reflect current market requirements. This activity (which began with a commercial drive) was led by SAFEMEAT. It culminated in the phase-out of all NVDs before version 0413 for cattle, sheep and goats, and all NVDs before version 0412 for bobby calves; after 16 November 2015, LPA-accredited producers are required to use current NVDs.

At 30 November 2015, 212 888 property identification codes were accredited in the LPA program. For the year ending 30 June 2015, approximately 5000 on-farm audits were completed under the core random audit program and the targeted audit program conducted on behalf of the National Residue Survey. To 30 November 2015, more than 46 750 audits had been completed since the program began.

1.5.2 National Feedlot Accreditation Scheme

The Australian feedlot industry was the first agriculturally based industry in Australia to embrace QA, and its National Feedlot Accreditation Scheme (NFAS) has been in place since 1994. This program, which covers approximately 400 feedlots, encompasses animal health and welfare, environmental conservation, food safety and product integrity. Third-party annual auditing of every accredited feedlot ensures that they adhere to legislation and the scheme's standards. Importantly, NFAS requirements are more stringent than legislation because of the industry's desire to continually exceed community expectations.

The NFAS is owned and managed independently of the industry to ensure that credibility and integrity are maintained. The scheme is overseen by the Feedlot Industry Accreditation Committee, which comprises predominantly government representatives from around Australia.

Accreditation is compulsory for the supply of grain-fed beef to the export market and the majority of product sold domestically. Accordingly, lot feeders have a large incentive to be accredited under the NFAS. Government and commercial incentives to increase NFAS uptake have also been implemented. For example, the peak body for the cattle feedlot industry, the Australian Lot Feeders' Association (ALFA), has obtained discounts from insurance providers for NFAS-accredited feedlots, which have a lower risk profile than feedlots that are not accredited. ALFA has also been able to negotiate an environmental licence fee discount (all feedlots require an environmental licence to operate) for NFAS-accredited feedlots in some states as a result of the superior environmental performance of such operations.

Continuous updating of the NFAS with relevant scientific and technical information enables industry to demonstrate that it operates in accordance with the requirements and expectations of consumers, markets, governments and the wider community. The standards and integrity delivered by NFAS mean that the program is now recognised under legislation in some states, thereby further encouraging industry uptake. For example, the Victorian Government has recognised the NFAS as an Approved Compliance Arrangement under the Victorian *Livestock Management Act 2010*. This means that NFAS-accredited feedlots in Victoria are deemed compliant with the requirements of the Livestock Management Act, and are not subject to further inspection or audit, other than that already required under the NFAS. This recognition of the NFAS by the Victorian Government will result in considerable cost savings to both producers and government.

ALFA has reviewed animal welfare within the sector, assessing industry:

- animal welfare issues, practices and standards
- knowledge and research gaps
- weaknesses and areas for improvement.

As a result of this review, ALFA has made numerous amendments to the NFAS standards. These have been promulgated through the industry via ALFA animal health and welfare workshops, development and dissemination of best-practice manuals, and the contracted Technical Services Officer. A number of research projects have been initiated to address identified knowledge gaps.

ALFA completed a strategic review of the NFAS in 2015 to ensure that the program meets the current and future needs of the industry and other stakeholders. The recommendations from the review will be implemented during 2016.

1.5.3 Dairy industry quality assurance program

Australia has comprehensive food standards, legislation and regulation that apply across the dairy production and processing chain, from farm to consumer, under the requirements of the Australia New Zealand Food Standards Code (Standard 4.2.4: *Primary production and processing standard for dairy products*). The production and processing chain monitors compliance with food standards to ensure the integrity of the dairy supply chain.

The Australian dairy food safety scheme has three elements:

- Dairy farms and dairy companies must have a food safety program that is developed, validated and approved by the competent government authority to national and international standards.
- Individual programs must be verified under legislation from farm through to retail or export.
- Each business (farm or manufacturing company) must be licensed, and compliance with the food safety program must be checked by audit.

Industry and government support programs underpin the scheme, and the partnership between industry and government is a critical factor in its success. The food safety requirements of the dairy industry on-farm QA program are complemented by recommended biosecurity elements to protect animal health; they cover provisions of national disease control programs, including for enzootic bovine leucosis and Johne's disease.

The state dairy food safety authorities license the operation of farm businesses. All on-farm dairy food safety programs are HACCP based. They cover the following core areas, which are relevant to both milk and meat production:

- physical, chemical and microbiological contaminants
- herd health programs (including safe and responsible animal treatments)
- dairy milking premises
- hygienic milking
- water supply and quality
- cleaning and sanitising
- identification of animals from birth
- traceability systems for both farm inputs (including animal feeds and pasture) and farm outputs (milk, and animal or meat products)
- appropriate records to enable verification
- competence of personnel.

All dairy companies have product identification and traceability systems to follow raw materials and products from farm to consumer.

1.5.4 Australian Pork Industry Quality Assurance Program

Following a recent major review of programs policies, processes and standards, the APIQ✓® Standards (Version 4.1, October 2015) were amended to include seven modules to better allow producers to manage all on-farm risks. The seven modules are:

- Management
- Food Safety
- Animal Welfare
- Biosecurity
- Traceability
- Environment
- Transport.

Other modules may be added where APIQ✓® Standards and Performance Indicators have been agreed and approved by the board of Australian Pork Limited, to take account of evolving industry requirements.

APIQ✓® also provides options for verification of additional requirements for specific customers or markets. Version 4.1 includes verification options for:

- gestation stall free (GSF)
- customer specifications for Coles Supermarkets Australia Pty Ltd.

APIQ✓® has three certification types available to producers:

- indoor (specified as APIQ✓®)
- free-range (specified as APIQ✓® FR)
- outdoor bred, raised indoors on straw (specified as APIQ✓® OB).

APIQ✓® certification incorporates the legal requirements set out in the *Model code of practice for the welfare of animals: pigs*. Certification enables producers to demonstrate that they are meeting relevant national, state and territory legislation, and following good agricultural practice.

The APIQ✓® Standards are outcome focused and supported by performance indicators. Supplementary information to help producers comply with the standards is provided in manuals, including a compliance guide and auditor guide for auditors.

Australian Pork Limited manages the program on the industry's behalf through APIQ✓ Management. A wide range of stakeholders have provided technical and policy input to the program, including producers, scientists, QA and audit experts, retailers, customer organisations, government, and supply chain members. The program was also trialled on-farm in different herd sizes and types of production systems.

All APIQ✓®–certified producers must have an annual on-site compliance audit and meet all the certification requirements. Auditors must be APIQ✓® registered and accredited by Exemplar Global as National Food Safety Auditors, Level 2; they must also have passed APIQ✓® Scope (an examination to test knowledge of the pig industry) and have attended annual APIQ✓® auditor training programs. They must be a third party with no conflicting interests and must not audit the same piggery for more than three consecutive years. Each auditor's skills and practices are assessed annually through an independent on-farm witness audit process. APIQ✓® auditors must renew their registration each year.

The APIQ✓® system and program is audited annually by an independent certifying body to ensure that its policies, processes and administration are robust, reliable and of a high standard.

An independent panel of experts, the APIQ✓ Panel, considers major or critical incidents involving producers and auditors, and determines courses of action when non-compliance issues arise, in accordance with APIQ✓® certification policies.

APIQ✓® underpins the PigPass NVD, which includes sections relating to pig ownership and health status (withholding periods, export slaughter intervals and food safety). When the PigPass NVD is linked to a certified and audited on-farm QA program such as APIQ✓®, it meets the requirements of the state food authorities and the Department of Agriculture and Water Resources under the *Australian standard for the hygienic production and transportation of meat and meat products for human consumption* (AS 4696:2007).[21]

As of 1 December 2015, 91.2% of commercial sows in production in Australia were APIQ✓® certified, with 13.3% of these certified as FR or OB. Producers continue to move voluntarily towards GSF production, in line with the industry's 2010 Shaping Our Future initiative; 70.7% of commercial sows in Australia are GSF verified. APIQ✓® auditors verify GSF status.

1.5.5 Egg Corp Assured, the national egg quality assurance program

The Australian Egg Corporation Limited (AECL) developed Egg Corp Assured (ECA), a voluntary national egg QA scheme, on behalf of the egg industry. The scheme is part of the egg industry's commitment as a signatory to the Government and Livestock Industry Cost Sharing Deed in Respect of Emergency Animal Disease Responses[22] and the industry's responsibility to the community to ensure the production of quality eggs. ECA is a unique QA scheme that provides standards for a range of egg industry good-practice criteria for pullet rearing, egg production, egg grading and egg packing. It addresses:

- animal health and welfare
- quarantine and biosecurity
- food safety
- egg labelling
- environmental management.

Launched in November 2004, the scheme is governed by certification rules, a registered trademark, a registration and licensing process, a suite of policies and procedures, and an independent, third-party auditing regime. Voluntary uptake of the scheme by industry has led to AECL issuing 221 certificates across 147 sites that constitute 56 egg businesses. The scheme covers more than half of the national laying flock. All farming systems from all regions and all sizes of businesses are licensed under the scheme.

As a result of a recent external review of the scheme, the administration and operations of ECA have been outsourced to Scheme Support Services, a wholly owned subsidiary of Freshcare. AECL entrusts audit management of ECA to global

21 www.publish.csiro.au/pid/5553.htm

22 www.animalhealthaustralia.com.au/what-we-do/emergency-animal-disease/ead-response-agreement

certification bodies whose auditing staff have Exemplar Global accreditation in food safety, as a minimum. Auditors must also attend the ECA auditor training program held each year by AECL. A program of verification and unannounced audits form part of the scheme.

1.5.6 Australian Chicken Meat Federation's customer-driven quality systems

The Australian Chicken Meat Federation maintains and promotes the *National farm biosecurity manual for chicken growers*.[23] This manual sets out the minimum biosecurity requirements that must be implemented on meat chicken farms. Compliance with the manual is obligatory for chicken growers under their contractual arrangements with the chicken-processing companies they supply. The manual includes an auditable checklist. Companies periodically assess their growers for compliance with the measures identified in the manual.

Implementation of the procedures in the manual also satisfies the requirements for poultry farming specified in the Primary Production and Processing Standard for Poultry Meat, issued by Food Standards Australia New Zealand. This standard came into effect on 20 May 2012, and has been incorporated into state and territory legislative frameworks. Under the standard, all meat chicken farms must have an appropriate food safety management system in place. Depending on the jurisdiction, farms may have to be licensed. Food safety management systems in place on farms are regularly audited by the relevant jurisdictional authority and/or the processor to whom the farmer is contracted, to confirm that appropriate measures are in place to ensure food safety.

The industry has developed auditable industry animal welfare standards for all steps in the chicken meat production process – including hatcheries, breeder farms and grow-out farms. Although there is no formal, across-industry farm assurance program to deliver these standards, processors are encouraged to integrate the standards into their in-house QA systems. All major meat chicken processors have instituted closed-circuit television surveillance of live animal handling areas at processing plants to ensure the humane treatment of the birds at all times.

Chicken meat–processing companies are also required to meet the standards required by their major customers, such as the major supermarket chains and quick service restaurants. These standards cover food safety, animal welfare and animal health. In many cases, compliance with the standards is independently audited.

The majority of chickens farmed with access to an outside range area are accredited under the Free Range Egg and Poultry Australia (FREPA) certification program. Compliance with FREPA standards is independently assessed. Most chickens produced in Australia are from farms that comply with RSPCA Approved Farming Scheme standards, and the majority of these are accredited under this system; RSPCA staff assess compliance with scheme standards.

1.5.7 Q-Alpaca

The Q-Alpaca program, developed and managed by the Australian Alpaca Association, is a QA program for voluntary use by Australian alpaca breeders and owners. Q-Alpaca is fully endorsed by all Australian Government, and state and territory animal health authorities.

The objectives of Q-Alpaca are to:

- encourage easier and more affordable disease monitoring and management, to increase member participation in disease surveillance programs
- provide a means of early detection of an EAD (such as FMD) in Australia and reduce the effects of such a disease on the Australian alpaca industry
- ensure that alpaca herds remain healthy, by professionally investigating deaths using private veterinary practitioners
- help to prevent disease spread between alpaca herds, and the introduction of diseases into a herd
- allow herds that are currently in the Alpaca Market Assurance Program (AlpacaMAP) for Johne's disease to gain an extra Monitored Negative (MN) status credit; these herds can maintain their MN status without further faecal testing, provided they continue their participation in Q-Alpaca
- allow other herds that are not in the AlpacaMAP to gain the equivalent of MN1 status (the lowest level of assurance).

The Q-Alpaca program provides disease surveillance information about the Australian alpaca herd. Postmortem examinations are required for any adult over 12 months of

23 http://farmbiosecurity.com.au/wp-content/uploads/2012/12/National-Farm-Biosecurity-Manual-for-Chicken-Growers.pdf

age that dies or is euthanased, or any cria under 12 months of age that shows signs of emaciation or diarrhoea and either dies or is euthanased.

The program is fully auditable. Among other requirements, owners of participating alpaca herds are required to keep movement records, adopt sound biosecurity practices when new arrivals are added to the herd, and maintain appropriate and adequate fencing.

An agreement signed between the participant and the private veterinary practitioner forms the basis of a partnership for adhering to the requirements of Q-Alpaca and the adoption of best practice in biosecurity.

1.5.8 National honey bee industry B-QUAL food safety program

The honey industry recognises that quality and food safety standards are required by customers, wholesalers and regulators. The industry must comply with the requirements of Food Standards Australia New Zealand – including the development of a HACCP-based food safety program – to ensure that honey products meet international, national, and state and territory food safety requirements.

The B-QUAL food safety program is a voluntary program for apiarists and honey-processing businesses that ensures that the honey bee industry's standards meet best practice, and domestic and international market demands. The program is owned by the Australian Honey Bee Industry Council, managed by the B-QUAL Australia board and administered by AUS-QUAL (a certification body accredited by the Joint Accreditation System of Australia and New Zealand).

The B-QUAL standards encompass all facets of honey production and industry services, including honey production, queen bees, pollination and honey packing. B-QUAL is a cost-effective and easy-to-use program. Beekeepers who wish to become certified first undergo training in HACCP principles and the B-QUAL requirements. The nationally recognised training is provided by AUS-MEAT through its registered training organisation. Groups of beekeepers can attend face-to-face workshops, or individual beekeepers can complete a self-learning pack.

Once a beekeeper has integrated the B-QUAL requirements into their operation, the business is audited by an Exemplar Global third-party auditor. Certification is provided by AUS-QUAL. Beekeepers selling direct to the public are audited every year. Those selling bulk honey to packers are audited once every two years.

The B-QUAL program provides comprehensive work instructions and record forms that must be maintained for:

- hive management (identification, location, movement, disease status)
- extraction (process, facilities, equipment)
- biosecurity
- hygiene (personal, machinery maintenance, sanitation, vermin control)
- purchases (inventory lists, stocktake activities)
- equipment calibration
- internal and external audit results
- staff training
- occupational health and safety issues.

The B-QUAL Board is committed to maintaining the integrity of the B-QUAL program, and ensuring it remains relevant and beneficial to the industry.

1.5.9 Other quality assurance programs

FeedSafe® stockfeed industry quality assurance program

The Stock Feed Manufacturers' Council of Australia (SFMCA) operates FeedSafe® as the QA program for the Australian stockfeed industry. FeedSafe® aims to increase the commitment of the Australian stockfeed industry to QA and risk mitigation in the manufacture and use of animal feeds. Through FeedSafe®, the SFMCA has recognised the need for a broader industry approach to feed and food safety, and is providing greater security of supply to Australia's livestock industries.

The central aspect of FeedSafe® is a code of good manufacturing practice.[24] This document was developed in consultation with the chief veterinary officers of each state and territory, and was endorsed by the then Standing Council on Primary Industries. FeedSafe® requires feed manufacturers to meet minimum standards and undergo annual site audits by independent third-party food safety auditors. Feed manufacturers are required to implement HACCP as part of their FeedSafe® accreditation.

24 www.sfmca.com.au/info_centre/documents/185

Australian Renderers Association rendering quality standards and accreditation

The *Australian standard for the hygienic rendering of animal products* (AS 5008:2007)[25] provides the framework for producing safe rendered products in Australia. It prescribes minimum requirements for:

- implementing QA and HACCP principles
- hygienic construction of rendering plants
- hygienic rendering operations, microbiological testing and validation of heat treatments
- product tracing and recall
- labelling requirements that are consistent with state and territory legislation on labelling stockfeed with a statement relating to restricted animal material.

Each state and territory requires rendering plants to abide by the standard. Compliance is verified by regular audits by, or on behalf of, state and territory food authorities, or by independent auditors, who recommend accreditation of rendering plants according to the scheme managed by the Australian Renderers Association (ARA). Independent auditors report their findings to the ARA. The Department of Agriculture and Water Resources is notified of all critical non-compliances affecting export operations. In some states and territories, the auditors also report results of audits, or compliance with product labelling requirements, to the relevant state or territory authorities.

PetFAST

The Pet Food Adverse Event System of Tracking (PetFAST)[26] is a voluntary joint initiative of the Australian Veterinary Association and the Pet Food Industry Association of Australia. It is designed to track health problems in dogs and cats that are suspected of being associated with eating certain pet foods or treats. The system enables veterinarians to report, and information to be analysed, so that potential problems can be identified and action taken. PetFAST was launched in January 2012.

Australian standards for the seafood industry

Australia's seafood comes from a combination of wild-capture and aquaculture sources. All producers and manufacturers consider public and consumer confidence in seafood safety to be of paramount importance. Many of the larger sectors have developed their own QA programs, based on HACCP principles and good manufacturing practices that are tailored to their individual operations.

The Fisheries Research and Development Corporation (FRDC) was accredited in October 2013 by the Accreditation Board for Standards Development Organisations to develop Australian standards for the seafood industry. The FRDC manages the ongoing maintenance and development of the *Australian fish names standard* (AS 5300),[27] which specifies the nationally agreed standard names for all fish species in Australia.

The seafood industry has developed and maintains a Seafood Incident Response Plan (SIRP, previously the Seafood Emergency Plan), to be activated in the event of an adverse seafood incident. The role of the SIRP is to minimise damage to the seafood industry by providing guidance on how the industry is to respond in the unlikely event of an adverse incident.

All individual food businesses are legally required to have a documented food recall plan in case a product has to be recalled. Similarly, all food safety agencies have well-developed emergency response strategies in place and regularly trial them. The strategies involve:

- stopping any further distribution and sale of unsafe food
- retrieving the potentially unsafe food
- informing the public and the relevant authorities about the problem.

25 www.publish.csiro.au/pid/5666.htm

26 www.ava.com.au/petfast

27 http://seafoodstandards.com.au/fish-names/Pages/default.aspx

Image credit: iStock

Image credit: Theresa Robinson

CHAPTER 2

Terrestrial animal health status

Australia has a long history of freedom from the major epidemic diseases of livestock. The geographical isolation of the continent provides a natural biosecurity barrier, which is supported by sound biosecurity policies and a history of successful disease eradication campaigns.

The spread of some endemic diseases in animals in Australia is limited by climate and the animal production enterprises present in a particular area. Tick fever, for example, occurs only in parts of northern Australia where the climate is suitable for the tick vectors.

State and territory governments manage the control and eradication of animal diseases, often with the support of industry accreditation schemes. Chapter 1 describes the coordinating mechanisms that are in place to provide national consistency – for example, Animal Health Committee.

This chapter provides information about Australia's reporting system for animal diseases, Australia's status for all nationally significant terrestrial animal diseases, and control programs for endemic diseases of national significance in terrestrial animals.

2.1 NATIONAL NOTIFIABLE ANIMAL DISEASES

The National List of Notifiable Animal Diseases[28] of terrestrial animals facilitates disease reporting and control. It takes into account key diseases on the list of diseases that are notifiable to the World Organisation for Animal Health (OIE) and also includes endemic diseases of national significance. Occurrences of diseases on this list must be reported to government authorities. This ensures that unusual incidents involving animal mortality or sickness and diseases of public health significance are investigated. The list is reviewed periodically by Animal Health Committee; it was last reviewed in early 2015.

The requirement to report a notifiable disease is contained in state and territory legislation. State and territory lists of notifiable diseases contain all the diseases on the national list, as well as others that are of particular interest to an individual state or territory.

2.2 INTERNATIONAL REPORTING

Australia provides the OIE with routine information about OIE-listed diseases through reports every six months. Information on other diseases of interest to the OIE is reported through annual questionnaires. Tables 2.1 and 2.2 show Australia's status for both these categories in 2015.

Table 2.1 Australia's status for OIE-listed diseases of terrestrial animals, 2015

Disease	Status	Date of last occurrence and notes
Multiple-species diseases		
Anthrax	Present	Limited distribution
Aujeszky's disease virus (infection with)	Free	Never occurred
Bluetongue	Viruses present	Restricted to specific northern areas of Australia. Sentinel herd and vector monitoring programs are in place
Brucella abortus (infection with)	Free	Australia declared freedom in 1989
Brucella melitensis (infection with)	Free	
Brucella suis (infection with)	Serological evidence	Maintained in feral pigs in some parts of Australia. Rare occurrence in domestic pigs
Crimean Congo haemorrhagic fever	Free	Never occurred
Echinococcus granulosus (infection with)	Present	
Echinococcus multilocularis (infection with)	Free	Never occurred
Epizootic haemorrhagic disease	Virus present	Disease has not been reported
Equine encephalomyelitis (eastern)	Free	Never occurred
Foot-and-mouth disease	Free	1872. Australia is officially recognised by the OIE as free without vaccination
Heartwater	Free	Never occurred
Japanese encephalitis	Serological evidence	Detected annually in Torres Strait, and on Cape York in 1998 and 2004

28 www.agriculture.gov.au/animal-plant-health/pests-diseases-weeds/animal/notifiable

Table 2.1 Australia's status for OIE-listed diseases of terrestrial animals, 2015 *continued*		
Disease	**Status**	**Date of last occurrence and notes**
Multiple-species diseases *continued*		
New World screw-worm fly (*Cochliomyia hominivorax*)	Free	Never occurred
Old World screw-worm fly (*Chrysomya bezziana*)	Free	Never occurred
Paratuberculosis	Present	National control and management programs are in place
Q fever	Present	
Rabies virus (infection with)	Free	1867
Rift Valley fever virus (infection with)	Free	Never occurred
Rinderpest virus (infection with)	Free	1923. With the global eradication of rinderpest in 2011, all countries are free
Surra (*Trypanosoma evansi*)	Free	Never occurred
Trichinella spp. (infection with)	Not reported	*T. spiralis* is not present. *T. pseudospiralis* is present in wildlife
Tularaemia	Free	Never occurred
West Nile fever	Australian variants present	A previously unknown Australian strain of West Nile virus was identified following an outbreak of neurological disease in horses in 2011. No cases were reported in 2015
Cattle diseases		
Bovine anaplasmosis	Present	
Bovine babesiosis	Present	
Bovine genital campylobacteriosis	Present	
Bovine spongiform encephalopathy	Free	Never occurred. The National Transmissible Spongiform Encephalopathies Freedom Assurance Program includes surveillance. Australia has official OIE 'negligible risk' status
Bovine tuberculosis	Free	Australia declared freedom in 1997. The last case in any species was reported in 2002
Bovine viral diarrhoea	Present	Bovine viral diarrhoea virus 1 (BVDV-1) is present. BVDV-2 has never occurred
Enzootic bovine leucosis	Very low prevalence in beef cattle	Australian dairy herd achieved freedom on 31 December 2012
Haemorrhagic septicaemia	Free	Never occurred. Strains of *Pasteurella multocida* are present, but not the 6b or 6e strains that cause haemorrhagic septicaemia
Infectious bovine rhinotracheitis/infectious pustular vulvovaginitis	Present	Bovine herpesvirus (BHV) 1.2b – present; BHV-1.1 and 1.2a – never occurred

Table 2.1 Australia's status for OIE-listed diseases of terrestrial animals, 2015 *continued*		
Disease	**Status**	**Date of last occurrence and notes**
Cattle diseases *continued*		
Lumpy skin disease	Free	Never occurred
Mycoplasma mycoides subsp. *mycoides* small colony (contagious bovine pleuropneumonia) (infection with)	Free	1967. Australia declared freedom in 1973 and is officially recognised by the OIE as free
Theileriosis	Free	*Theileria parva* and *T. annulata* are not present
Trichomonosis	Present	
Trypanosomosis (tsetse borne)	Free	Never occurred
Sheep and goat diseases		
Caprine arthritis–encephalitis	Present	Voluntary accreditation schemes exist
Chlamydophila abortus (enzootic abortion of ewes, ovine chlamydiosis) (infection with)	Not reported	Never occurred
Contagious agalactia	Not reported	*Mycoplasma agalactiae* has been isolated, but Australian strains do not produce agalactia in sheep
Contagious caprine pleuropneumonia	Free	Never occurred
Maedi–visna	Free	Never occurred
Nairobi sheep disease	Free	Never occurred
Ovine epididymitis (*Brucella ovis*)	Present	Voluntary accreditation schemes exist in all states
Peste des petits ruminants (infection with)	Free	Never occurred. Australia is officially recognised by the OIE as free
Salmonellosis (*Salmonella* Abortusovis)	Free	Never occurred. Surveillance has shown no evidence of infection in sheep
Scrapie	Free	1952. The National Transmissible Spongiform Encephalopathies Freedom Assurance Program includes surveillance. Atypical scrapie has been detected several times
Sheep pox and goat pox	Free	Never occurred
Equine diseases		
African horse sickness virus (infection with)	Free	Never occurred. Australia is officially recognised by the OIE as free
Contagious equine metritis	Free	1980
Dourine	Free	Never occurred
Equid herpesvirus 1 (equine rhinopneumonitis) (infection with)	Present	
Equine encephalomyelitis (western)	Free	Never occurred
Equine infectious anaemia	Present	Limited distribution and sporadic occurrence

Table 2.1 Australia's status for OIE-listed diseases of terrestrial animals, 2015 *continued*		
Disease	**Status**	**Date of last occurrence and notes**
Equine diseases *continued*		
Equine influenza virus (infection with)	Free	Australia's first outbreak occurred between 24 August and 25 December 2007. Australia declared freedom according to OIE standards on 25 December 2008
Equine piroplasmosis	Free	1976
Equine viral arteritis (infection with)	Serological evidence	
Glanders	Free	1891
Venezuelan equine encephalomyelitis	Free	Never occurred
Swine diseases		
African swine fever	Free	Never occurred
Classical swine fever virus (infection with)	Free	1962. Australia is officially recognised by the OIE as free
Nipah virus encephalitis	Free	Never occurred
Porcine cysticercosis	Free	Never occurred
Porcine reproductive and respiratory syndrome	Free	Never occurred
Transmissible gastroenteritis	Free	Never occurred
Avian diseases		
Avian chlamydiosis	Present	
Avian infectious bronchitis	Present	
Avian infectious laryngotracheitis	Present	
Avian mycoplasmosis (*Mycoplasma gallisepticum*)	Present	
Avian mycoplasmosis (*M. synoviae*)	Present	
Duck virus hepatitis	Free	Never occurred
Fowl typhoid	Free	1952
Highly pathogenic avian influenza virus (infection with)	Free	2013
Infectious bursal disease (Gumboro disease)	Present	Infectious bursal disease occurs in a mild form. Very virulent strains are not present
Low pathogenicity notifiable avian influenza virus (poultry) (infection with)	Occasional	2013

Table 2.1 Australia's status for OIE-listed diseases of terrestrial animals, 2015 *continued*		
Disease	**Status**	**Date of last occurrence and notes**
Avian diseases *continued*		
Newcastle disease virus in poultry (infection with)	Lentogenic viruses present	Virulent Newcastle disease last occurred in poultry in 2002. In August 2011, a paramyxovirus not previously reported in Australia was detected in hobby pigeons in Victoria. Disease caused by this virus has not spread to poultry
Pullorum disease	Not reported	Last reported in 1992. *Salmonella* Pullorum has been eradicated from commercial chicken flocks
Turkey rhinotracheitis	Free	Never occurred
Lagomorph diseases		
Myxomatosis	Present	Used as a biological control agent for wild rabbits
Rabbit haemorrhagic disease	Present	Used as a biological control agent for wild rabbits. A new strain was detected in 2015[a]
Bee diseases		
Acarapis woodi (infestation of honey bees with)	Free	Never occurred
Paenibacillus larvae (American foulbrood) (infection of honey bees with)	Present	
Melissococcus plutonius (European foulbrood) (infection of honey bees with)	Present	
Aethina tumida (small hive beetle) (infestation with)	Present	Restricted distribution
Tropilaelaps spp. (infestation of honey bees with)	Free	Never occurred
Varroa spp. (varroosis) (infestation of honey bees with)	Free	*Varroa destructor* has never been reported in Australia
Other diseases		
Camel pox	Free	Never occurred
Leishmaniasis	Australian variant present	Rare. No Australian *Leishmania* was isolated from macropods in 2015. A case occurred in an imported dog in 2015

OIE = World Organisation for Animal Health

a www.oie.int/wahis_2/public/wahid.php/Reviewreport/Review?page_refer=MapFullEventReport&reportid=18075

Table 2.2 Australia's status for other diseases of terrestrial animals that are reported to the OIE each year, 2015		
Disease	**Status**	**Date of last occurrence and notes**
Actinomycosis	Present	
Avian encephalomyelitis	Present	
Avian leucosis	Present	
Avian salmonellosis (excluding fowl typhoid and pullorum disease)	Present	
Avian spirochaetosis	Present	
Blackleg	Present	
Botulism	Present	
Caseous lymphadenitis	Present	
Coccidiosis	Present	
Contagious ophthalmia	Present	
Contagious pustular dermatitis	Present	
Distomatosis (liver fluke)	Present	Restricted distribution
Enterotoxaemia	Present	
Equine coital exanthema	Present	
Filariasis	Present	
Footrot	Present	Restricted distribution
Infectious coryza	Present	
Intestinal *Salmonella* infections	Present	
Listeriosis	Present	
Melioidosis	Present	Restricted distribution
Nosemosis of bees	Present	
Salmonellosis (*Salmonella* Abortusequi)	Free	Never reported
Sheep mange	Free	1896
Strangles	Present	
Swine erysipelas	Present	
Toxoplasmosis	Present	
Ulcerative lymphangitis	Free	Never reported
Vibrionic dysentery	Present	
Warble fly infestation	Free	Never reported
Other clostridial infections	Present	
Other pasteurelloses	Present	

OIE = World Organisation for Animal Health

2.3 NATIONAL REPORTING SYSTEM FOR ANIMAL DISEASES IN AUSTRALIA

Australia's disease surveillance is based on targeted and passive disease surveillance activities under the authority of the Australian, state and territory governments (jurisdictions). Each jurisdiction delivers a disease surveillance business plan to comply with legislated obligations to detect the occurrence and prevalence of notifiable diseases. Data on these disease investigations are held in field and laboratory databases, enabling control programs to be informed by property, regional, state and national intelligence on diseases.

Some data are collated nationally. Australia's National Animal Health Information System (NAHIS) collates data from a wide range of government and non-government surveillance and monitoring programs to provide an overview of animal health in Australia. The information in NAHIS is essential for supporting trade in animal commodities and meeting Australia's international reporting obligations.

All applications managed by NAHIS use the same underlying Central Animal Health Database, but maintain separate and distinct web interfaces. NAHIS provides selected summaries of national animal health data, NAMPInfo provides the official interactive bluetongue virus zone map, and the Endemic Disease Information System (EDIS) has a searchable register of herds and flocks in the Australian Johne's Disease Market Assurance Program.

NAHIS data are routinely reported, together with case reports of veterinary investigations, in the *Animal Health Surveillance Quarterly* newsletter, and are used by the Australian Government in reports to the OIE, the Food and Agriculture Organization of the United Nations, and the World Health Organization. Current disease surveillance reports and publications are available on the NAHIS page of the Animal Health Australia (AHA) website.[29]

29 www.animalhealthaustralia.com.au/what-we-do/disease-surveillance/national-animal-health-information-system-nahis

2.4 ENDEMIC DISEASES OF NATIONAL SIGNIFICANCE

This section describes the status of, and programs for, endemic animal diseases of national significance in 2015. Disease notifications for the Australian Capital Territory are included in New South Wales reporting.

2.4.1 American foulbrood

American foulbrood (AFB) is a brood disease of honey bees caused by the spore-forming bacterium *Paenibacillus larvae* subsp. *larvae* (formerly *Bacillus larvae*). The disease attacks bee larvae, eventually killing the affected hive. It is very difficult to treat, because the bacteria form spores that are resistant to heat, drying and chemicals. The recommended treatment for AFB-infected hives is to depopulate the hives, burn or bury the dead bees, and then burn, bury or irradiate the hive material. AFB is nationally notifiable and subject to control programs in several states. It is endemic in New South Wales, Queensland, South Australia (except for Kangaroo Island, which remains free), Tasmania, Victoria and Western Australia. It has not been reported in the Northern Territory.

In 2015, the Australian Honey Bee Industry Council, state and territory governments, the Australian Government Department of Agriculture and Water Resources, and Plant Health Australia continued to work together on developing the Australian Honey Bee Industry Biosecurity Code of Practice and the National Bee Biosecurity Program.

The code and program will commence in 2016. They aim to improve the management of established bee pests and diseases (particularly AFB), increase the preparedness of beekeepers for exotic pests, and increase surveillance for exotic pests. The program will be funded by the honey bee industry through the honey levy, with state governments contributing extensive in-kind resources. It will be managed nationally by Plant Health Australia, and will include the employment of bee biosecurity officers in all state primary industries departments.

A national survey for honey bee pests and diseases (established and exotic) was conducted between August

2013 and April 2015, and published in October 2015.[30] The Commonwealth Scientific and Industrial Research Organisation (CSIRO) undertook the survey with funding from the Rural Industries Research and Development Corporation (RIRDC), the honey bee industry and the Australian Government. It is the first national survey for honey bee pathogens using modern molecular tools. It outlines the current prevalence of honey bee viruses, and reports on the distribution of endemic pests and diseases in Australia.

New South Wales

In areas with a high incidence of AFB, the Biosecurity Compliance Unit of the New South Wales Department of Primary Industries (NSW DPI) has conducted special apiary compliance operations. These aim to raise awareness of the apiary industry's responsibilities under the New South Wales *Apiaries Act 1985*, to detect breaches of the Act and to allow compliance action to be taken, where necessary. The apiary industry has worked closely with NSW DPI in providing departmental apiary inspectors with information about the location of abandoned, neglected and diseased hives, and helping with the removal of some of these hives for destruction.

The take-home messages to the apiary industry were:

- to use the diagnostic, advisory and compliance services provided by NSW DPI
- that industry is responsible for eradicating AFB from its own operations.

Queensland

AFB is widespread in Queensland, and its control is a routine part of apiary management. Apiary staff from the Queensland Department of Agriculture and Fisheries (DAF) hold monthly information sessions for beekeepers in various locations, which cover sterilisation, control and management techniques.

During 2015, 113 submissions, most of them consisting of multiple samples, were made to Queensland DAF's Biosecurity Science Laboratory for diagnosis of AFB and European foulbrood (see Section 2.4.2). Of these, 62 contained one or more samples that were diagnosed as positive for AFB by microscopic examination.

South Australia

AFB is endemic in South Australia, except for Kangaroo Island, which remains free from the disease. AFB control is achieved predominantly through a combination of apiarist reporting, packer testing and active disease surveillance. AFB surveillance and control will be managed by the industry-funded National Bee Biosecurity Program once it is in place.

During 2015, AFB was reported in 256 hives belonging to 37 apiarists.

Tasmania

The Tasmanian apiary industry has established the Apiary Industry Disease Control Program for voluntarily registered beekeepers, in the absence of a government control program for AFB. Registration fees fund the testing of honey samples for AFB. This assists with disease surveillance by encouraging broad participation by both commercial and recreational beekeepers. The Tasmanian Department of Primary Industries, Parks, Water and Environment offers free inspection of hives and an advisory service to apiarists when positive hives are identified from honey samples.

Victoria

AFB is endemic in Victoria, and beekeepers are encouraged to seek laboratory confirmation of AFB when it is suspected.

Western Australia

Beekeepers in Western Australia are required to register their beehives and report occurrences of AFB in their apiaries. Eradication action is also required, and failure to take action can lead to the imposition of quarantine measures and a requirement to follow a management plan. The Department of Agriculture and Food Western Australia (DAFWA) provides a diagnostic service that allows beekeepers to monitor the AFB status of their apiaries and the department to monitor infected apiaries. These measures support a quality assurance program, B-QUAL, which has been adopted by the industry (see Section 1.5.8). The percentage of infected apiaries in 2015 remained low (6–10%).

2.4.2 European foulbrood

European foulbrood (EFB) is a disease of bee larvae caused by the bacterium *Melissococcus plutonius*. The disease is usually acquired only by larvae less than 48 hours old, which generally die at 4–5 days of age, particularly in early spring when the colonies are growing rapidly. Colonies infected with

30 https://rirdc.infoservices.com.au/items/15-095

EFB release a characteristic odour, and infected larvae die and turn brown during the coiled stage, giving a peppered appearance to the brood comb. Because of the young age at which larvae are affected, cells with diseased larvae are usually unsealed. The disease causes high mortality of larvae and reduces the longevity of queens.

EFB occurs in many regions around the world. It was first reported in Australia in 1977, and is now found in all states and territories except Western Australia and the Northern Territory. Western Australia maintains stringent control measures to minimise the risk of introduction of the disease.

EFB is diagnosed intermittently in Tasmanian honey bees – the last case was detected in 2011. It is monitored by the Tasmanian apiary industry's Apiary Industry Disease Control Program for voluntarily registered beekeepers. No incidents of EFB were detected in Tasmania during 2015.

2.4.3 Asian honey bee

The Australian Government invested $2 million from July 2011 to June 2013 to move from eradication of Asian honey bee to management of the pest in Australia through establishment of the Asian Honey Bee Transition to Management (AHB T2M) program. This was done in partnership with Biosecurity Queensland and the Australian Honey Bee Industry Council, which contributed significant funding and activities. The program, which was administered by Plant Health Australia and concluded on 30 June 2013, focused on minimising the bee's spread, and providing a range of safe and effective tools to help the community manage this pest. An Asian Honey Bee Transition Management Group was established to oversee the program, monitor its delivery and ensure that its outcomes were achieved. An Asian Honey Bee Scientific Advisory Group was also established to provide technical advice, feedback, and consideration of specific projects and activities under the AHB T2M program.

Queensland

Since their first detection in Queensland in 2007, Asian honey bees have gradually spread as far north as Mossman, south to Mena Creek and west towards Mutchilba. Natural movement is expected to result in further slow spread of the bee. A number of research and development projects started under the AHB T2M program and are continuing in 2015–16. Projects are capitalising on opportunities to reduce the incidence and impact of bee pests and diseases, and build capacity to apply research findings through extension and education. Organisations such as the RIRDC, CSIRO and Horticulture Innovation Australia[31] are delivering this research.

2.4.4 Small hive beetle

Small hive beetle (SHB), *Aethina tumida*, invades honey bee hives. It can cause serious economic concern to producers through loss of bee colonies and infestation of honeycombs awaiting extraction, especially under the hot and humid conditions in which the beetle thrives. SHB is on the list of nationally notifiable diseases. Eradication from Australia has not been attempted; the agreed management strategies aim to reduce the impact of SHB on productivity, slow its spread and minimise damage in infested apiaries. Government apiary officers provide advice and guidance to the honey bee industry. Researchers have designed, tested and commercialised a chemical-based in-hive beetle harbourage (APITHOR) – a fipronil-impregnated cardboard trap – to minimise the impact of SHB. APITHOR has been approved by the Australian Pesticides and Veterinary Medicines Authority.

A research project funded by the RIRDC on the development of an external attractant trap for SHB commenced in 2015.[32]

New South Wales

SHB is widespread in New South Wales beehives.

Northern Territory

A survey of registered beekeepers in the Northern Territory in 2009–10 confirmed the absence of SHB. Import controls to restrict entry of the pest have been introduced. Beekeepers and the Northern Territory Department of Primary Industry and Fisheries conduct targeted surveillance. No detections were reported in 2015.

Queensland

SHB is a major pest species in Queensland, where it is endemic in most coastal regions. It is present in other, drier areas as a result of beekeepers moving their apiaries to access seasonal flora. The prevalence is increasing in the northern part of the state and increases after rain in warmer months of the year. Queensland DAF provides beekeepers with information on the most efficient trapping methods. Scientific research is continuing on fungal control, yeast identification and the relationship of yeast to the SHB life cycle.

31 Previously Horticulture Australia Limited

32 www.rirdc.gov.au/research-project-details/custr10_HBE/PRJ-009334

South Australia

Despite two previous detections and a long border with Victoria, there was no evidence that SHB had established in South Australia until 2015, when it was detected in a number of apiaries in the Riverland area of South Australia. Subsequent delimiting surveillance (i.e. surveillance to establish the boundaries of the infested area) and industry consultation led to SHB being removed from the list of notifiable diseases; control is now the responsibility of individual apiarists.

Although large numbers of hives have been moved out of the Riverland area since SHB was detected, SHB has been reported from only one other location, as a result of voluntary industry notification.

Tasmania

There is no evidence of SHB in Tasmania. Apiarists are encouraged to inspect their hives regularly and to submit suspect insects to the state laboratory for identification. Queen bees, queen cells and escorts may be imported, but must be in SHB-proof containers and accompanied by a completed health certificate declaring freedom from SHB. Entry of used beekeeping equipment, packaged bees and unmelted beeswax into Tasmania is prohibited.

Victoria

SHB is endemic in Victoria, and its occurrence is monitored by the Victorian Department of Economic Development, Jobs, Transport and Resources.

Western Australia

In September 2007, SHB was detected in Western Australia in the Ord River Irrigation Area at Kununurra. Surveillance, monitoring and tracing have contained the beetle within the Ord River Irrigation Area. Zoning under legislation has identified an SHB-infested area and an SHB-free area within the state. Targeted surveillance continues; no samples collected have confirmed the presence of SHB in the free area. Import controls to restrict entry of SHB are in place.

2.4.5 Anthrax

Anthrax is on the list of nationally notifiable diseases. It is subject to compulsory government controls, including quarantine, disposal of carcasses, and vaccination and tracing of at-risk animals and their products. Areas at risk of anthrax occurrence, which are well defined, include the northern and north-eastern districts of Victoria, and central New South Wales. In these areas, anthrax has a low prevalence and occurs only sporadically.

Anthrax has never been recorded in the Northern Territory. In Queensland, the most recent confirmed cases were in 2002

Image credit: Glynda Bluhm

(six animals) and 1993 (one animal). South Australia's last recorded anthrax outbreak was in 1914, and Tasmania's was in 1933. The only case in Western Australia was an isolated case in 1994.

All suspected cases of anthrax are investigated and controlled according to an agreed jurisdictional program.

New South Wales

Three anthrax incidents occurred during 2015, all involving beef cattle. In March, a single animal died from a herd of 25 in the Condobolin district of the Central West Local Land Services region. In November, deaths occurred on two nearby properties in the Forbes district of the Central West region. Nine mixed yearlings died on one property from a herd of 220, and 19 died on the other from a herd of 142. The immunochromatographic test (ICT; see 'Victoria', below) was used, with positive results in each case, and laboratory confirmation followed. All three properties are in the known anthrax endemic area. The National Livestock Identification System database was used to trace a number of animals that had recently moved off the Forbes properties. All animals were accounted for and either returned to the property of origin, detained for 21 days or destroyed.

The three properties were managed according to NSW DPI anthrax policy. The properties were quarantined for 42 days, contaminated areas were disinfected, and all carcasses were burnt to ash. All at-risk cattle and other livestock were vaccinated.

During 2015, anthrax was excluded in 102 investigations of livestock mortality: 70 in cattle, 25 in sheep, 4 in pigs, 2 in horses and 1 in alpaca. Alternative diagnoses for cattle included clostridial infection, hypocalcaemia or hypomagnesaemia, pneumonia and plant poisoning. Alternative diagnoses for sheep included bloat, hypocalcaemia, pneumonia and intestinal parasitism. The alpaca death was diagnosed as rodenticide toxicity and the diagnoses in pigs included erysipelas.

Victoria

Victoria had one confirmed case of anthrax during 2015. A total of 76 anthrax exclusion investigations were undertaken – 64 on cattle, 11 on sheep and 1 on a horse. An 'animal-side' ICT, developed by the then Victorian Department of Primary Industries, has been used for the past several years in Victoria. This field test enables rapid screening for anthrax when government or private veterinarians are investigating sudden, unexplained deaths in ruminant livestock. Following approval of this test in 2010 by the then Sub-Committee on Animal Health Laboratory Standards, the ICT kits have been manufactured by the department and are being supplied for use in other states.

2.4.6 Caprine arthritis–encephalitis

Caprine retrovirus causes caprine arthritis–encephalitis (CAE), a multisystemic, inflammatory condition of goats. The disease is found in most countries, including Australia. It has been reported in all Australian states and territories except the Northern Territory. CAE is not included on the list of nationally notifiable diseases. Although Australia has no regulatory control programs for CAE, there are some voluntary accreditation programs based on serological testing in New South Wales, Queensland, South Australia and Tasmania. Animals testing positive are removed from the herd.

New South Wales

In New South Wales, a voluntary control program is available to goat producers. Virologists at the Elizabeth Macarthur Agricultural Institute are researching better diagnostic tests, with the aim of improving detection and providing an avenue for possible eradication of the disease.

Queensland

Queensland has had a voluntary control program for dairy goats since 1987. In December 2015, the program had 103 CAE-accredited herds.

South Australia

In South Australia, where CAE is present, the Dairy Goat Society of South Australia has a voluntary market assurance scheme.

Tasmania

A voluntary herd accreditation scheme for CAE was introduced in Tasmania in late 2011. The Department of Primary Industries, Parks, Water and Environment maintains a register of accredited-free herds. CAE is not a notifiable disease in Tasmania.

Victoria

In Victoria, where CAE is a notifiable disease, up to 100 goat herds annually are tested for CAE, either for export, for breeding or showing, or for lameness investigations. In 2015, serologically CAE-positive goats were confirmed on five properties; of these, three herds were endemically infected.

Western Australia

CAE is not a notifiable disease in Western Australia.

2.4.7 Cattle tick and tick fever

The cattle tick, *Rhipicephalus microplus* (previously *Boophilus microplus*), was introduced to Australia in the late 19th century. It spread steadily from Darwin across northern Australia, stabilising to its current distribution in the northern and north-eastern coastal regions by about 1918. The distribution of cattle tick is determined largely by climatic factors: the tick needs high humidity and ambient temperatures of at least 15–20 °C for egg laying and hatching. Cattle ticks mainly infest cattle, but may occasionally affect horses, sheep, goats, camelids, deer and water buffalo.

Tick infestations damage hides, reduce production, and cause anaemia and death. Cattle tick can also transmit tick fever (bovine babesiosis or anaplasmosis), caused by *Babesia bigemina*, *B. bovis* or *Anaplasma marginale*. Babesiosis and anaplasmosis are nationally notifiable diseases in tick-free areas.

Acaricide treatment (dipping, pour-on treatments or spraying) has been widely used for tick control in endemic areas. Inspection and treatment are compulsory for cattle leaving defined tick areas in the Northern Territory, Queensland and Western Australia, and for cattle leaving known infested properties in New South Wales. The spread of ticks from endemic areas is restricted by state-managed zoning policies. Many producers in the tick endemic area have changed to *Bos indicus*–type cattle because these breeds have greater resistance to tick infestation.

No incursions of cattle ticks or cases of tick fever were reported in South Australia, Tasmania or Victoria during 2015.

New South Wales

New infestations of cattle tick regularly occur in New South Wales; they are generally confined to the far north-eastern corner of the state. NSW DPI maintains a surveillance program at all far North Coast saleyards, where all cattle presented for sale are inspected. Inspectors treat cattle returning to a property from a sale with acaricide (by dipping) before their dispatch. Regular surveillance also occurs at North Coast abattoirs. Infested and at-risk properties are quarantined, and eradication programs and movement controls are implemented.

Surveillance cameras at eight sites along the New South Wales – Queensland border monitor livestock movements into New South Wales from the tick-infested areas of Queensland. Led and tractable livestock may be treated at the Kirra border crossing before they enter New South Wales from tick-infested areas of Queensland. Other stock originating from tick-infested areas are treated at official clearing facilities on the Queensland tick line before entering New South Wales.

During 2015, 169 new cattle tick infestations were recorded, an increase on the figures for the previous three years. Most outbreaks were directly attributable to failures of on-farm biosecurity, which allowed straying of cattle and access to land where cattle tick larvae were present. The majority of outbreaks were identified through abattoir and saleyard surveillance rather than on-farm detection. This meant that spread to other holdings had often occurred before quarantine was put in place. Acaricide resistance is not currently an issue in New South Wales isolates – amitraz resistance is only rarely recorded, usually associated with introductions of infected hosts from Queensland.

Tick fever was confirmed on four occasions in New South Wales in 2015, in three beef herds and one dairy herd, where cattle ticks were also present. The dairy herd had only one mortality, while the three beef herds had mortalities of 23, 3 and 7, respectively. The herd with 23 mortalities was infected with *B. bigemina*, whereas the other two beef herds were infected with *B. bovis*. Tick fever occurs in New South Wales infrequently; 17 outbreaks have been recorded in the past five years.

Northern Territory

Four declared areas for cattle tick are gazetted under Northern Territory legislation, and movement restrictions are in place to prevent the spread of cattle ticks between zones and interstate. The cattle tick–infested zone occurs only in the northern tropical and subtropical regions; the southern half of the Northern Territory is a cattle tick–free zone. A buffer zone, known as the cattle tick control zone, separates the infested and free areas. Cattle tick may be present on properties within this zone, and is managed by regulated movement conditions and approved programs for property management of cattle tick. An active surveillance program is in place to detect changes in cattle tick distribution. No spread of cattle tick was detected during 2015 surveillance.

A Parkhurst-infested zone was declared in 2011 around Darwin. Parkhurst-strain cattle ticks, which are resistant to synthetic pyrethroid and organophosphate chemicals, were

first detected on properties in the area in the 1990s and were originally managed by quarantining individual properties. A declared area was gazetted following active surveillance across the area, which identified spread to other properties. Movement controls, such as clean inspections and supervised treatment of livestock with an acaricide effective against Parkhurst-strain ticks, are used to minimise the risk of further spread of these ticks outside the declared area.

Surveillance on properties at the boundary of the declared area in 2015 showed no further spread of Parkhurst-strain ticks. There were no new detections of Parkhurst-strain ticks on properties outside the Parkhurst-infested zone. The only quarantined property outside the declared area was released from quarantine following completion of an intensive surveillance and management program.

Tick fever is not commonly diagnosed in the Northern Territory, although the organisms responsible for babesiosis and anaplasmosis are present. Tick fever is seen mainly in cattle that have had little or no previous exposure to ticks.

Queensland

Queensland regulates the movement of stock to control cattle ticks through the declaration of three zones: infested, free and control. The control zone is used as a buffer between the free and infested zones in parts of Queensland, to minimise the risk of incursions. Owners of stock are encouraged to take measures to eradicate or prevent the spread of cattle ticks.

Stock moving from the infested zone or from restricted properties in either of the other zones are required to meet regulated movement conditions, which may include inspection and/or treatment.

For movements from the infested zone, Queensland DAF uses a system of approved providers to provide cattle tick inspection services. Approved providers inspect and supervise treatments of stock at official clearing facilities, accounting for more than 95% of stock clearances from the infested zone. Currently, 67 approved providers are available to provide services at 26 clearing dips and 2 livestock inspection centres (spray stations). Approved providers are trained and monitored by Queensland DAF biosecurity officers.

Queensland DAF inspectors provide regulatory and advisory services for cattle tick control, eradication and management. They also provide inspection and treatment services for the restricted properties in the free and control zones, and at three clearing facilities that have not progressed to operation by an approved provider. Queensland DAF provides laboratory services for the analysis of dip fluids, and for testing and identifying acaricide-resistant strains of cattle ticks.

At the end of June 2015, when the Queensland cattle tick season ended, 142 infested properties in the free zone and 184 infested properties in the control zone were under movement restrictions. An additional 1500 properties in the free and control zones had a cattle tick status of either at risk (high) or at risk (low).

During 2015, 79 incidents of babesiosis (with an average mortality rate of 6% – range 0–40% – of at-risk animals) and 14 incidents of anaplasmosis (with an average mortality rate of 8% – range 0–13% – of at-risk animals) were confirmed through the Queensland DAF veterinary laboratory.

Live vaccines produced by Queensland DAF's Tick Fever Centre are used to control babesiosis and anaplasmosis. During 2015, the centre sold 684 000 doses of trivalent vaccine (96% chilled and 4% frozen).

Western Australia

The cattle tick–infested area in Western Australia includes the Kimberley in the north; the southern boundary is generally at latitude 20°S. Cattle moving from the tick-infested area to the tick-free area of the state are inspected and treated for ticks. There are no regulatory control measures for ticks within the tick-infested area, and there is almost no strategic treatment for ticks or vaccination for tick fever.

The last two detections of cattle tick in the tick-free area were in 1979 and 2001, and the cattle ticks were eradicated successfully. Acaricide-resistant ticks have not been detected in Western Australia.

2.4.8 Equid herpesvirus 1

Equid herpesvirus 1 (EHV-1) is a respiratory pathogen of horses that occasionally causes abortion and, rarely, neurological disease. The abortigenic and neurological strains are on the list of nationally notifiable diseases. EHV-1 abortions are generally sporadic, but outbreaks do occur. EHV-1 neurological disease is an emerging disease of increasing prevalence overseas, and new cases have been diagnosed in recent years in Australia.

Herpesvirus infection can be tentatively diagnosed if intranuclear inclusion bodies are detected during examination of tissue samples under a microscope. However, definitive diagnosis of EHV-1 infection – in cases of either

abortion or neurological disease – requires the virus to be detected by polymerase chain reaction or virus isolation. Virus detection and categorisation are essential when EHV-1 is suspected, because there are nine EHV serotypes. There is evidence that EHV-1 neurological disease could be associated with a nucleotide substitution in the EHV-1 polymerase gene. Virus isolation and sequence analysis can provide information on the prevalence of this mutation in Australian isolates.

In 2015, DAFWA diagnosed EHV-1 in a nine-year-old mare that aborted mid-term. This was the only mare affected on the property. The EHV-1 abortigenic strain was diagnosed on the basis of the clinical signs and demonstration of a rising antibody titre.

In Victoria in 2015, abortion due to EHV-1 infection was diagnosed in two mares from separate properties. It was also diagnosed in a neonatal foal that died at three days of age.

2.4.9 Hendra virus infection

Numerous Hendra virus incidents have occurred in Queensland and New South Wales since 1994, involving more than 90 horses. Most infected horses have died as a result of the disease.

Seven people are known to have been infected with the virus. Four of these have died, and one is reported to have ongoing health problems. Antibodies to Hendra virus have also been detected in two dogs that were in close contact with infected horses. Both dogs remained clinically normal, with no occurrence of related illness, but were euthanased to manage public health risks.

Flying foxes (fruit bats) are the natural host for Hendra virus, and infection is periodically present in flying fox populations across Australia. The virus has been isolated from all four species of flying fox: black (*Pteropus alecto*), grey-headed (*P. poliocephalus*), little red (*P. scapulatus*) and spectacled (*P. conspicillatus*). Spillover of infection from flying foxes to horses occurs as rare, sporadic events. To date, cases of Hendra virus infection in horses have only been detected in Queensland and northern New South Wales.

Horse-to-horse transmission of the virus has been seen in some incidents. Humans who have become infected have had very close contact with sick or dead infected horses. Seropositive dogs have also been in close contact with infected horses. Person-to-person or bat-to-person transmission of the virus has not been reported.

The incidents are not known to be linked, beyond a common exposure of horses to flying foxes. Wherever flying foxes and horses are together, there is potential for spillover of the virus to horses and then transmission to other horses, dogs or people. Regardless of the likelihood that flying foxes in any particular area are infected, it is prudent risk management for horse owners to take steps to minimise the potential for contact between flying foxes and horses, and to vaccinate their horses against Hendra virus.

In 2015, three incidents were reported: in June in Murwillumbah, New South Wales; in July in the Atherton Tableland, Queensland; and in September in Lismore, New South Wales (see also Section 4.6.1). The Queensland[33] and New South Wales[34] governments implement well-established biosecurity and public health responses to Hendra virus incidents.

2.4.10 Infectious bovine rhinotracheitis

Infectious bovine rhinotracheitis is caused by bovine herpesvirus 1 (BHV-1), which also causes infectious pustular vulvovaginitis, infectious balanoposthitis and several other clinical syndromes. BHV-1 occurs in most cattle-raising countries.

Three subtypes of BHV-1 are recognised worldwide: BHV-1.1, BHV-1.2a and BHV-1.2b. Subtypes 1.1 and 1.2a are more virulent than subtype 1.2b, and subtype 1.2a can cause severe respiratory disease and several other syndromes, including abortion. These virulent subtypes are present in North America, Europe and many other parts of the world, but only the relatively benign BHV-1.2b is present in Australia. The absence of more virulent subtypes and a predominance of pasture-based grazing means that disease due to infectious bovine rhinotracheitis is rare in Australia.

2.4.11 Johne's disease

Johne's disease (paratuberculosis) is a chronic mycobacterial infection, primarily of the intestines, that causes ill-thrift, wasting and death in several species of grazing animals. In Australia, there are two main types of the causative organism (*Mycobacterium avium* subsp. *paratuberculosis*); the sheep strain is largely restricted to sheep, whereas the cattle strain

33 www.daf.qld.gov.au/animal-industries/animal-health-and-diseases/a-z-list/hendra-virus/general-information

34 www.dpi.nsw.gov.au/agriculture/livestock/horses/health/general/hendra-virus

affects cattle, goats, alpaca and deer. In 2012, a novel 'bison' (B) strain was detected in cattle in Queensland. It is being investigated to better understand its characteristics and extent.

The livestock industries, governments and the veterinary profession collaboratively manage the Australian National Johne's Disease Control Program, which aims to reduce the impact of both the infection and the measures taken to control it. In partnership with governments, each affected industry has implemented strategies that suit its particular needs and disease situation. Key elements of the program are the Australian Johne's Disease Market Assurance Programs for cattle, sheep, goats and alpaca. These provide a high level of assurance that participating herds and flocks are not infected with Johne's disease. Details of herds and flocks in the Market Assurance Programs are maintained in NAHIS, and are available on the AHA website.[35]

In 2015, Western Australia retained its status as a bovine Johne's disease (BJD)–Free Zone. Queensland, the Northern Territory and northern South Australia's Protected Zones maintained controls on introductions to manage the risk of entry of BJD. Johne's disease is rare in the alpaca industry, and no cases were detected in 2015.

The mid-term review of the National BJD Strategic Plan commenced in 2015. This review is considering the future approach to managing BJD. A major part of the approach is a move away from zoning towards encouraging producers to take increased responsibility for their own biosecurity – for both Johne's disease and other endemic diseases. The new program is expected to commence in early 2016.

Beef cattle

BJD has rarely been detected in the northern and western beef industry. After detections in 2011 and 2012 in Queensland, most traced herds have now been released from quarantine. A small number are still in quarantine while investigation continues.

BJD is also uncommon in beef herds in south-eastern Australia. To help protect this situation, producers whose herds have had little or no contact with dairy cattle are encouraged to make a written declaration that the breeding cattle they are selling meet the criteria to be classified as low risk ('Beef Only').

Although the disease is uncommon, the impacts can be serious for individual infected herds. The National BJD Financial and Non-Financial Assistance Package helps owners of infected herds to eliminate BJD, thus contributing to the low prevalence of BJD in the beef industry. Since the scheme started in 2004, it has assisted 492 producers, about 392 of whom have had the infected or suspect statuses of their herds resolved. A key element of the scheme is the non-financial aspect. Two BJD counsellors are employed under the program to conduct a situation assessment, assist with considering management and trading options, develop a disease management plan and liaise with the supervising veterinarian.

Dairy cattle

In south-eastern Australia, the dairy industry promotes hygienic calf rearing to help reduce the incidence of BJD in replacement heifers. Buyers seeking BJD assurance are also encouraged to ask the seller for a written declaration of the National Dairy BJD Assurance Score for the cattle. A score of 10 indicates a very high level of confidence that the cattle are not infected. New South Wales and South Australia require sellers to declare the dairy score when selling dairy cattle.

Sheep

Following a major review in 2012, a revised five-year control program for Johne's disease in sheep (ovine Johne's disease – OJD) commenced from 1 July 2013. The main elements of the revised program are the implementation of regional biosecurity areas (groups of producers working together voluntarily to keep disease out of the area) and continued use of the National Sheep Health Statement. This is a declaration by the owner about the sheep that enables buyers to assess the risk of OJD and other diseases.

Abattoir surveillance provides feedback to individual farmers and the wider sheep industry on the occurrence of OJD and other significant endemic diseases. In 2014, the sheep industry continued working with AHA and the meat-processing industry to support abattoir surveillance at several sites across southern Australia. In the 2014–15 financial year, approximately 10 459 consignments, comprising 2 132 170 adult sheep, were inspected for evidence of OJD. The data from this project are used each year to assess the regional flock prevalence of OJD.

Goats

The goat industry has established a risk-based trading approach, which uses a National Goat Health Statement with a nationally agreed risk ranking system. This owner

35 www.animalhealthaustralia.com.au/what-we-do/endemic-disease/market-assurance-programs-maps

declaration includes a risk rating for Johne's disease and provides herd information on other conditions that can easily spread from herd to herd with movements of goats. A component of the strategy is a National Kid Rearing Plan to help protect young goats from infections such as Johne's disease and CAE.

2.4.12 Newcastle disease

Newcastle disease (ND) is a viral disease of domestic poultry and wild birds. It can cause gastrointestinal, respiratory and nervous signs. Avirulent strains of ND are endemic in Australia. Australia has been free from outbreaks of virulent ND since 2002, when two incidents of virulent ND of Australian origin occurred in Victoria and New South Wales. These outbreaks were eradicated as prescribed by the Australian Veterinary Emergency Plan (AUSVETPLAN). Subsequently, the National Newcastle Disease Management Plan was developed to minimise the risk of Australian-origin virulent ND outbreaks in Australian commercial chicken flocks.

The plan is overseen by a steering committee, which includes representatives from the commercial chicken sector, the Australian Government, most state governments and the CSIRO Australian Animal Health Laboratory. Membership also includes experts in poultry vaccination and poultry disease management. AHA manages the plan and chairs the committee.

The goal of the *National Newcastle disease management plan 2013–16*[36] is a vaccination program that mitigates the risk of Australian-origin ND outbreaks by strategically applying vaccination – using attenuated (live) V4 and inactivated (killed) vaccines – together with surveillance and poultry industry biosecurity plans.

The primary objective of the vaccination program is for the vaccine strain of the virus to outcompete potential precursor strains of ND virus – that is, strains with genome sequences similar to the virulent sequence that might result in the emergence of virulent ND virus. Based on the risk level of an outbreak of Australian-origin virulent ND in each state or territory, chickens of different classes (meat chickens, laying hens, and chickens used for breeding) are vaccinated and surveyed according to standard operating procedures. Vaccination compliance is monitored through reconciliation of data on vaccine sales with commercial chicken numbers, and industry intelligence.

The *National Newcastle disease management plan 2013–16* does not propose any changes to the vaccination requirements for long-lived birds (layers and broiler breeders) from the requirements in previous management plans. However, consistent with relaxation of the rules for short-lived birds in Tasmania and Western Australia in the 2008–12 plan, the 2013–16 plan provides for relaxed rules in such birds in Queensland and South Australia. However, if poultry owners opt for reduced vaccination in their flocks, the surveillance protocols detailed in the plan must be implemented.

New South Wales

The standard operating procedures for vaccination in New South Wales poultry were unchanged in 2015 from the previous year.

Queensland

In Queensland, vaccination of poultry against ND is in accordance with the *National Newcastle disease management plan 2013–16* for a low-risk state, as agreed by the national steering committee.

The 2013–16 management plan has removed the compulsory vaccination requirements for broilers in Queensland, based on the assessed risk of an outbreak of virulent ND in Australia. Although vaccination of broilers is no longer compulsory in Queensland, producers can still voluntarily choose to vaccinate them. The Queensland broiler industry has indicated to Biosecurity Queensland that it is keen to adopt the reduced vaccination requirement for the Queensland broiler flock. Stock Amendment Regulation 2014 was passed by the Queensland Parliament in August 2014 to enable non-vaccination of broilers, combined with surveillance activity. Two major broiler companies have chosen this option and ceased ND vaccination from October 2014; the other major broiler company in Queensland is continuing to vaccinate its broiler flocks.

During 2015, no virulent ND or precursor ND viruses were detected in Queensland. All detections of ND virus were categorised as V4 or V4-like strains.

South Australia

Legislation in South Australia requires that all egg-laying and breeding chickens, and chickens over 24 weeks of age

36 www.animalhealthaustralia.com.au/what-we-do/endemic-disease/newcastle-disease

in commercial poultry flocks are vaccinated against ND and are serologically monitored to demonstrate vaccination efficacy, unless otherwise approved by the Chief Inspector of Stock. In addition, no person may introduce into South Australia any chickens for egg-laying or breeding purposes, or any chickens over 24 weeks of age within the commercial poultry industry unless the birds have been vaccinated against ND. This requirement is in accordance with the ND vaccination program standard operating procedures. Vaccination is in accordance with the *National Newcastle disease management plan 2013–16*, as agreed by the national steering committee.

During 2014 and 2015, a surveillance project was carried out, as approved under the *National Newcastle disease management plan 2013–16*, on a sample of broiler farms that had ceased vaccinating for ND. Surveillance was undertaken on 43 eligible poultry farms. Each growing area in the state was tested twice, at six-monthly intervals. Four serologically positive farms were identified. Where virus was detected, it was found to be the V4 strain (identical to that found in the live ND vaccine).

There were no other detections of ND in South Australia during 2015.

Tasmania

In Tasmania, compulsory vaccination requirements apply to growers with 1000 or more birds. Meat chicken producers are exempt from vaccinating flocks, provided that they comply with passive surveillance requirements under the *National Newcastle disease management plan 2013–16* and birds are grown for less than 24 weeks. Meat chicken breeders are not included in this exemption. Vaccine is obtained from the supplier under licence from the Chief Veterinary Officer and must be used according to the manufacturer's instructions.

Victoria

Owners of commercial poultry flocks with more than 1000 birds are required by law in Victoria to vaccinate against ND. In 2015, 9 permits were issued for the purchase and use of approximately 37 million doses of ND vaccine on 66 properties.

Western Australia

In Western Australia, owners of 1000 or more chickens are required to vaccinate long-lived birds, keep vaccination records, and report and collect samples from any flock meeting the ND case definition. ND vaccination of meat chickens kept for less than 24 weeks is not required, and permits to purchase ND vaccine are no longer required. Vaccination compliance is assessed by comparing census data and vaccine sales. The nationally agreed biosecurity standards are strongly promoted to industry, and biosecurity practices are monitored.

Image credit: iStock

2.4.13 Ovine brucellosis

Ovine brucellosis, caused by *Brucella ovis*, is endemic in commercial sheep flocks in some states, but its prevalence is low. It is not on the list of nationally notifiable diseases. Accreditation schemes for stud flocks are well supported, and are managed by state animal health authorities and breed societies. The numbers of accredited flocks at the end of 2015 are shown in Table 2.3.

Table 2.3 Ovine brucellosis accredited-free flocks, at 31 December 2015

Jurisdiction	Accredited-free
New South Wales	846
Queensland	79
South Australia	530
Tasmania	62
Victoria	471
Western Australia	183
Australia	**2171**

New South Wales

The New South Wales Ovine Brucellosis Accreditation Scheme has been operating since 1981, with some flocks maintaining continuous accreditation. The scheme requires producers to adopt a biosecurity plan and a testing regime. Flocks are tested by accredited private veterinary practitioners either annually or every second or third year, depending on how long they have been in the scheme. The program is strongly supported by the New South Wales sheep industry and show societies, and accreditation is a requirement for entry to many major shows and sales. At the end of 2015, the scheme covered 846 flocks, predominantly stud flocks.

Queensland

Queensland has a voluntary ovine brucellosis accreditation scheme for stud flocks. In December 2015, 79 flocks were accredited. Although a number of new flocks were accredited during 2015, severe drought conditions and dispersal of some flocks are likely to have contributed to a number of flocks exiting the scheme.

South Australia

A voluntary ovine brucellosis accreditation scheme operates in South Australia. It is administered by Primary Industries and Regions South Australia, and provides assurance of ram freedom from ovine brucellosis. As of December 2015, there were 422 producers, and 530 flocks were accredited free from ovine brucellosis.

Tasmania

The Tasmanian Department of Primary Industries, Parks, Water and Environment – in conjunction with veterinary practitioners and industry – has developed a voluntary ovine brucellosis accreditation scheme to control the disease in Tasmanian flocks. Accredited private veterinary practitioners test the flocks, and the department maintains the records. Tasmania has about 64 accredited ovine brucellosis–free flocks at any one time. Ovine brucellosis has not been confirmed in any sheep in Tasmania since 1988.

Victoria

Ovine brucellosis is present at low levels in Victorian sheep flocks. During 2015, infection was detected in five flocks.

A voluntary ovine brucellosis accreditation scheme, which is administered by the Victorian Department of Economic Development, Jobs, Transport and Resources, provides assurance that rams are free from ovine brucellosis. This assurance is required for sales, interstate movement, overseas export and attendance at shows. The scheme is based on property risk assessment, regular testing, adherence to best-practice flock management and investigation of suspect cases. Both departmental staff and private veterinary practitioners are involved in implementing the program across Victoria. As of December 2015, 471 flocks were accredited as free from ovine brucellosis.

Western Australia

DAFWA administers a voluntary ovine brucellosis accreditation scheme for ram breeders. Registered veterinarians inspect properties, advise on property biosecurity, and inspect and blood-test rams on studs participating in the scheme. As of December 2015, the scheme had 183 accredited flocks.

2.4.14 Ovine footrot

Ovine footrot, caused by *Dichelobacter nodosus* infection, was probably introduced in the early days of the Australian sheep industry. Virulent ovine footrot causes significant economic loss in southern Australia. Ovine footrot is not on the list of nationally notifiable diseases.

Several states have eradication or control programs. New South Wales has implemented the NSW Footrot Strategic Plan since 1988, and the state has been declared a protected area for footrot since August 2009. The prevalence of virulent footrot in New South Wales has remained at less than 0.1% of flocks, and the state maintained protected area status in 2015. This was in spite of a series of seasons that were highly conducive to footrot in the southern parts of the state, which resulted in localised outbreaks of disease.

The major threat to the protected area status of New South Wales is the introduction of sheep from control areas in other states. New South Wales requires sheep moving from interstate to be accompanied by a National Sheep Health Statement, which includes a declaration about the footrot status of the flock.

South Australia and Western Australia also operate control programs. In Western Australia, less than 1% of flocks are infected with virulent footrot. Tasmania and Victoria do not have official control programs for footrot, although legislation is available to quarantine properties, if required. The ability of strain-specific footrot vaccines to eradicate footrot from large sheep flocks is being trialled in Tasmania. A similar trial is being undertaken in Western Australia.

Footrot is not regarded as a significant problem in Queensland, and no clinical cases were reported in 2015.

There are no commercial sheep flocks in the Northern Territory.

2.4.15 Pigeon paramyxovirus 1

Pigeon paramyxovirus 1 (PPMV-1) was first identified in hobby and domestic pigeons in Victoria in 2011. It is now considered endemic in domestic and feral pigeons in Victoria. During February and May 2015, the Victorian Department of Economic Development, Jobs, Transport and Resources monitored an increase in the incidence of pigeons showing signs of PPMV-1. Hobbyists reported 21 cases, 16 of which were confirmed by laboratory testing. Most of the cases were in the greater Melbourne area.

PPMV-1 is considered endemic in the New South Wales feral pigeon population and has been detected occasionally in pigeon lofts in New South Wales since 2011. It was detected in single lofts of racing pigeons in the Sydney region in July and November 2015, respectively.

In November 2015, DAFWA confirmed Western Australia's first case of PPMV-1 in a flock of fancy pigeons in the Perth metropolitan area. Testing at the CSIRO Australian Animal Health Laboratory confirmed the strain as identical to that previously isolated from Victoria. Affected pigeons had significant neurological signs, and approximately 25% of the flock died. DAFWA implemented movement controls and monitoring for the affected loft, and reiterated advice on biosecurity practices, including vaccination, to the wider pigeon industry to reduce the likelihood of PPMV-1 being introduced into other pigeon lofts.

2.4.16 Swine brucellosis

Swine brucellosis resulting from infection with *Brucella suis* causes sterility and abortion in sows, and orchitis in boars. Other livestock species may be infected but do not show clinical signs; however, orchitis has been seen in antibody-positive pig-hunting dogs. The disease is a zoonosis – humans can also be infected.

New South Wales

Serological evidence of *B. suis* infection has been detected at a low prevalence in feral pigs in northern New South Wales.

Queensland

In Queensland, *B. suis* is confined to some populations of feral pigs. A *B. suis* Accredited Herd Scheme is administered by Queensland DAF on behalf of the industry and currently has 10 member herds. The scheme aims to ensure piggery freedom from *B. suis* and to provide a secure source of disease-free breeding stock for pig producers.

South Australia

To protect the disease-free status of farmed pigs in South Australia, movement controls are maintained for domestic pigs originating from states where *B. suis* can occasionally be detected in feral populations. In 2015, no cases of *B. suis* infection were reported in South Australia.

2.4.17 Theileriosis

Theileria orientalis, the blood parasite that causes benign theileriosis, has been in Australia for more than 100 years. It is established in coastal regions of eastern Australia. Historically, it has rarely caused disease. Australia is free from East Coast fever (*T. parva* infection) and Mediterranean theileriosis (caused by *T. annulata*), which are diseases listed by the OIE.

Since late 2005, the number and severity of disease cases due to *T. orientalis* infection in cattle in eastern Australia have increased. Disease has been seen in areas where it had not previously been found, often associated with introduction of animals from areas where the disease is known to be present.

New South Wales

In New South Wales in 2015, 34 investigations from 34 properties were reported. As in previous years, investigations occurred in districts where disease had been reported previously, predominantly coastal districts.

Victoria

In Victoria in 2015, 24 cases from 24 properties were reported – 15 cases were in dairy cattle and 9 were in beef cattle. As in previous years, cases occurred in Gippsland and north-east Victoria.

Western Australia

In May 2013, the first case in Western Australia of bovine anaemia due to *T. orientalis* type Ikeda was detected on a beef cattle property in the Southern Agricultural Region. Cases have continued to be reported in the region, and sporadic cases have also occurred in the South West Agricultural Region.

Image credit: AHA

CHAPTER 3

Terrestrial animal disease surveillance and monitoring

Australia's surveillance and monitoring capability for terrestrial animal diseases is underpinned by a network of government field veterinary officers, government and private veterinary diagnostic laboratories, private veterinarians, researchers and livestock owners.

This network undertakes surveillance to identify and treat risks from notifiable, emerging and exotic diseases. It is supported by the National Livestock Identification System (see Section 1.4), which enables livestock to be identified and traced from property of birth to slaughter, and the National Animal Health Information System (NAHIS; see Chapter 2) for collating data.

This chapter describes Australia's general surveillance for terrestrial animal diseases and key targeted national programs. It also outlines surveillance programs specific to northern Australia and public health surveillance for zoonotic diseases.

3.1 GENERAL SURVEILLANCE

General surveillance – the observation and reporting of diseased animals by farmers, abattoir workers, veterinarians and others in contact with the animals – is important in maintaining Australia's favourable animal health status and ensuring early detection of animal disease emergencies.

3.1.1 Enhancing general surveillance

In 2015, Australian governments and livestock industries collaborated to develop a National Animal Health Surveillance and Diagnostics (NAHSD) Strategy and a draft business plan. These documents include objectives and activities for 2016–18 that represent the shared commitment of governments and industries to maintain and strengthen Australia's animal health surveillance system.

The draft NAHSD business plan identifies four key objectives, all of which include elements to enhance general surveillance. They are:

- to maintain and enhance surveillance programs and activities that are focused on the highest risks
- to enhance the collection, management and effective use of animal health surveillance information
- to strengthen the knowledge, attitudes and practices of people involved in surveillance
- to cultivate effective partnerships and stewardship.

The business plan will be implemented by governments and industries in partnership, in accordance with the principle that biosecurity is a shared responsibility. Some activities will be supported by funds linked to the implementation of the Australian Government's Agricultural Competitiveness White Paper, which emphasises the importance of biosecurity surveillance.

3.1.2 State and territory government surveillance

Australia's state and territory governments recognise the importance of surveillance for suspect notifiable diseases – that is, exotic, emergency and endemic diseases of national significance. Collectively, they invest in more than 100 field veterinarians with district surveillance responsibilities, supported by six modern government veterinary laboratories, veterinary pathology staff, abattoir veterinarians and inspectors, and stock inspectors. This is the largest and most costly individual animal disease surveillance project in Australia.

State and territory government surveillance plans have a common objective: to ensure that relevant information from general animal health surveillance is readily available for assessing and managing risks to trade in livestock and products, public health and animal production efficiency. Historically, this has led to:

- early detection of emergency and emerging diseases
- demonstration of freedom from diseases or disease agents
- determination of, and detection of changes in, the distribution, prevalence and incidence of diseases and disease agents
- detection of changes in factors or events that influence the risk of diseases.

Legislation in all states and territories requires that animal owners, veterinarians and laboratories report to animal health authorities any suspicion of notifiable diseases. These include endemic emergency animal diseases (EADs) such as anthrax and Hendra virus infection, and exotic diseases such as foot-and-mouth disease, highly pathogenic avian influenza and African swine fever.

The laws are supported by networks of official state and territory field veterinarians, diagnostic veterinary laboratory pathologists and private veterinarians, who diagnose and gather intelligence about notifiable diseases and any emerging diseases that occur.

In some cases, private veterinary practitioners are contracted to the government to investigate suspect notifiable diseases before official veterinary involvement. In all states and territories, official government veterinarians establish relationships with private veterinarians in their districts so that they collaborate effectively on any unusual disease incident. They do this by running training programs (e.g. in postmortem techniques or exotic disease investigations), presenting case reports at profession branch meetings and veterinary conferences, and circulating newsletters.

Through these networks, as well as through their research and extension facilities, governments obtain knowledge about the distribution and prevalence of a wide range of animal diseases, not just notifiable ones. Consequently, official

government veterinarians are able to document the status of stock in their districts with respect to notifiable diseases – this is important for domestic trade, and as a valid basis for international animal health reporting and certification (see Chapter 1 for further details on information management).

Samples for laboratory confirmation or exclusion of disease are quickly taken and dispatched. Laboratory diagnosis is free of charge to the submitter for many categories of submission. Samples may be submitted to government laboratories that have access to specialist diagnostic pathologists, or to contracted private laboratories that meet prescribed standards. In all cases of suspect exotic diseases and some other EADs, samples are also submitted to the Australian Animal Health Laboratory of the Commonwealth Scientific and Industrial Research Organisation (CSIRO-AAHL).

Laboratory quality assurance is maintained by compulsory accreditation of laboratories by the National Association of Testing Authorities, as well as compulsory participation by laboratories in interlaboratory quality assurance programs (see Chapter 1 for further information).

The information collected by state and territory field and laboratory staff is recorded in information management systems. These can be linked to mapping programs to visually display disease distribution. Property-of-origin health certificates and official reports to various authorities – including the World Organisation for Animal Health (OIE) – of regional and national disease status can readily be extracted from these systems. The information is also fed back to the veterinary networks through surveillance reports that keep state and territory field and laboratory staff, and private veterinary practitioners informed about disease patterns.

State and territory veterinarians conduct targeted disease surveillance projects that help to develop and maintain their epidemiological skills, and enable use of the most recent surveillance tools for analysing existing and emerging diseases. Importantly, these projects create links with stock owners that help notifiable diseases to be detected and reported. Significant achievements in 2015 included:

- surveillance by the Department of Agriculture and Food Western Australia (DAFWA) to obtain information on
  - state livestock producers' knowledge of, and behaviours around, recognition and reporting of livestock disease
  - key drivers and barriers in livestock disease reporting
  - livestock producers' primary means of obtaining information on livestock disease
- detection by DAFWA, in conjunction with a private veterinarian, of the first case in Western Australia of pigeon paramyxovirus type 1 in a Perth metropolitan pigeon loft
- an epidemiological study of an unusual disease of the upper alimentary tract of weaned dairy calves in Victoria; similar disease outbreaks have been reported in New South Wales. A newly identified pestivirus is suspected as the cause in both states, and investigations and laboratory testing are in progress
- a study investigating the potential exposure of cattle to anthrax spores in the environment
- examination of the causes of deaths or condemnations of livestock at saleyards or abattoirs in Victoria
- identification of an association between *Chlamydophila psittaci* and abortions in mares in New South Wales, along with the zoonotic risks of handling aborted material in mares
- identification of a novel virus associated with mass morbidity and mortalities in endangered Bellinger River snapping turtles in northern New South Wales (see Section 3.1.7)
- confirmation that dogs used to assist pig hunters in controlling feral pigs in western New South Wales may become infected with *Brucella suis*
- investigation of risks associated with avian influenza in free-range egg and poultry production
- social research on attitudes to managing biosecurity risks from Hendra virus
- reporting of the prevalence of drench resistance in gastrointestinal parasites in southern New South Wales sheep flocks
- confirmation that calves may be infected in utero with *Theileria orientalis* in New South Wales
- targeted surveillance for pestivirus and other cattle diseases in the Central Tablelands of New South Wales under animal biosecurity extension programs delivered by the government veterinary officer
- investigation of serological evidence of *Coxiella burnetii* infection in beef cattle in the Lachlan Livestock Health and Pest Authority in New South Wales
- development of a surveillance program to assess the importance of vibriosis and trichomoniasis as a cause of infertility in Tasmanian cattle herds; bulls over four years of age and culled empty cows were surveyed for the

presence of *Campylobacter* and *Trichomonas*, with the aim of improving the capacity of Tasmania's Animal Health Laboratory to detect *Campylobacter fetus* subsp. *venerealis*, and increasing awareness and understanding of the disease among rural veterinarians and cattle producers

- ongoing surveillance for hydatid disease and clinical salmonellosis in Tasmania.

3.1.3 Participation by private veterinarians in disease surveillance and management

Private veterinary practitioners play a key role in general surveillance in Australia, by providing expertise in evaluating, clinically investigating and reporting outbreaks of significant disease in animals. They also participate in national surveillance programs, particularly the National Significant Disease Investigation Program (NSDIP) and the National Transmissible Spongiform Encephalopathies Surveillance Program (NTSESP; see Section 3.2.2).

National Significant Disease Investigation Program

The NSDIP was initiated in June 2009 to support private veterinary practitioners in conducting full investigations, which can otherwise be limited by competing priorities and commercial realities, such as the low economic value of individual animals relative to the cost of veterinary services.

Managed by Animal Health Australia (AHA), and delivered by state and territory governments, the NSDIP is funded from livestock industry and government subscriptions. The program aims to boost Australia's capacity for the early detection of significant disease incidents in livestock and wildlife by increasing the participation of veterinary practitioners in disease investigations. Registered non-government veterinarians engaged in clinical veterinary medicine – including veterinary practitioners in university clinics, zoos and wildlife parks – are eligible to participate in the program. Significant disease incidents are broadly defined as those that may impact trade or market access, farm productivity, public health, or wildlife biodiversity conservation.

Subsidies are available for the initial clinical evaluation, laboratory analyses and a follow-up investigation, if required. In return, the practitioner must provide a brief report of the investigation to their state or territory animal health authority. Where there is a genuine suspicion of a notifiable animal disease, the veterinary practitioner has a legal responsibility to notify their relevant animal health authority through this pathway.[37]

Image credit: iStock

37 www.agriculture.gov.au/animal-plant-health/pests-diseases-weeds/animal/notifiable

In addition, some jurisdictions independently fund similar complementary programs (see below).

During 2014–15, the NSDIP subsidised 246 investigations by private veterinary practitioners. Summary data of investigations are shown in Figures 3.1 and 3.2.

Further information on the NSDIP is available on the AHA website.[38]

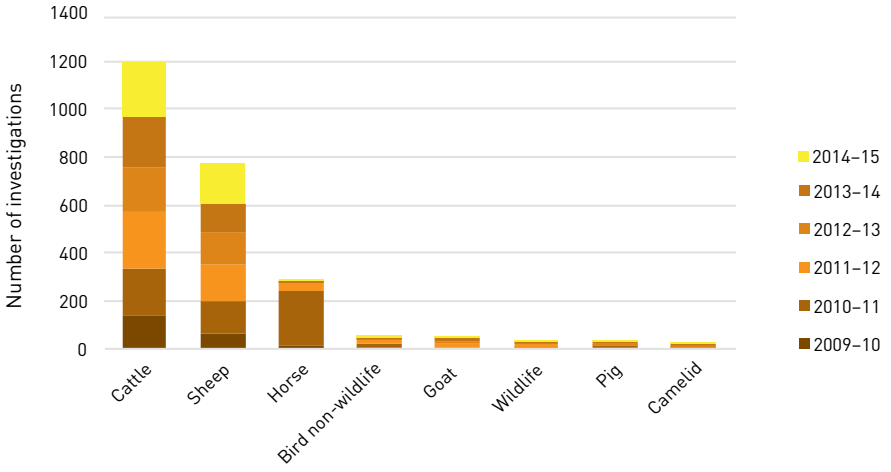

Figure 3.1 Number of investigations, by animal group and year, in the National Significant Disease Investigation Program, July 2009 to June 2015

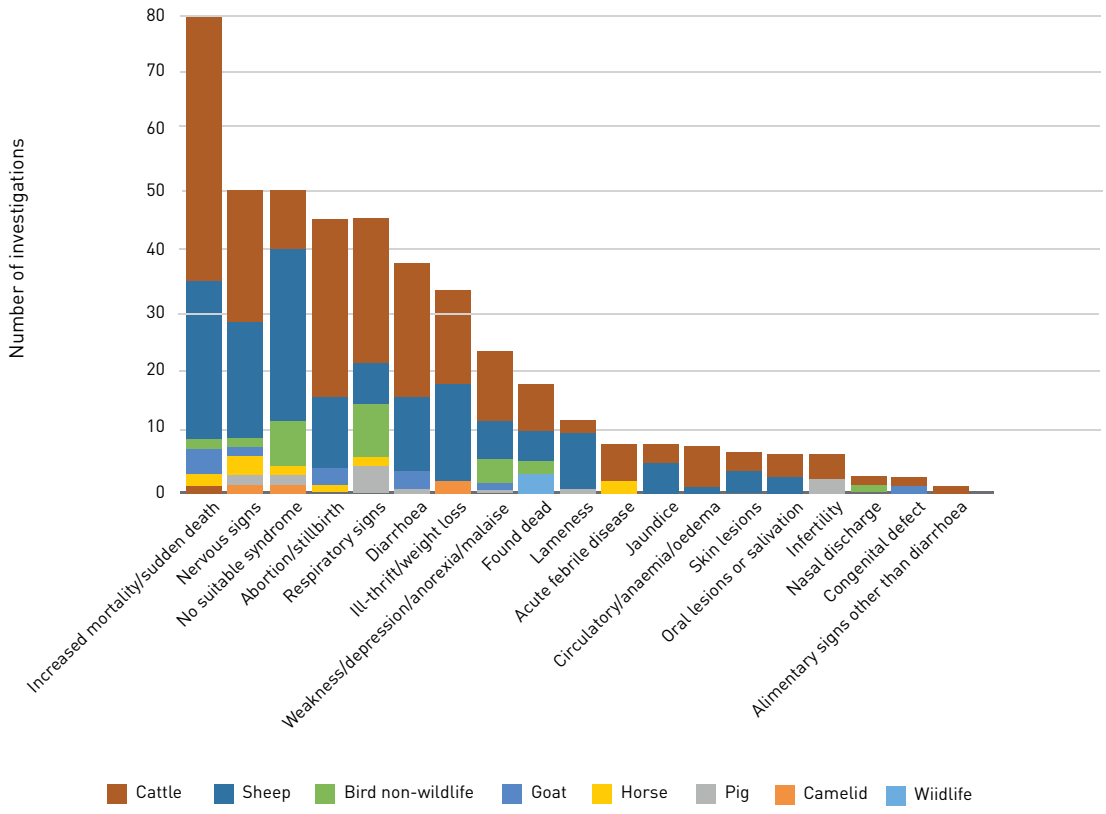

Figure 3.2 Number of investigations, by syndrome and animal group, in the National Significant Disease Investigation Program, July 2014 to June 2015

38 www.animalhealthaustralia.com.au/programs/disease-surveillance/national-significant-disease-investigation-program

Surveillance in the states and territories by private veterinarians

New South Wales

In New South Wales, cases of suspect notifiable diseases are investigated after private practitioners submit diagnostic specimens to the State Veterinary Laboratory of the New South Wales Department of Primary Industries. State and district government veterinary officers collate data from these investigations, and often assist in investigating or managing cases referred by private practitioners. Private practitioners receive subsidised laboratory testing for cases in which notifiable diseases are suspected. They also receive training in sample submission, disease investigation methods for some notifiable diseases and the use of personal protective equipment.

Northern Territory

The Northern Territory Department of Primary Industry and Fisheries encourages and supports participation of private practitioners in disease surveillance. This includes investigation of significant disease events for the NSDIP, and investigation of cattle and sheep exhibiting progressive behavioural changes or neurological signs for the NTSESP. Laboratory samples submitted by private practitioners for disease investigations in livestock and significant events in wildlife are analysed as a free service.

Queensland

Private veterinary practitioners involved in large animal practice in Queensland are regularly visited or contacted by veterinary or biosecurity officers from the Queensland Department of Agriculture and Fisheries to discuss disease incidents in their area. Private practitioners are reminded of the importance of reporting significant animal disease events, including notifiable diseases and suspect EADs.

Departmental veterinary officers also work with private veterinary consultants in the intensive pig and poultry industries to manage serious disease issues. The department's veterinary pathologists provide telephone advice and in-field support to private practitioners and field veterinary officers investigating complex disease cases, particularly when no clear cause for the problem has been identified.

State veterinary officers are involved in structured teaching activities at Queensland's two veterinary schools. New graduates are entering the veterinary profession with a deeper appreciation of state veterinary medicine.

South Australia

Biosecurity SA, a division of Primary Industries and Regions South Australia, maintains close communication with rural private veterinary practitioners, who make a valuable contribution to surveillance by investigating potential incidents of notifiable diseases and significant disease events. Biosecurity SA has an Enhanced Disease Surveillance Program to promote investigation of disease incidents in South Australian livestock. In partnership with the NSDIP, the program funds laboratory submissions for suspect infectious diseases in livestock and subsidises contracted private veterinary practitioners for costs incurred in investigating unusual disease events.

Biosecurity SA offers training and refresher courses in EAD detection and necropsy technique to practitioners, and provides ongoing technical support, when required.

Tasmania

In Tasmania, private veterinary practices provide general surveillance information via personal contacts with animal health staff from the Department of Primary Industries, Parks, Water and Environment. They also participate in the NSDIP and various targeted disease surveillance programs, such as the NTSESP.

During 2015, the department provided assistance for a private veterinarian to attend foot-and-mouth disease training in Nepal. Recruitment is currently under way to assist other private practitioners in Tasmania to undertake an online foot-and-mouth disease training program.

The *Animal Health and Welfare* newsletter is produced three times per year and distributed to all private practitioners in the state. It provides information on relevant surveillance programs, reports of surveillance information from disease investigations, and data from Tasmania's Animal Health Laboratory. A dedicated webpage for Tasmanian practitioners on the department's website enables easy access to resources for practitioner programs and promotes external initiatives, such as the Veterinary Emergency Response Team Tasmania.

Victoria

In Victoria, private veterinary practitioners make an important contribution to surveillance by providing reports of notifiable diseases and significant disease events. Since 2005, private veterinary practitioners in Victoria have investigated significant disease events as part of the Victorian Significant Disease Investigation Program. Participating practitioners receive a payment from the Department of

Economic Development, Jobs, Transport and Resources for reporting the investigation, and a subsidy towards laboratory investigation costs. In 2010, the department also introduced a subsidy for cattle, sheep, goat and pig owners who initiate an investigation of a significant disease event, to partially cover the cost of engaging a veterinary practitioner. During 2015, private veterinary practitioners investigated and reported approximately 307 disease events as part of the Victorian Significant Disease Investigation Program.

Private veterinary practitioners are also contracted by the department to undertake on-farm activities associated with endemic disease management programs – for example, for bovine Johne's disease.

In 2015, the department offered four intensive courses in livestock disease investigation theory and field techniques. Thirty private veterinary practitioners and seven departmental staff completed the two-day training course. The department also delivered a series of one-day courses in field-based gross pathology techniques; around 50 private veterinary practitioners and departmental staff from two regions attended. Further workshops are planned for 2016 to cover the remaining regions. As part of the department's commitment to training, AgriBio pathologists and department field veterinarians presented evening education programs at a number of regional meetings of the Australian Veterinary Association. Topics covered included emergency diseases such as avian influenza and foot-and-mouth disease.

Western Australia

Western Australia's animal health surveillance capability is underpinned by the network that has been established between DAFWA and livestock industry members, including private veterinarians, livestock agents, saleyard operators and livestock owners. Private veterinarians are an integral part of the animal health surveillance network through regular contact with producers and by providing vital disease investigation services to the livestock industries.

DAFWA promotes surveillance and reporting of significant livestock disease events by everyone involved in the livestock industry, particularly private practitioners, through a range of activities. These activities include networking by departmental veterinary officers, regional training workshops in disease investigation and the production of a monthly surveillance newsletter, the *WA Livestock Disease Outlook* (WALDO), which is intended to improve the exchange of surveillance information, thereby strengthening the animal health surveillance network.

During 2015, DAFWA and the NSDIP sponsored approximately 135 investigations of significant disease in livestock by private veterinarians. This included subsidising the cost of the veterinary practitioner investigation, paying travel costs, subsidising all laboratory costs associated with the case, and assisting with collecting and dispatching appropriate samples. Practitioners, DAFWA field veterinary officers and pathologists liaise closely under the program.

The DAFWA Animal Health Laboratories also subsidise the cost of laboratory diagnostic work for cases of suspect reportable diseases or cases that are considered to be of public benefit. During 2015, approximately 1400 cases of livestock disease were investigated as a result of submissions from private veterinarians. Of these cases, approximately 330 included exotic disease exclusions.

3.1.4 Bovine tuberculosis surveillance

In 1970, Australia began a campaign to eradicate bovine tuberculosis (TB). Australia achieved freedom from TB in accordance with OIE standards, and was officially declared free from TB caused by *Mycobacterium bovis* on 31 December 1997. The last case of bovine TB was reported in 2002 in buffalo.

In 2010, bovine TB surveillance data were evaluated quantitatively using a scenario-tree methodology.[39] This showed a very high level of confidence (approaching 100%) that Australia is free from bovine TB and that, if the disease were present, it would have been detected.

In the unlikely event of a case of bovine TB, eradication activities will be guided by the current *Bovine tuberculosis case response manual – managing an incident of bovine tuberculosis*.[40] This provides for an 'approved property or herd' eradication program agreed to by the owner and the relevant state or territory government. Funding agreements, including reimbursement for destroyed livestock, are included in the Government and Livestock Industry Cost Sharing Deed in Respect of Emergency Animal Disease Responses.[41]

39 Martin P, Cameron A & Greiner M (2007). Demonstrating freedom from disease using multiple complex data sources 1: a new methodology based on scenario trees. *Preventive Veterinary Medicine* 79:71–97.

40 www.animalhealthaustralia.com.au/our-publications/ausvetplan-manuals-and-documents

41 www.animalhealthaustralia.com.au/programs/emergency-animal-disease-preparedness/ead-response-agreement

Image credit: Kerry Wehilburg

The *Australian standard for the hygienic production and transportation of meat and meat products for human consumption* (AS 4696:2007)[42] requires that all carcases and their parts are inspected by a meat safety inspector. Because bovine TB is considered an exotic animal disease in Australia, suspicious granulomas identified when cattle carcases are inspected at slaughter establishments, including export abattoirs, are submitted for testing to exclude *M. bovis* as a cause.

3.1.5 Bovine brucellosis surveillance

After an eradication campaign that began in 1970, Australia achieved freedom from bovine brucellosis (caused by *Brucella abortus*) in July 1989, and remains free from this disease. Targeted serological surveillance – performed by serological testing of blood samples collected from adult female cattle at slaughter – continued until the end of 1993. Since then, extensive general surveillance by investigating abortions has demonstrated ongoing freedom from bovine brucellosis.

State and territory veterinary laboratories test for *B. abortus* as part of abortion investigations (Table 3.1) and for other reasons, such as export requirements (Table 3.2). Species other than cattle are also sampled.

42 www.publish.csiro.au/pid/5553.htm

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Table 3.1 Serological tests for *Brucella abortus* in Australia, abortion serology, 2008–15

	Year							
Species	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Cattle	626	289	1313	939	1205	733	743	721
Dog	0	0	0	0	2	0	0	0
Goat	0	0	0	0	0	0	0	6
Pig	0	0	0	0	1	0	0	0
Sheep	0	0	0	0	0	0	0	4
Total	**626**	**289**	**1313**	**939**	**1208**	**733**	**743**	**731**

Table 3.2 Serological tests for *Brucella abortus* in Australia, other serology, 2008–15

	Year							
Species	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Alpaca	0	8	0	0	0	0	0	0
Cattle	9 860	5 672	11 398	4 936	4 880	8 960	7 259	3 522
Deer	0	53	0	0	0	0	0	0
Goat	0	905	0	9	64	0	0	0
Horse	0	0	2	1	0	0	0	0
Pig	0	18	0	0	11	0	0	0
Sheep	45	5	0	3	2	0	0	3 314
Total	**9 905**	**6 661**	**11 400**	**4 949**	**4 957**	**8 960**	**7 259**	**6 836**

3.1.6 National Sheep Health Monitoring Project

The National Sheep Health Monitoring Project (NSHMP), which commenced in 2007, monitors lines[43] of adult sheep in abattoirs for a number of important animal health conditions.

In the 2014–15 financial year, 2 985 323 sheep, including lambs (697 108), were monitored across 18 domestic and export abattoirs; some of these abattoirs were monitored part-time.

The NSHMP currently only reports significant endemic diseases that can be identified by inspecting viscera or at the adjoining carcase-inspection stage. Lines of adult sheep are monitored by qualified meat inspectors and company-based personnel. Attention focuses on diseases that are likely to cause significant production loss, animal welfare issues, or market access concerns based on food safety or product aesthetics. The sheep industry's peak councils, Animal Health Committee and the Australian Meat Industry Council have agreed that sheep lines will be monitored for a core group of conditions: liver fluke, grass seed contamination, pleurisy, melanosis, caseous lymphadenitis, sheep measles (*Taenia ovis* infection), hydatid infection, bladder worm (*Cysticercus tenuicollis*) and *Sarcocystis* spp.

Data collected under the NSHMP are stored in the Central Animal Health Database, which is maintained by AHA. Business rules determine the level of access to the data for an individual or organisation. State Sheep Health Coordinators have access to the state dataset and return this information to producers in the form of individual animal health status reports on the lines inspected. Processors are provided with a daily report for their own plants.

43 A line of sheep is a group of animals purchased from a single location, although the group may contain animals from multiple vendors, as may occur at a saleyard.

Monitoring livestock in abattoirs also enables public health risk management for diseases such as hydatid disease. It provides the opportunity to collect surveillance data that can be used to inform domestic animal health management decisions, and to confirm Australia's freedom from specified diseases. Information provided to individual producers can assist them to improve their flocks' productiveness and fine-tune animal health programs. For processors, there is the opportunity to reduce product non-compliance, thereby lifting productivity and reducing costs.

The NSHMP has generated a comprehensive and contemporary dataset that provides a good indication of the animal health status of the Australian flock. This information can be used by governments, industry groups and processors as solid evidence in support of market access and to demonstrate the quality of Australian product.

The Sheepmeat Council of Australia and WoolProducers Australia support the NSHMP because of the productivity and welfare impacts of uncontrolled disease. Both recognise the importance of individual producers having access to information about the sheep they have sold, so that producers can make sound and informed animal health management decisions.

3.1.7 Wildlife health surveillance

Wildlife Health Australia (WHA) administers Australia's general wildlife health surveillance system. Key elements of the system include a network of WHA coordinators, appointed by chief veterinary officers; coordinators at zoo and 'sentinel clinic' wildlife hospitals, and universities; and a web-enabled national database of wildlife health surveillance information (eWHIS). Targeted projects and a number of focus or working groups coordinated by WHA are also part of the system. WHA coordinators represent each of Australia's states and territories, including the Australian Antarctic Territory. Ten zoos across Australia participate in the Zoo Based Wildlife Disease Surveillance Program – a collaborative project between WHA and the Zoo and Aquarium Association (the peak representative body for zoos and aquariums in Australia).

WHA is continuing to expand the national wildlife health surveillance system. Three veterinary clinics have now joined the sentinel clinic surveillance program that began in 2014, and a new surveillance program involving seven university veterinary schools began in late 2015.

WHA promotes and facilitates collaboration around Australia in the investigation and management of wildlife health, focusing on potential risks to trade, biodiversity, and human and animal health. Wildlife health surveillance focuses on six disease categories: diseases listed by the OIE, bat viral diseases, mass or unusual mortality events, *Salmonella* cases, arbovirus infections, and diseases that wildlife coordinators consider unusual or interesting. In addition to surveillance, WHA assists with disease investigations and research in wildlife and feral animals, and facilitates education and training to ensure that Australia is well prepared for serious disease outbreaks in livestock, and wild native and feral animal populations.

WHA administers a 'first alert system', which allows email alerts to be sent to more than 550 individuals and agencies around Australia with an interest in wildlife health issues. WHA also produces a weekly electronic digest of wildlife health information relevant to Australia. These digests are circulated nationally and to OIE member countries within the region.

Image credit: Clare Death

In 2015, WHA's surveillance activities focused on:

- assisting Australia's states, territories and national agencies in general wildlife health surveillance and coordination for wildlife disease incidents
- contributing to the work of NAHIS
- assisting AHA in its efforts to incorporate wildlife into the NSDIP
- assisting in EAD events by providing relevant information on wildlife disease and facilitating communication with wildlife stakeholders
- providing wildlife health information for national and international reports prepared by the Australian Government
- managing and coordinating the avian influenza surveillance program in wild birds
- 'horizon scanning' to identify issues associated with wildlife health that may affect Australia's trade, human health or biodiversity
- coordinating a network of wildlife health expertise and organising working groups with a particular focus, including
  - a group focusing on university researchers' contributions to national wildlife health issues
  - a group focusing on bat health issues in Australia
  - the Zoo Animal Health Reference Group, which focuses on the zoo industry and its wildlife hospitals
- encouraging collaboration, communication and engagement among national, state and local government, and non-government agencies.

During the year, 810 wildlife disease investigation events were added to the national database. Approximately 43% of these events were bats submitted for exclusion testing for Australian bat lyssavirus (ABLV); wild bird mortalities accounted for a further 37% of investigations reported.

Surveillance of diseases in bats

Surveillance of diseases in bats in Australia provides a better understanding of the ecology of these diseases. A particular focus is pathogens that have potential to affect livestock health, public health or biodiversity. Spillover of disease agents such as ABLV and Hendra virus from bats can have serious impacts on humans and domestic animals. Diseases that threaten bat populations can interfere with some of the bats' important ecological functions, such as pollination and insect control, leading to ecological and economic losses.[44] WHA coordinates a working group that focuses on improving national coordination of issues associated with bat health.

State and territory animal and public health laboratories, and CSIRO-AAHL continue to screen Australian bats for ABLV. WHA collates and publishes national ABLV test results[45] as part of NAHIS. In 2015, 353 bats were tested for ABLV. Of these, 22 tested positive: 9 grey-headed flying foxes (*Pteropus poliocephalus*), 8 black flying foxes (*P. alecto*), 3 little red flying foxes (*P. scapulatus*), 1 spectacled flying fox (*P. conspicillatus*) and 1 unidentified flying fox (*Pteropus* sp.).

Investigation of wild bird morbidity and mortality events

Investigation of significant unexplained morbidity and mortality events in wild birds contributes to the National Avian Influenza Wild Bird Surveillance Program (see Section 3.2.4). Diagnostic testing for wild bird mortality events includes exclusion of avian influenza, avian paramyxovirus and West Nile virus, where appropriate. In 2015, no wild bird mortality events were attributed to avian influenza or West Nile virus.

Findings in bird mortality events included aspergillosis, avian chlamydiosis, avian paramyxovirus, avian pox, botulism, coccidiosis, *Macrorhabdus ornithogaster* infection, spironucleosis, corynebacteriosis, candidiasis, aspiration pneumonia, poisoning, psittacine beak and feather disease, trichomoniasis and trauma.

Other wildlife disease investigations

A severe mortality event involving Bellinger River snapping turtles (*Myuchelys georgesi*) was investigated after dead and dying turtles were reported in February 2015. More than 430 turtles are estimated to have been affected, with clinical signs including swollen eyes, blindness, emaciation, clear nasal discharge and hind limb paresis, and a very high case fatality rate. Diagnostic investigation was conducted by multiple agencies and organisations. A wide range of potential infectious aetiologies were excluded by laboratory testing, and no evidence of pesticides was found in river water samples. In July 2015, a novel virus was detected in tissues of affected turtles. Further work is being undertaken to characterise the virus, determine its significance in the pathogenesis of the disease and develop further testing

44 JG Boyles, PM Cryan, GF McCracken & TH Kunz (2011). Economic importance of bats in agriculture. *Science* 332(6025):41–42.

45 ABLV Bat Stats: www.wildlifehealthaustralia.com.au/ProgramsProjects/BatHealthFocusGroup.aspx

capabilities in a range of tissues. *M. georgesi* is a freshwater turtle species that is found only in small sections of the Bellinger and Kalang rivers, and total numbers are estimated to be extremely low. A small number of healthy turtles were therefore removed from the river for a captive breeding program, and have remained healthy.

A mass mortality and morbidity event involved more than 300 juvenile eastern grey kangaroos (*Macropus giganteus*) in New South Wales and the Australian Capital Territory between July and September 2015. Affected kangaroos were thin and weak, with poor coat condition and pale mucous membranes, and failed to move when approached. Diagnostic investigation found a range of findings, including reduced or no subcutaneous, abdominal or thoracic adipose tissue to severe chronic emaciation; anaemia; hypoproteinaemia; loss of muscle mass; reduced bone marrow cellularity; reduced or no colloid in follicles of the thyroid; and gastrointestinal parasite burdens. The cause of this event is multifactorial, including overpopulation, undernutrition, cold stress and parasitic burden. Starvation related to restricted food availability is believed to be the key driving factor. Seasonal mortalities of subadult eastern grey kangaroos have previously been observed in the Australian Capital Territory, Victoria and New South Wales.

A stranding event occurred between August 2014 and February 2015 involving 22 Risso's dolphins (*Grampus griseus*) in New South Wales, Tasmania and Victoria. This event was unusual due to the spatial and temporal pattern of strandings, and the large numbers of strandings. Stranded dolphins were generally in poor body condition. Findings on pathology were considered more likely to be associated with a toxin (e.g. biotoxin, heavy metal) or nutritional causes than an infectious agent. Morbillivirus and *Brucella* sp. were excluded. Analysis for biotoxins and heavy metals is ongoing. Environmental causes – such as changes in water temperature and food sources – and genetic susceptibility are also being considered.

3.2 TARGETED NATIONAL PROGRAMS

Australia's general surveillance for terrestrial animal diseases is complemented by a range of targeted surveillance activities. The surveillance information generated by these programs enables animal health authorities in Australia to accurately assess the status and risk of diseases within their jurisdiction, and provide timely advice of any significant changes. The information also facilitates the development or refinement of protocols for exports and imports with trading partners. The following sections describe key targeted national programs that are of particular interest to Australian animal health authorities.

3.2.1 National Arbovirus Monitoring Program

The National Arbovirus Monitoring program (NAMP) monitors the distribution of economically important arboviruses (insect-borne viruses) of ruminant livestock and associated insect vectors in Australia. Arboviruses monitored by NAMP include bluetongue, Akabane and bovine ephemeral fever (BEF) viruses. Clinical bluetongue disease has not been observed in commercial livestock flocks and herds in Australia.

Australia's economy benefits from the export of ruminant livestock and their genetic material (semen and embryos). This trade depends on a shared confidence between Australia and its trading partners that risks to the animal health status of the importing country can be accurately assessed and properly managed. NAMP provides credible data on the nature and distribution of important, specific arbovirus infections in Australia for use by the Australian Government and livestock exporters. NAMP enables the Australian Government to certify to trading partners that ruminants are sourced from areas that are free from these specified arboviruses. In addition, NAMP data are available for overseas countries to use when developing animal health requirements for the importation of Australian ruminant livestock and their genetic material.

NAMP is jointly funded by its primary beneficiaries: the cattle, sheep and goat industries; the livestock export industry; and the state, territory and Australian governments.

Objectives of NAMP

NAMP has three specific objectives:

- market access – to facilitate the export of live cattle, sheep and goats, and ruminant genetic material to countries with concerns about bluetongue, Akabane and BEF viruses
- bluetongue early warning – to detect incursions of exotic strains of bluetongue virus (BTV) and vectors (*Culicoides* species – midges) into Australia by surveillance of the northern BTV endemic area

- risk management – to detect changes in the seasonal distribution in Australia of endemic bluetongue, Akabane and BEF viruses and their vectors, in support of livestock exporters and producers.

Operation of NAMP

NAMP data are gathered throughout Australia by serological monitoring of cattle in sentinel herds and strategic serological surveys of cattle herds (virology), and trapping of insect vectors (entomology).

Blood samples from groups of young cattle that have not previously been exposed to arbovirus infection are tested at regular intervals for evidence of new infection with bluetongue, Akabane and BEF viruses. The frequency of blood sampling relates to the probability of arbovirus transmission – that is, the greater the likelihood of virus transmission, the more frequent the sampling. Insect traps to detect *Culicoides* species are positioned near the monitored herds during the period of testing or near herds where conditions are favourable for *Culicoides* species survival.

The number and locations of herds (Figure 3.3) are selected to enable the distribution of the specified arboviruses to be determined. Hence, most sentinel sites are located either along the border between the zone where infection is expected and the zone where infection is not expected, or in areas where infection occurs sporadically. In addition, areas expected to be arbovirus-free are monitored to verify their freedom, and known infected areas are sampled to detect new strains of virus and to assess the seasonal intensity of infection with each arbovirus.

Beatrice Hill in the far north of the Northern Territory is a focus for exotic BTV surveillance – virus isolation is routinely undertaken on blood samples collected at this location. Serotyping, virus isolation and molecular testing are applied strategically in other herds in the Northern Territory, Queensland, Western Australia and New South Wales after seroconversions are detected. NAMP surveillance data relating to bluetongue early warning are supplemented by targeted surveillance activities conducted by the Northern Australia Quarantine Strategy of the Australian Government Department of Agriculture and Water Resources in remote coastal regions of northern Australia, including the Torres Strait islands.

Figure 3.3 Locations of NAMP virology monitoring sites, 2014–15 arbovirus transmission season

Epidemiology

Bluetongue, Akabane and BEF viruses are non-contagious and are biologically transmitted by their insect vectors. Climatic factors – rainfall and temperature – determine the distribution of potential vectors, and complex interactions between the virus, vector and environment limit the number of efficient vector species within an endemic vector environment.

The arboviruses are transmitted only if vectors are present; consequently, southern and central Australia are always free from these arboviruses. In northern Australia, and eastern and western coastal areas, arbovirus distribution changes within and between years based on seasonal climatic conditions.

Research in Australia since the mid-1970s has provided a detailed understanding of the epidemiology of Australian BTV strains and their *Culicoides* midge vectors. The important vector species in Australia are likely to have all originally arrived on air currents from neighbouring countries; *C. brevitarsis* is the main vector of both BTV and Akabane virus. A close correlation exists between the southern limits of *C. brevitarsis* and the distribution of the two viruses, although the viruses are less widely distributed than their vectors. Other vectors of BTV in Australia, which are less widely distributed than *C. brevitarsis*, are *C. actoni*, *C. dumdumi*, *C. fulvus* and *C. wadai*.

The main vector of BEF virus in Australia is putatively the mosquito *Culex annulirostris*. *C. annulirostris* has different ecological thresholds from *C. brevitarsis*, particularly its tolerance to lower temperatures, which accounts for its wider distribution and its occurrence in regions not affected by BTV or Akabane virus.

Monitoring results for 2014–15

This section summarises and explains the results of vector and virus monitoring and describes the limits of distribution of bluetongue, Akabane and BEF viruses in the 2014–15 arbovirus transmission season (September 2014 – August 2015).

The numbers of virology and entomology sites in each state and territory are shown in Table 3.3.

Table 3.3 Number of virology and entomology sites, by state and territory, 2014–15

Jurisdiction	Sentinel herds	Serosurveys	Insect traps
New South Wales	40	3	34
Queensland	18	9	18
Western Australia	14	9	17
Northern Territory	7	10	10
Victoria	5	0	3
South Australia	5	0	3
Tasmania	1	0	1

Image credit: Maxwell Maddock

Bluetongue virus distribution

Clinical bluetongue disease has not been observed in commercial flocks or herds of any susceptible species in Australia. The limits of BTV transmission in Australia are shown on the interactive BTV zone map,[46] which defines areas in which no viral transmission[47] has been detected for the past two years.

BTV is endemic in northern and north-eastern Australia (Western Australia, Northern Territory, Queensland and New South Wales), and remains undetected in South Australia, Tasmania and Victoria (Figure 3.4).

Virology testing in the Northern Territory showed that BTV activity was widespread in the north from September, when BTV-1 was first detected. The distribution of BTV remained largely stable, with the exception of evidence of BTV in a serosurvey herd near Tennant Creek in the centre of the Territory, resulting in a small expansion to the BTV zone. This was despite average rainfall but above-average temperatures across the Territory. Two serotypes were detected in Australia for the first time: BTV-5 and BTV-12. Both were detected in the Beatrice Hill sentinel herd, and were isolated from cattle without clinical signs.

In Western Australia, virology tests showed that BTV distribution remained stable, occurring only in the Kimberley region. Absence of BTV in the Pilbara region was despite above-average rainfall and temperature – conditions favourable to vectors. BTV-5 was detected in two northern sentinel herds, at Kalumburu and Kununurra, and retrospective testing indicated that this new serotype was present in Western Australia before the Northern Territory. No disease was associated with this serotype. The zone of BTV transmission was expanded slightly to the south in July 2014, following the detection of virus in a serosurvey herd at Fitzroy Crossing in the southern Kimberley region. The first isolation of BTV-12 was made at Beatrice Hill in early February 2015.

In Queensland, drought was declared across 80% of the state by the end of the arbovirus transmission season. Although rainfall was significantly below average and temperatures were above average across the state, virology work near the BTV zone boundary detected evidence of BTV, prompting four expansions of the BTV zone to the south. Zone changes occurred in central, southern and south-west Queensland between October 2014 and April 2015. The BTV zone of possible activity now comprises the vast majority of Queensland, with only arid south-western regions in the BTV-free zone. Only the endemic serotypes BTV-1 and BTV-21 were detected in Queensland.

In New South Wales, rainfall was above average along the coastal plain; however, only a single BTV seroconversion, of serotype BTV-21, was detected. This occurred in the Lismore sentinel herd on the far North Coast.

C. brevitarsis, the only vector detected in New South Wales this year, was restricted to the wetter coastal regions and the Hunter Valley, which is consistent with the only occurrence of BTV. In warmer conditions near the end of the season, a few individual specimens were detected briefly at sites on the Great Dividing Range before the onset of cooler conditions.

No competent vector species were detected in South Australia, Tasmania or Victoria, consistent with the serological evidence of virus absence.

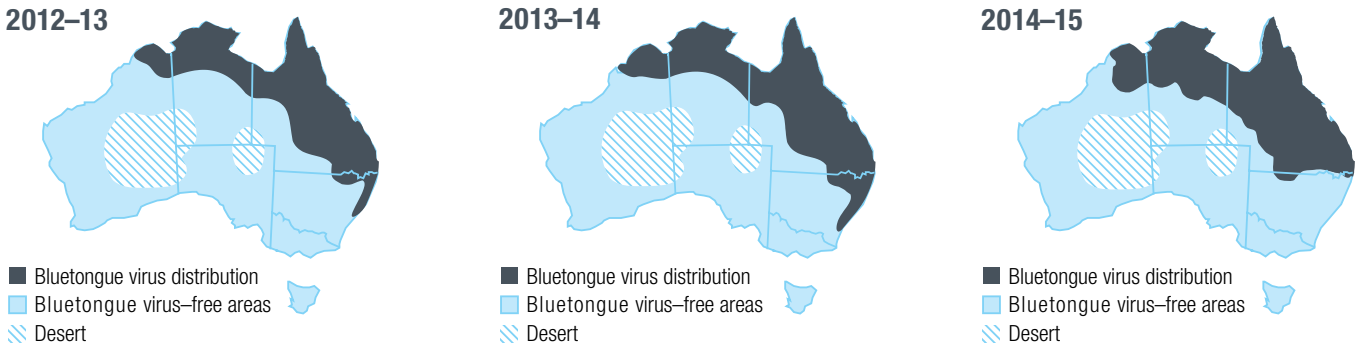


Figure 3.4 Distribution of bluetongue virus in Australia, 2012–13 to 2014–15

46 http://namp.animalhealthaustralia.com.au/public.php?page=namp_public&program=2

47 Viral transmission is defined as detection or evidence of viral infection based on serological monitoring of cattle.

Akabane virus distribution

The distribution of Akabane virus (Figure 3.5) varies within the limits of its presumed vector, *C. brevitarsis*, occurring endemically in northern Australia (Western Australia, Northern Territory and northern Queensland) and showing a distinct seasonal spread in southern parts of Queensland and New South Wales.

In Western Australia, Akabane virus was detected at all monitoring sites (six) in the Kimberley region, except Broome in the west, and was not detected south of the Kimberley.

In the Northern Territory, limited virology detected Akabane virus in the central region from April 2015 to June 2015, but it was not detected in the south at Alice Springs. Sentinel herds in the northern Akabane virus endemic area were not tested.

In Queensland, Akabane virus was detected widely across the state, extending to the far south-east and far south-west.

In New South Wales, Akabane virus detection was limited to the northern coastal region between Lismore and Kempsey. This is consistent with the season's distribution of the vector *C. brevitarsis*. This region is considered endemic for Akabane virus.

Akabane virus remains undetected in South Australia, Tasmania and Victoria.

Bovine ephemeral fever virus distribution

BEF virus is endemic in northern Australia (Western Australia, Northern Territory and Queensland), where fever can occur in both the dry and wet seasons (spring, summer or autumn). In New South Wales and parts of southern Queensland, virus occurrence is limited by the effect of cold winters, restricting the distribution of its mosquito vector.

In Western Australia, BEF virus was detected by serology of sentinel herds in the Kimberley (from September 2014), the Pilbara (June 2015) and the Murchison regions (January 2015). Clinical signs of BEF were reported from the latter two regions. No serological or clinical evidence was detected in south-west Western Australia.

In the Northern Territory, BEF virus was first detected in September 2014 at Beatrice Hill in the north, where numerous clinical cases were also observed, and later at other northern sites and Alice Springs (January–March 2015).

In Queensland, BEF virus was detected widely across the state, extending to the far south-east and far south-west.

In New South Wales, no BEF virology was conducted on samples from sentinel herds. Monitoring for BEF virus was dependent on investigation of suspected clinical cases and samples sent to the Virology Laboratory, Elizabeth Macarthur Agricultural Institute. One clinical case was confirmed on the far North Coast in March 2015. To support market access to North America, BEF testing will resume in 2015–16.

BEF virus was not detected in South Australia, Tasmania or Victoria.

The distribution of BEF virus is shown in Figure 3.6.

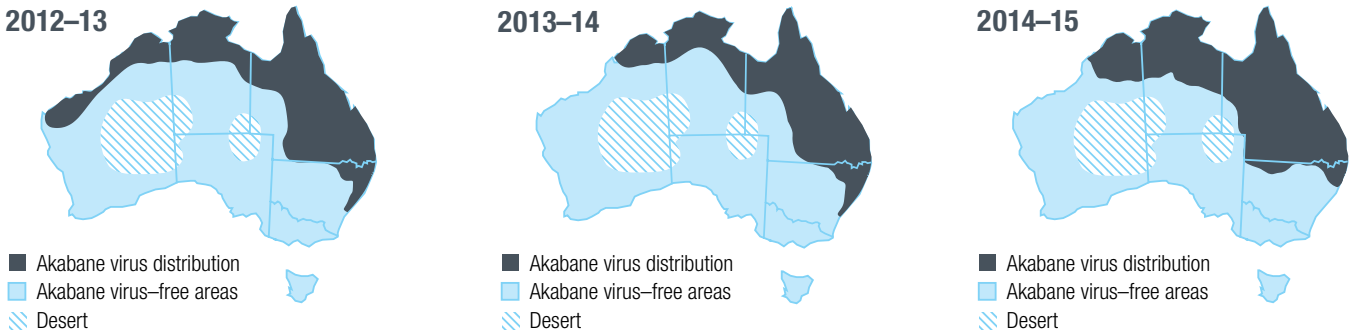


Figure 3.5 Distribution of Akabane virus in Australia, 2012–13 to 2014–15

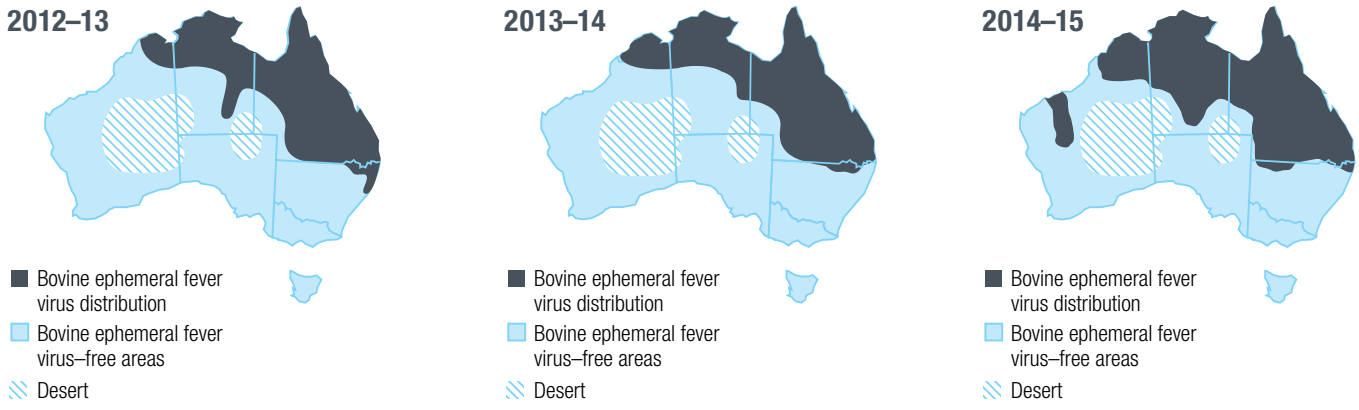


Figure 3.6 Distribution of bovine ephemeral fever virus in Australia, 2012–13 to 2014–15

3.2.2 Transmissible Spongiform Encephalopathies Freedom Assurance Program

In 2015, Australia continued to be recognised as a country of 'negligible risk' for bovine spongiform encephalopathy (BSE) and free from classical scrapie. These diseases are types of transmissible spongiform encephalopathies (TSEs). The purpose of the Transmissible Spongiform Encephalopathies Freedom Assurance Program (TSEFAP) is to increase market confidence that Australian animals and animal products are free from TSEs. This is achieved through the structured and nationally integrated management of animal-related TSE activities.

Projects that operate under the TSEFAP are:

- the NTSESP
- the Australian ruminant feed-ban scheme, including inspections and testing
- imported animal surveillance, including buyback schemes for certain imported cattle
- communications.

National Transmissible Spongiform Encephalopathies Surveillance Program

The NTSESP demonstrates Australia's ability to meet the requirements for a BSE negligible risk and classical scrapie–free country, and provide early detection of these diseases should they occur. It involves the collection of samples from 'clinically consistent',[48] 'fallen'[49] and 'casualty slaughter'[50] cattle and from 'clinically consistent' sheep. Details of the sampling program for cattle and sheep are provided in the NTSESP *National guidelines for field operations*.[51]

For cattle, Australia is assessed by the OIE as BSE negligible risk. This means that Australia implements OIE type B surveillance, which is designed to allow the detection of at least one BSE case per 50 000 in the adult cattle population at a confidence level of 95%. Surveillance points are assigned to cattle samples according to the animal's age and subpopulation category (i.e. the likelihood of detecting BSE). Australia's target is to achieve a minimum of 150 000 surveillance points during a seven-year moving window. Australia also aims to meet OIE recommendations to investigate all clinically consistent cattle, and ensure that cattle from the fallen and casualty slaughter subpopulations are tested.

For sheep, the NTSESP is a targeted surveillance program that has an annual sampling intensity designed so that there is at least a 99% probability of detecting scrapie if this disease accounted for 1% of the cases of neurological disease in sheep in Australia. This is achieved by the annual laboratory examination of a minimum of 440 sheep brains collected from animals showing clinical signs of a neurological disorder.

AHA manages the NTSESP with funding from 10 industry stakeholders (livestock and associated industries), the Australian Government, and the state and territory governments.

Table 3.4 shows the results from the NTSESP for the 2014–15 financial year. Data for other periods are available from the NAHIS database.[52]

Australian ruminant feed-ban scheme

Since 1997, Australia has had a total ban on feeding ruminant meat and bonemeal to ruminants. In 1999, this ban was extended to cover feeding of specified mammalian materials to ruminants. Since 2002, feeding of ruminants with any meals derived from vertebrates (including fish and birds) has been banned. The ban is enforced under legislation in each state and territory, and by a uniform approach to the inspection of all parts of the ruminant production chain. It does not include tallow, gelatine, milk products, or animal oils and rendered fats.

In the 2014–15 financial year, 515 operations were inspected by jurisdictional staff, from renderers to end users. This revealed 34 instances of non-compliance, all of which were successfully resolved. During the same period, 9717 audits were completed through industry quality assurance programs.

48 A clinically consistent animal is defined as 'an animal that is found with clinical signs considered consistent with BSE'. This is analogous with the term 'clinical suspect' used in the OIE 2015 *Terrestrial animal health code*, Chapter 11.4, on surveillance for BSE.

49 Fallen cattle are defined in the OIE *Terrestrial animal health code*, Chapter 11.4, as 'cattle over 30 months of age which are found dead or killed on farm, during transport or at an abattoir'.

50 Casualty slaughter cattle are defined in the OIE *Terrestrial animal health code*, Chapter 11.4, as 'cattle over 30 months of age that are non-ambulatory, recumbent, unable to rise or to walk without assistance; cattle over 30 months of age sent for emergency slaughter or condemned at ante-mortem inspection'.

51 Available at www.animalhealthaustralia.com.au/programs/biosecurity/tse-freedom-assurance-program/national-tse-surveillance-program

52 www.animalhealthaustralia.com.au/what-we-do/disease-surveillance/national-animal-health-information-system-nahis

Table 3.4 Summary of results from the National Transmissible Spongiform Encephalopathies Surveillance Program, 2014–15

	Cattle			Sheep	
Jurisdiction	Number examined	Points	Number positive	Number examined	Number positive
New South Wales	170	56 947.1	0	219	0
Northern Territory	27	3 271.5	0	0	0
Queensland	291	86 826.6	0	42	0
South Australia	37	17 202.2	0	77	0
Tasmania	36	7 503.1	0	13	0
Victoria	161	45 088.5	0	253	0
Western Australia	52	25 811.4	0	248	0
Total	**774**	**242 650.4**	**0**	**852**	**0**

Image credit: Mardi Remond

Imported animal surveillance

All cattle imported between 1996 and 2002 from countries that have experienced a native-born case of BSE have been placed under lifetime quarantine, are electronically tagged as part of the National Livestock Identification System for cattle, and are inspected by government authorities every 12 months. These animals may not enter the human or animal feed chains. They are slaughtered, then incinerated or buried. The Cattle Council of Australia funds the removal of these cattle from the Australian herd.

Program communications

During 2015, TSEFAP communications included:

- a pamphlet aimed at producers, to encourage them to report animals with TSE-consistent clinical signs for sampling under the TSEFAP
- a media release encouraging stockfeed retailers to comply with the ruminant feed-ban scheme
- distribution of a series of pamphlets for stockfeed manufacturers and users, promoting awareness of their responsibilities under the ruminant feed-ban legislation
- updating of the webpages on the components of the TSEFAP on the AHA website.

3.2.3 Screw-worm Fly Surveillance and Preparedness Program

Background

Old World screw-worm fly (OWS; *Chrysomya bezziana*) and New World screw-worm fly (NWS; *Cochliomyia hominivorax*) are exotic to Australia, and suspicion of infestation in animals is notifiable under state and territory animal health legislation.[53] Screw-worm fly infestation in humans is not notifiable.[54]

OWS and NWS have similar biology and fill similar ecological niches in Africa and Asia, and the Americas, respectively.[55] OWS is a significant production disease of livestock throughout its range. It is considered a greater threat to Australian livestock industries than NWS because of the proximity of areas where it occurs to Australia and the return of livestock export vessels from Asia to Australian ports.

AHA manages the Screw-worm Fly Surveillance and Preparedness Program (SWFSPP) in consultation with a committee of industry and government stakeholders.

Historically, surveillance for OWS included adult fly trapping in Torres Strait and at seaports, maggot identification from myiasis cases in livestock and wildlife, and public awareness activities in rural and coastal northern Australia. Surveillance aims to detect an incursion early, to increase the likelihood of success of an eradication program. Nationally collated OWS surveillance data show that *C. bezziana* has not been detected through insect trapping and inspection of arriving international livestock vessels (data since 2003), insect trapping in Torres Strait (data since 2004) or myiasis investigations (data since 1997). The only known introduction of OWS into Australia was in 1988, when nine adult flies (two females and seven males) were captured in Darwin Harbour on a livestock vessel returning from Brunei.[56]

NWS poses a risk to Australia from myiasis on travellers returning from South America. The literature reports only two cases of NWS human myiasis in Australia, in which larvae were extracted by medical practitioners.[57,58]

Although surveillance indicates a low likelihood of incursion of screw-worm fly into Australia, the potential for establishment and spread across several states is significant.[59] Screw-worm flies lay their eggs in the wounds of any living warm-blooded animal, and the Australian tropical climate is favourable to their life cycle. Modelling has indicated that most of tropical northern Australia and part of the eastern seaboard offer a suitable climate for OWS survival; in the south of Australia, extremes of temperature and moisture would limit survival.[60] The relative likelihood of introduction and establishment of screw-worm fly is shown in Figures 3.7 and 3.8. Figure 3.7 is based on average climatic conditions without taking seasonality into account, and Figure 3.8 shows areas with suitable climatic conditions year-round for screw-worm fly survival.[61]

53 www.agriculture.gov.au/pests-diseases-weeds/animal/notifiable

54 www.health.gov.au/casedefinitions

55 Spradbery P (1994). Screw-worm fly: a tale of two species. *Agricultural Zoology Reviews* 6:1–62.

56 Rajapaksa N & Spradbery JP (1989). Occurrence of the Old World screw-worm fly *Chrysomya bezziana* on livestock vessels and commercial aircraft. *Australian Veterinary Journal* 66(3):94–96.

57 Searson J, Sanders L, Davis G, Tweddle N & Thornber P (1992). Screw-worm fly myiasis in an overseas traveller. *Australian Veterinary Journal* 69:193.

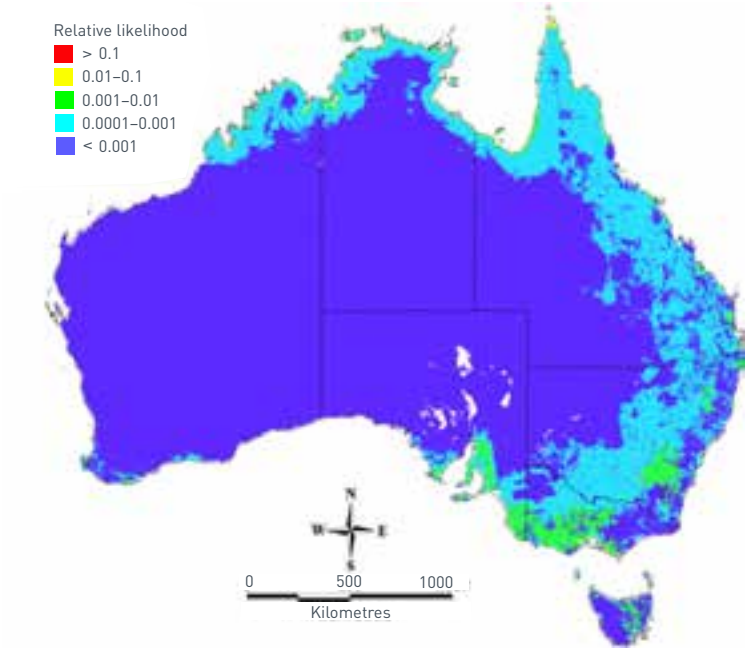
58 Lau S, Langstaff I & Ryan N (2015). A case of imported New World screw-worm fly myiasis. *Medical Journal of Australia* 203(11):435.

59 Animal Health Australia (2007). *Disease strategy: screw-worm fly* (version 3.0), Australian Veterinary Emergency Plan (AUSVETPLAN), edn 3, Primary Industries Ministerial Council, Canberra.

60 Beckett S (2014). *Review of risk of entry of Old World screw-worm fly into Australia and surveillance requirements*, Animal Health Australia, Canberra.

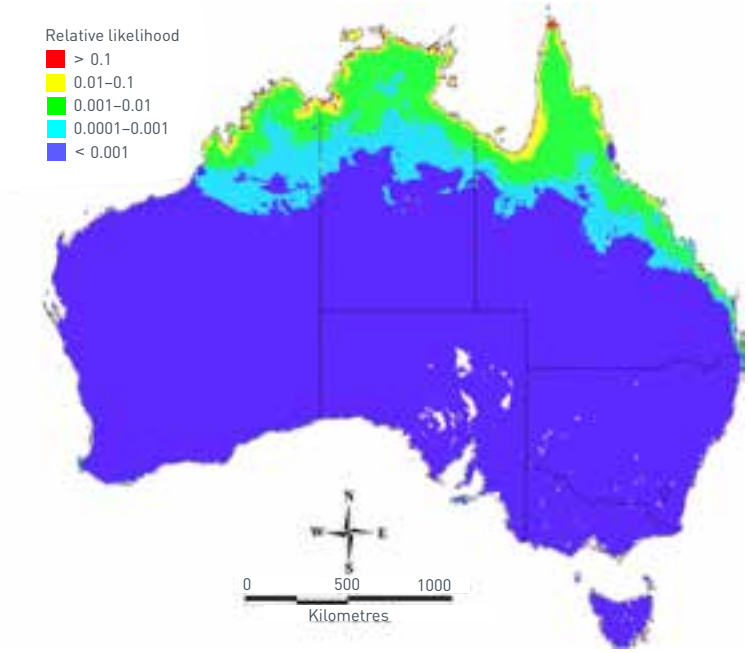
61 Fruean S & East I (2014). Spatial analysis of targeted surveillance for screw-worm fly (*Chrysomya bezziana* or *Cochliomyia hominivorax*) in Australia. *Australian Veterinary Journal* 92:254.

Both feral animals and livestock would be important hosts in Australia. Targets for infestation are husbandry wounds, wounds resulting from fighting, tick bite wounds and the navels of newborns. The large feral animal populations in the north, and the large numbers of both extensively and intensively reared livestock along the eastern seaboard mean that screw-worm fly could spread widely if it entered and established in Australia.



Source: Fruean S & East I (2014). Spatial analysis of targeted surveillance for screw-worm fly (*Chrysomya bezziana* or *Cochliomyia hominivorax*) in Australia. *Australian Veterinary Journal* 92:254.

Figure 3.7 Relative likelihood of introduction and establishment of screw-worm fly in Australia



Source: Fruean S & East I (2014). Spatial analysis of targeted surveillance for screw-worm fly (*Chrysomya bezziana* or *Cochliomyia hominivorax*) in Australia. *Australian Veterinary Journal* 92:254.

Figure 3.8 Relative likelihood of introduction and establishment of screw-worm fly in Australia under climatic extremes

Program review

During 2015, a program review was completed and a revised program was initiated.

During the 1980s and 1990s, OWS was considered a very high priority for targeted surveillance in Australia, similar to foot-and-mouth disease, avian influenza, bluetongue and Newcastle disease. However, targeted surveillance for OWS is now a lower priority; the review reassessed the priority as moderate. The highest risk pathway is still considered to be through Torres Strait or with returning livestock vessels.

The revised program comprises four areas of work:

- surveillance (Figure 3.9)
  - by fly trapping in Western Australia (four locations), the Northern Territory (two locations) and Queensland (two locations)
  - by targeted livestock wound surveys for myiasis in Western Australia (two locations), the Northern Territory (three locations) and Queensland (three locations)
- entomology training and development of reference resources
- awareness promotion to increase general surveillance for myiasis
- monitoring of the risk profile for screw-worm fly in Australia.

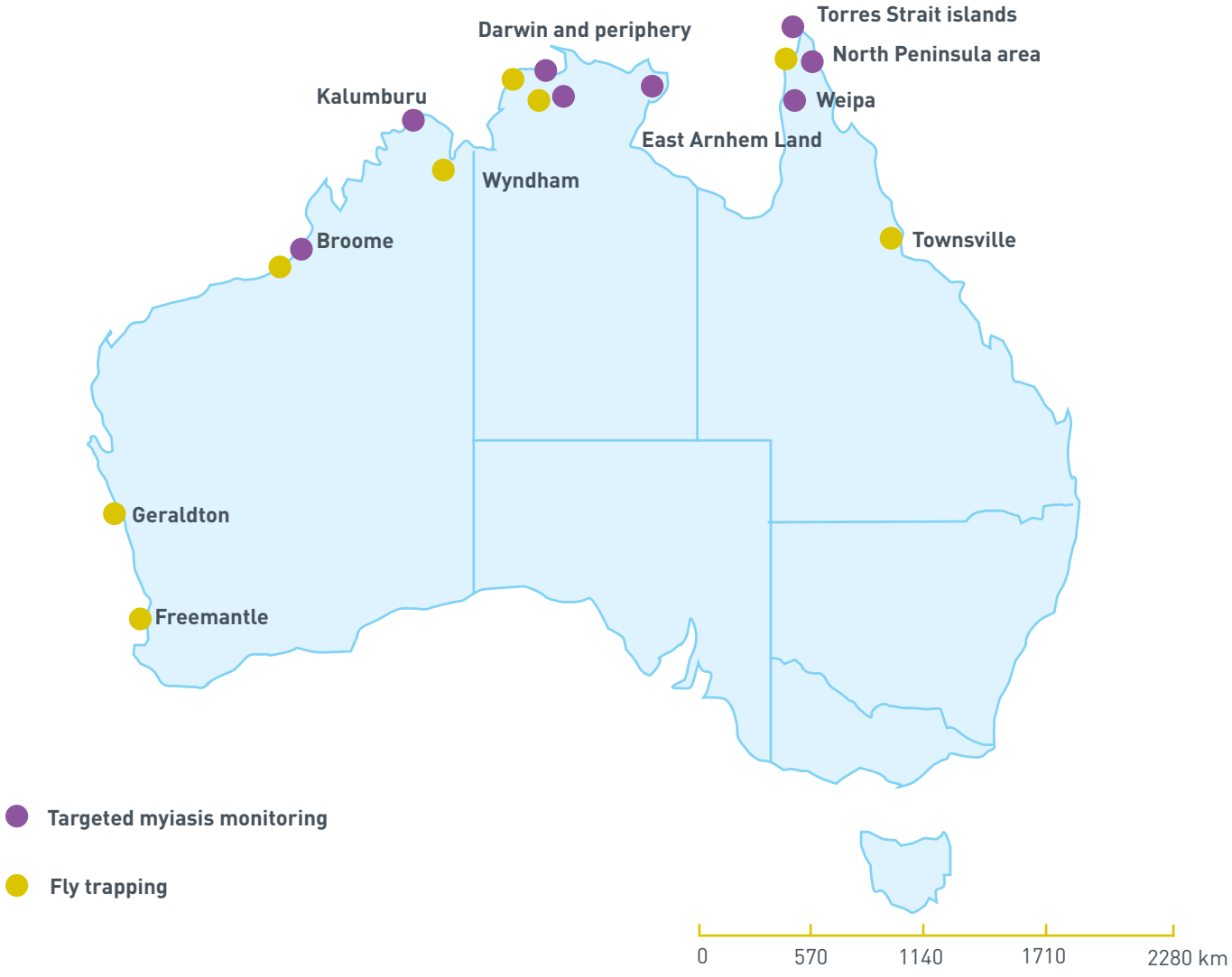


Figure 3.9 Locations of targeted myiasis monitoring and fly trapping in the revised Screw-worm Fly Surveillance and Preparedness Program

During 2016, refresher training in identification of adult and immature screw-worm flies will be delivered nationally to entomologists. Entomology expertise will then be used to evaluate the adequacy of identification materials and identify the need for future national training.

Awareness promotion includes targeted delivery of published materials (posters, brochure and fridge magnets) and distribution of maggot collection kits. The target audience includes veterinary practices, livestock agents, cattle producers, cattle export depots, quarantine check points, and government offices and medical practices. The Northern Australia Quarantine Strategy (NAQS) also provides awareness material through its engagement with local communities and visitors to the Torres Strait region.

Biosecurity practices, and prompt recognition and reporting (via the Emergency Animal Disease Watch Hotline) of an incursion are critical to Australia's preparation for screw-worm fly.

Further information on the screw-worm fly program is available on the AHA website.[62]

3.2.4 National Avian Influenza Wild Bird Surveillance Program

Activities under the National Avian Influenza Wild Bird (NAIWB) Surveillance Program occur Australia-wide. Surveillance for avian influenza in wild birds comprises two sampling components: targeted surveillance via sampling of apparently healthy and hunter-killed wild birds, and general surveillance via investigating significant unexplained morbidity and mortality events in wild birds, including captive and wild birds within zoo grounds (see Section 3.1.7). Sources for targeted wild bird surveillance data include state and territory government laboratories, universities, and samples collected through the NAQS program. Samples from sick birds include submissions from members of the public, private practitioners, universities, zoos and wildlife sanctuaries.

In 2015, targeted wild bird surveillance took place in New South Wales, Queensland, South Australia, Tasmania, Victoria and Western Australia – 6522 birds were sampled. The majority of samples were collected from waterbirds (ducks and waders). No highly pathogenic avian influenza viruses were identified. However, surveillance activities continue to find evidence of a wide range of subtypes of low pathogenicity avian influenza viruses; subtypes H2–H11 were detected in 2015.

The NAIWB Surveillance Program continues to provide valuable ecological and epidemiological background information that assists strategic risk management to minimise the potential impacts of avian influenza (particularly highly pathogenic avian influenza) on human health, poultry industries and wildlife in Australia. Importantly, this program is a key source of samples that are positive for avian influenza viruses, which are used to maintain and develop current and specific diagnostic primers and probes. These are essential for continued confidence that the tests being used in Australia will detect any H5 or H7 strains of highly pathogenic avian influenza in the event of an outbreak of these subtypes in poultry. The multi-agency and cross-jurisdictional approach of this project provides a forum for collaboration on technical aspects of influenza in humans, animals and wildlife.

3.2.5 National Bee Pest Surveillance Program

The National Bee Pest Surveillance Program (NBPSP)[63] is an early warning system to detect new incursions of pest bees and exotic bee pests, particularly varroa mites (*Varroa destructor* and *V. jacobsoni*), tropilaelaps mites (*Tropilaelaps clareae* and *T. mercedesae*) and tracheal mite (*Acarapis woodi*). Early detection of these exotic pests is critical to eradicating an incursion and limiting the economic impact. As well as providing early detection of pest bees and bee pests, the NBPSP supplies data to support health certification for exports of queen bees and packaged bees.

Plant Health Australia (PHA) has managed the program since 2012. On 1 July 2013, the NBPSP became a cost-shared initiative between the honey bee industry (represented by the Australian Honey Bee Industry Council), plant industries that rely on pollination (represented by Horticulture Innovation Australia[64]) and the Australian Government Department of Agriculture and Water Resources. This cost-shared funding model is continuing for 2015–16.

A major focus of the year has been the project 'Statistical review and redesign of the NBPSP', funded by Horticulture Innovation Australia. The aim of this project is to prepare a risk-based statistical design to be used in the NBPSP

62 www.animalhealthaustralia.com.au/swf

63 www.planthealthaustralia.com.au/national-programs/national-bee-pest-surveillance-program

64 Previously Horticulture Australia Limited

Image credit: Tanya Davis

for the early detection of exotic bee pests, particularly varroa mite. The statistical redesign will deliver a cost-effective and sensitive combination of surveillance methods for early detection of high-priority pests, for both eradication and containment scenarios. PHA is leading the project, in collaboration with CSIRO, the Queensland University of Technology, and Plant & Food Research (New Zealand). Government agencies and horticultural industry representatives are also involved.

The final report for the project, to be produced by February 2016, will identify improvements for the NBPSP, which will provide stakeholders with greater confidence in future surveillance efforts. The project will act as the catalyst for PHA, the honey bee industry, pollination-reliant plant industries, research and development agencies, and governments to implement a long-term funding agreement for the NBPSP from 2016–17.

Another improvement for the NBPSP in 2015 was the issue of a minor use permit (PER80923, issued in September) by the Australian Pesticides and Veterinary Medicines Authority for use of the miticides Bayvarol (flumethrin) and Apistan (tau-fluvalinate) in sentinel hives used in the NBPSP. The previous permit only allowed use of these miticides for 24–48 hours every 6–8 weeks, whereas the new permit allows use for 1–6 days every 6–8 weeks. Leaving miticide strips in sentinel hives for longer increases the likelihood of early detection of mites.

PHA is negotiating with stakeholders to continue to implement changes to the NBPSP. These changes, which include incorporating additional surveillance techniques, and more surveillance at high-risk ports, reflect an ongoing transition to a more broadly based surveillance program for pest bees and bee pests. The revised NBPSP will increase the efficiency of detecting both internal and exotic mites, and

exotic bees that occur in Asia (Asian honey bee, red dwarf honey bee and giant honey bee).

In 2015, 166 sentinel hives had been established, and were monitored every eight weeks with a sticky mat and miticide strip. This is an increase from 146 in 2014 and 128 in 2013.

During 2015, more than 50 catch boxes (empty hives) were deployed at many southern ports as an additional surveillance measure. These are used to detect bee swarms in the port area and test the bees for exotic pests, such as varroa mites. Once the trial of 20 remote surveillance hives currently placed around Australia concludes in early 2016, PHA will work with stakeholders to gradually replace the catch boxes with remote surveillance hives.

Formalised surveillance for small hive beetle (SHB; *Aethina tumida*) across Australia continued. Surveillance using APITHOR traps (which contain the insecticide fipronil) and oil traps continued on sentinel hives in the Northern Territory and Tasmania, where SHB is currently absent, as well as in southern Western Australia, where SHB is confined to Karratha in the north of the state.

Tables 3.5 and 3.6 show sample data from sentinel hives located at Australian ports in 2015 and other surveillance activities.

Table 3.5 Samples examined for pests of bees, by state or territory, 2015

Jurisdiction	Specimens examined
New South Wales	156
Northern Territory	98
Queensland	186
South Australia	100
Tasmania	113
Victoria	162
Western Australia	124
Total	**939**

Table 3.6 Samples examined for pest bees, and pests of bees, by agent, 2015

Agent	Specimens examined
Pest bees (*Apis cerana, A. florea, A. dorsata*)[a]	61[b]
Tracheal mite	160[c]
Small hive beetle	138[d]
Varroa and *Tropilaelaps* mite[e]	580[f]
Total	**939**

a Operational Science Services collected 23 swarms of Asian honey bee (*Apis cerana* Java genotype) in the Cairns port area in 2015. Diagnostics on the bees did not detect specimens of *Varroa* spp., *Tropilaelaps* spp. or *Acarapis woodi*.

b The development of floral maps and coordinated floral sweep netting around Australia began in late 2014 to detect pest bees. This figure is the number of floral sweep netting runs in 2015.

c Includes 30–60 bees from randomly selected sentinel hives that were morphologically dissected to determine tracheal mite presence.

d Samples included APITHOR traps, oil traps and hive inspection of sentinel hives in Western Australia, the Northern Territory and Tasmania. All samples were negative for small hive beetle.

e An additional 814 sugar-shaking, alcohol-washing and drone-uncapping samples were collected from hives across Australia throughout 2015. Of these, 669 were collected in Victoria as part of a routine sugar-shaking program.

f This is the number of sentinel hives tested with an acaricide and a sticky mat being examined.

3.3 SURVEILLANCE IN NORTHERN AUSTRALIA

Northern Australia's biosecurity risk profile has distinctive features that warrant dedicated and targeted surveillance. Proximity to neighbouring countries, extensive areas of land and sea, seasonal climatic conditions, significant food and fibre industries, receptive animal populations, and unregulated movement of goods and people all contribute to the region's vulnerability to pests and disease incursions of significance to animal health, production and trade.

3.3.1 Northern Australia Quarantine Strategy

The NAQS of the Department of Agriculture and Water Resources is an integrated program of active and passive surveillance measures, including:

- targeted surveys and monitoring programs, including sentinel cattle herds and insect trapping
- biosecurity surveillance services delivered by Aboriginal and Torres Strait Islander ranger groups and other stakeholders
- strategic collaborations with Queensland, Northern Territory and Western Australian biosecurity agencies and other stakeholders
- collection and analysis of relevant risk data through the offshore–onshore continuum
- public awareness and community reporting under the Biosecurity Top Watch initiative.

NAQS contributes to Australia's capacity to demonstrate the absence of high-risk pests and diseases. This allows privileged access for Australian agricultural produce to important and vigilant international markets.

Surveillance measures focus on early detection and reporting of exotic pests and diseases in coastal regions between Broome (on Australia's west coast) and Cairns (on the east coast), including the special quarantine zones established in Torres Strait. Resources and the frequency of surveillance – developed in consultation with key stakeholders and reviewed annually – target the highest-risk areas. Target organisms are currently those that match all, or a majority, of the following criteria:

- organisms that pose serious threats to Australia's agricultural productivity, export markets, human health (i.e. zoonoses) or the environment
- organisms with potential to enter northern Australia from Indonesia, Papua New Guinea, Timor-Leste or other locations by unregulated pathways, such as wind or tidal movements; animal migrations; or unauthorised human-assisted movements, including traditional movements
- organisms with a high likelihood of establishment and spread.

In 2015, key priorities for NAQS were:

- risk-based surveillance for detection of exotic pests and diseases, including foot-and-mouth disease, exotic strains of BTV and its biting midge vectors, classical swine fever, Aujeszky's disease, rabies, screw-worm fly and highly pathogenic avian influenza
- contributing to national surveillance programs, including NAMP, the SWFSPP, and the NAIWB Surveillance Program
- expanding the level of participation in biosecurity surveillance in Aboriginal and Torres Strait Islander communities through a community animal health reporting project and other initiatives
- improving rabies surveillance and preparedness in northern Australia, including reviewing risk pathways and better targeting awareness messages in remote Aboriginal and Torres Strait Islander communities.

Specific disease surveillance strategies in 2015 included the following:

- Surveys to detect exotic diseases in potential host animal species. In 2015, 10 animal health surveys were completed. During these surveys, wild and domestic animals are inspected by veterinary officers, and samples are taken for laboratory testing for a range of target diseases. No exotic diseases were confirmed during 2015. Data are reported formally through NAHIS, and contribute to Australia's capacity to demonstrate the absence of pests and diseases of significance to trading partners.
- Aboriginal and Torres Strait Islander ranger groups contributed to animal health surveillance through a community animal health reporting program. Land and sea ranger groups provide syndromic reports on domestic

and wild animal populations to give a current picture of animal health in the region and enable emerging trends to be identified. Data are gathered each quarter from targeted groups within each community, including human health clinics, animal management or environmental health workers, hunters and private veterinarians. This has been an effective way of gathering data from remote communities in northern Australia and maintaining a baseline understanding of animal health in these areas for modest cost. It also promotes awareness of animal pests and diseases of concern within the community, and encourages people to report unusual signs of pests and diseases.

- A national review of the screw-worm fly surveillance strategy was undertaken through the SWFSPP (see Section 3.2.3). As a result, surveillance to address specific risks of screw-worm fly entering Australia via the Torres Strait islands was reviewed by NAQS. Changes included installation of adult fly traps on the Australian mainland in the Northern Peninsula Area, and an increased focus on myiasis inspections throughout the Torres Strait islands and northern Cape York Peninsula. As a result of the increased focus on myiasis inspections, adult fly trapping in the northern islands of Torres Strait ceased from July 2015.
- Japanese encephalitis (JE) virus surveillance is conducted during the wet season in northern Queensland. JE virus is exotic to mainland Australia but is seasonally present in Torres Strait. Monthly samples from the sentinel cattle herd in the Northern Peninsula Area were tested for JE virus and related arboviruses. A novel method of surveillance that allows molecular testing of excreted saliva from mosquitoes (the primary vectors of the virus) was also used. There has been no evidence of virus circulation on the mainland since early 2004.
- The Biosecurity Top Watch public awareness and education campaign included activities delivered in more than 40 remote communities and properties to strengthen general surveillance. These involved visits to schools, to health clinics, and with Indigenous ranger groups and pastoralists. They aim to increase the capacity of residents to identify and report pests and diseases across northern Australia.

Key surveillance achievements for 2015 were:

- 10 targeted animal health surveys delivered across northern Australia, with no confirmed detections of exotic pests or diseases
- 613 wild and domestic animals, including pigs, cattle, buffalo, horses, chickens and dogs, tested for a range of exotic pests and diseases
- 1094 environmental faecal samples tested for avian influenza viruses
- 29 sentinel herd visits (at five separate sites), with 384 samples tested
- 113 screw-worm fly traps set and inspected
- 27 512 biting midges (*Culicoides* spp.) identified from eight northern trap sites
- 95 community animal health reports received from 41 individual communities.

More information on NAQS is available on the department's website.[65]

3.3.2 State and territory animal biosecurity in northern Australia

Surveillance and awareness activities for notifiable pests and diseases are conducted across northern Australia by DAFWA, the Northern Territory Department of Primary Industry and Fisheries, and the Queensland Department of Agriculture and Fisheries. These activities complement those of other programs, including border security and quarantine barrier activities – such as NAQS – undertaken by the Australian Government Department of Agriculture and Water Resources. They also contribute to national pest and disease surveillance programs, including:

- NAMP (Section 3.2.1)
- the NTSESP (Section 3.2.2)
- the SWFSPP (Section 3.2.3)
- the NBPSP (Section 3.2.5).

Activities in aquatic animal health surveillance, EAD preparedness, disease prevention and control, and livestock identification and traceability also take place.

Government officers work to raise awareness about biosecurity, providing advice and guidance to the public and private sectors on:

- managing the risk of exposure to zoonotic disease, including from wildlife
- preparing for, and managing, emergency pest and disease incidents

65 www.agriculture.gov.au/biosecurity/australia/naqs

- on-farm biosecurity planning
- investigating suspect animal pests or diseases
- animal disease prevention strategies, including swill-feeding regulations
- animal welfare
- live animal export.

Government agencies investigate reported outbreaks of disease and losses in livestock, wildlife and domestic animals that may involve a notifiable disease or EAD. The only significant EAD event in northern Australia during 2015 was a single case of Hendra virus infection in a horse in north Queensland in July.

Numerous exclusions of Hendra virus in equids (horses and donkeys) were made across the north, particularly in Queensland, in 2015. Typical cases for Hendra virus exclusion involved horses with neurological symptoms and fever. Other EAD exclusions included examination of maggots collected from myiasis cases to exclude screw-worm fly, and investigation of abortion in cattle to exclude brucellosis. ABLV and Hendra virus were also excluded in several cases where bats showed indicative clinical signs.

Extension programs in northern Australia during 2015 included:

- visits by veterinary officers to private veterinary clinics to discuss procedures for investigating suspected cases of Hendra virus and other notifiable diseases
- discussions with private veterinarians about disease investigations suitable for subsidy under the NSDIP and the NTSESP
- awareness seminars for horse-owner groups and private veterinarians about Hendra virus
- extension with wildlife carers on the clinical signs of diseases with known zoonotic risk in wildlife
- extension at export depots, agricultural shows and field days, focusing on biosecurity programs
- one-on-one awareness sessions with cattle producers and private veterinarians about disease awareness, including reporting or collecting maggots in wounds on cattle and other animals to exclude screw-worm fly
- presentations at remote Indigenous training workshops for environmental health workers and animal management workers, to promote the importance of biosecurity awareness, animal welfare and zoonotic diseases for Indigenous communities
- tutorial sessions at James Cook University (JCU) School of Veterinary and Biomedical Sciences, and practical field placements of veterinary science students from universities across Australia to provide the students with experience in national surveillance programs, EAD preparedness and response (including an exercise based on an avian influenza outbreak held at JCU), and on-farm biosecurity planning
- information sessions for apiarists on Asian honey bee, and bee pests and diseases
- information sessions for producers on Johne's disease.

3.4 PUBLIC HEALTH SURVEILLANCE FOR ZOONOTIC DISEASES

3.4.1 Communicable Diseases Network Australia

The Communicable Diseases Network Australia (CDNA;[66] see Chapter 7) provides national leadership and coordination for the surveillance, prevention and control of communicable human diseases that pose a threat to public health. Its members include the Australian Government, state and territory governments, and key non-government organisations concerned with communicable diseases. The network provides advice to governments and other bodies on public health strategies to minimise the effect of communicable diseases, and oversees the development of nationally consistent public health guidelines to guide the public health response to outbreaks of communicable diseases. The CDNA reports to the Australian Health Ministers' Advisory Council through the Australian Health Protection Principal Committee.

3.4.2 National Notifiable Diseases Surveillance System

The National Notifiable Diseases Surveillance System (NNDSS) coordinates the national surveillance of more than 50 communicable diseases or disease groups that can affect people. Unit records of disease notifications made to state or territory health authorities, under the provisions of the public

66 www.health.gov.au/internet/main/publishing.nsf/content/cda-cdna-cdna.htm

health legislation in each jurisdiction, are supplied daily to the Office of Health Protection, Australian Government Department of Health. The data are published weekly on the NNDSS website[67] and quarterly in *Communicable Diseases Intelligence*[68] (an online, quarterly, peer-reviewed journal that disseminates information on the epidemiology of communicable diseases in Australia, including surveillance, prevention and control). Data on five important zoonoses are reproduced in *Animal Health Surveillance Quarterly*.[69]

Table 3.7 reports the incidence of selected zoonotic diseases in 2015, and compares these data with those for 2014 and the five-year mean.

3.4.3 National Enteric Pathogens Surveillance Scheme

The National Enteric Pathogens Surveillance Scheme collects, analyses and disseminates data on enteric pathogens isolated from humans, animals, food, water, the environment and other sources. The scheme is operated and maintained by the Microbiological Diagnostic Unit at the University of Melbourne. Data on pathogens – such as *Salmonella* spp., pathogenic *Escherichia coli*, *Yersinia* spp. and *Campylobacter* spp. – isolated from humans and non-human sources are submitted from participating laboratories around Australia. Data for human notifications are reported within the NNDSS.

NNDSS data show that, as in recent years, the most frequently reported foodborne infections in 2015 were campylobacteriosis[70] (19 046 cases) and salmonellosis (16 952 cases).

3.4.4 Middle East respiratory syndrome coronavirus

Middle East respiratory syndrome coronavirus (MERS-CoV) is a novel coronavirus with a case fatality rate of approximately 36% in humans. The majority of human cases of MERS have been attributed to human-to-human infections; however, camels have been implicated as a likely reservoir of the virus. A recent proactive surveillance study found no serological evidence for the presence of MERS-CoV in Australian camels.[71]

Table 3.7 Incidence of selected zoonotic diseases in humans, 2015

Zoonotic disease	Number of cases		
	2014	2015	5-year mean (2011–15)
Anthrax	0	0	0
Barmah Forest virus infection	739	628	1840.2
Brucellosis	17	18	23.4
Kunjin virus infection	1	1	1.2
Leptospirosis	88	67	114
Murray Valley encephalitis virus infection	0	2	3.8
Ornithosis	38	12	53
Q fever	450	549	447.4
Ross River virus infection	5331	9536	5798.4

67 www.health.gov.au/internet/main/publishing.nsf/Content/cda-surveil-nndss-nndssintro.htm

68 www.health.gov.au/internet/main/publishing.nsf/Content/cda-pubs-cdi-cdiintro.htm

69 www.animalhealthaustralia.com.au/our-publications/animal-health-surveillance-quarterly

70 In New South Wales, campylobacteriosis is only notifiable as a foodborne disease or gastroenteritis if it occurs in an institution.

71 Crameri G, Durr PA, Barr J, Yu M, Graham K, Williams OJ, Kayali G Smith D, Peiris M, Mackenzie JS & Wang LF (2015). Absence of MERS-CoV antibodies in feral camels in Australia: implications for the pathogen's origin and spread. *One Health* 1:76–82.

Image credit: iStock

CHAPTER 4

Managing terrestrial animal health emergencies

Emergency animal disease (EAD) responses in Australia are coordinated nationally. Governments, the private sector and other key players work together to ensure a successful outcome.

This chapter describes the arrangements and initiatives that are in place to prepare for, and respond to, terrestrial EADs. It also provides information on terrestrial animal disease incidents that occurred during 2015. Information on management of aquatic animal health emergencies and aquatic animal disease incidents during 2015 is provided in Chapter 5.

The Australian Government, state and territory governments, livestock industries, the Commonwealth Scientific and Industrial Research Organisation (CSIRO), private veterinarians and laboratories, and other animal health workers all contribute to the management of EADs. Animal Health Australia (AHA) manages and strengthens Australia's EAD response arrangements through effective and successful partnerships with its members.

4.1 RESPONSE PLANS AND COORDINATION

EAD responses in Australia are coordinated nationally – governments and industry work together to ensure a successful outcome. Responses are underpinned by the Government and Livestock Industry Cost Sharing Deed in Respect of Emergency Animal Disease Responses (Emergency Animal Disease Response Agreement – EADRA).[72]

The EADRA ensures that responses:

- accommodate the relevant state's or territory's legislative, industry, government and community structures
- are guided by a nationally agreed plan – the Australian Veterinary Emergency Plan (AUSVETPLAN).

4.1.1 Emergency Animal Disease Response Agreement

The EADRA is a legally binding agreement between the Australian Government, state and territory governments, livestock industries (currently 14 industries) and AHA. It is a strong and robust nationally agreed, unified framework that ensures that Australia is able to deal successfully with EADs.

The agreement, which is a world first, establishes basic operating principles and guidelines, and defines roles and responsibilities of the parties that are involved. It provides for formal consultation and dispute resolution between government and industry on resource allocation, funding, training, risk management and ongoing biosecurity arrangements.

The signatories to the EADRA are committed to:

- minimising the risk of EAD incursions by developing and implementing biosecurity plans for their jurisdictions or industries
- maintaining capacity to respond to an EAD by having adequate numbers of trained personnel available to fill roles specified in AUSVETPLAN
- participating in decision making relating to EAD responses, through representation on the Consultative Committee on Emergency Animal Diseases (CCEAD) and the National Management Group (NMG)
- sharing the eligible response costs of EAD incursions using pre-agreed formulas.

The EADRA is regularly reviewed so that it remains relevant, flexible and functional. In 2015, only minor and administrative updates were made. The latest version of the EADRA is on the AHA website.[73]

4.1.2 Australian Veterinary Emergency Plan

AUSVETPLAN[74] is a comprehensive series of manuals that sets out the starting policy and guidelines for agencies and organisations involved in a response to an EAD outbreak.

AHA works in consultation with its government and industry members to prepare and review the AUSVETPLAN manuals and supporting documents. AHA does not determine animal health policy; it facilitates the development of national policy through engagement with the relevant stakeholders. Governments are ultimately responsible for developing and implementing national disease response policies.

The availability of agreed AUSVETPLAN disease strategies or response policy briefs[75] for all diseases listed in the EADRA ensures that informed decisions about the policies and procedures needed to manage an EAD response are immediately at hand; no time is lost in the event of an EAD outbreak. This requires that as many policy principles as possible are agreed to during non-outbreak times. EAD responses are planned and implemented at three levels – national, state or territory, and local – and involve animal health authorities, emergency management agencies and industry organisations.

The disease strategies and response policy briefs are supported by operational manuals, enterprise manuals, and other resource and guidance documents. The AUSVETPLAN *Summary document*[76] describes the components of AUSVETPLAN and outlines their functional relationships.

72 www.animalhealthaustralia.com.au/what-we-do/emergency-animal-disease/ead-response-agreement

73 www.animalhealthaustralia.com.au/what-we-do/emergency-animal-disease/ead-response-agreement

74 www.animalhealthaustralia.com.au/what-we-do/emergency-animal-disease/ausvetplan

75 Response policy briefs cover EADs that are subject to cost sharing between governments and livestock industries, but are not currently covered by full disease strategies.

76 www.animalhealthaustralia.com.au/our-publications/ausvetplan-manuals-and-documents (note that the *Summary document* is in the process of being reviewed and renamed as *Overview of AUSVETPLAN*)

Updating prioritised AUSVETPLAN manuals

In 2015, AHA worked with the AUSVETPLAN Technical Review Group, industry and government experts, Animal Health Committee (AHC) and scientific editors to revise and publish updated prioritised AUSVETPLAN manuals.

The updated manuals published were:

- *Anthrax, Aujeszky's disease, Bluetongue* and *Classical swine fever* (disease strategies) – updates of these disease strategies to the new edition 4 standardised format and generic text
- *Control centres management manual* (parts 1 and 2) – a major revision to update the manual to the new edition 4 standardised format and generic text, and to ensure that the manual is aligned with contemporary emergency management structures and practices, as described in the Biosecurity Incident Management System guide[77]
- *Disposal* (operational manual) – a major revision to update the structure of the manual and information on disposal procedures
- *Destruction of animals* (operational manual) – a minor update to include the use of foam technology, which is now available in Australia, for destruction of chickens, and to incorporate a reference to the AUSVETPLAN resource document *Methods for the destruction of poultry, pet/zoo birds and aviary species.*

Revisions were also made to the AUSVETPLAN manuals for Australian bat lyssavirus, avian influenza, porcine reproductive and respiratory syndrome, scrapie, screw-worm fly, and valuation and compensation. These revisions are undergoing formal development and approvals processes.

Two new documents published were:

- an enterprise manual for the wool industry, for individuals and entities in Australia involved in the harvesting (shearing), transport, handling, storage, processing and export of wool fibre ('from shed to ship')
- a resource document on a decision matrix for a national livestock standstill in the case of an outbreak of foot-and-mouth disease.

4.1.3 Nationally agreed standard operating procedures

Nationally agreed standard operating procedures (NASOPs) have been developed for use by states and territories during responses to EAD incidents and emergencies. They support national consistency and provide guidance to response personnel undertaking operational tasks. Although not formally part of AUSVETPLAN, NASOPs underpin elements of AUSVETPLAN and describe the actions typically undertaken during a response to an incident. They are provided to guide states and territories in developing local procedures and work instructions.

NASOPs currently published on the AHA website[78] address topics relevant to animal disease emergencies, such as personal decontamination, collecting samples, managing stock during a national livestock standstill, and transporting carcasses, as well as generic topics such as briefing, debriefing and handovers in a biosecurity response.

4.1.4 What happens in an emergency animal disease response?

Operational responsibility for the response to an EAD lies with the relevant state or territory, which develops an EAD response plan (EADRP). In most jurisdictions, the government department of agriculture or primary industries manages the response to an EAD outbreak and implements the EADRP. State and territory chief veterinary officers (CVOs) have leadership roles in the response, which also involves state emergency services, public safety services and other government departments, as needed. Pre-existing emergency management and whole-of-government arrangements allow agriculture or primary industries departments to draw on resources and expertise from these agencies.

The CCEAD is responsible for technical coordination of an EAD response. The Australian CVO or delegate chairs the committee, which comprises the state and territory CVOs, the Director of the CSIRO Australian Animal Health Laboratory (CSIRO-AAHL), members of the Australian Government Department of Agriculture and Water Resources, and technical representatives from relevant industries. Industry representatives comprise one nominee agreed to by all industry parties and one nominee from each of the affected industries. AHA attends CCEAD meetings as an observer.

77 www.agriculture.gov.au/biosecurity/partnerships/nbc/nbepeg/documents/bims

78 www.animalhealthaustralia.com.au/what-we-do/emergency-animal-disease/nationally-agreed-standard-operating-procedures

To ensure a timely and effective response, the CCEAD oversees implementation of EADRPs, strategy development and planning, and the development of technical policy. The CCEAD provides advice to an NMG that is established for each incident. The Secretary of the Department of Agriculture and Water Resources chairs the NMG; members are chief executives of the state and territory agriculture or primary industries departments, and chief executives from each affected industry. Representatives of AHA attend NMG meetings as observers.

When the NMG receives technical advice from the CCEAD, it considers policy and financial issues associated with the EADRP. The NMG's agreement to an EADRP is an undertaking to share eligible costs under the EADRA.

This structure ensures that the resources needed for agriculture and animal health authorities to deal with an EAD are available and coordinated for the most effective response.

Further information about the mechanism of an EAD response and how cost-sharing provisions are implemented can be found in the AUSVETPLAN *Summary document*.[79]

4.1.5 Improved national arrangements for emergency preparedness and response

Under Schedule 7 of the Intergovernmental Agreement on Biosecurity, the Australian, state and territory governments are working together to improve emergency preparedness and response arrangements to allow:

- nationally consistent response arrangements
- consistent and agreed funding arrangements
- timely decisions and actions
- trained people to move between jurisdictions
- a coordinated national approach to capability and infrastructure for biosecurity emergency responses
- development and maintenance of scientific and technical capacity to support response activities
- improved communication capability between jurisdictions during an emergency.

79 www.animalhealthaustralia.com.au/our-publications/ausvetplan-manuals-and-documents (note that the *Summary document* is in the process of being reviewed and renamed as *Overview of AUSVETPLAN*)

4.2 PREPAREDNESS INITIATIVES

4.2.1 Emergency Animal Disease Preparedness and Response Service Stream

When EAD outbreaks occur, preparedness to manage and respond to them ensures that Australia can mount a rapid and effective response with minimal disruption to livestock (including horse) industries and food industries. The Emergency Animal Disease Preparedness and Response Service Stream, which is managed by AHA, ensures that the EADRA and supporting tools are effective and current, and strengthens government–industry partnerships for successful responses to EADs. The main objective is to ensure that Australia is well prepared for EAD incidents, through a range of activities, including public awareness, training, simulation exercises and surveillance.

For example, part of Australia's preparedness to manage an outbreak of foot-and-mouth disease (FMD) is the establishment and maintenance of an FMD vaccine bank. The bank allows rapid production and delivery of FMD vaccine, should it be required in an outbreak situation. AHA also has a contract in place for cold storage and distribution of vaccine. The current manufacture, storage and supply agreement was activated on 15 December 2014 and will continue until December 2019.

4.2.2 National Emergency Animal Disease Training Program

In the event of an EAD incident, government officers, livestock producers, private veterinary practitioners and emergency workers are called upon to help eradicate or control the disease. AUSVETPLAN describes how the response to an EAD incident is to be conducted and the roles that require specific training.

The national EAD training program provides education and training in the various EAD response functions. Face-to-face EAD awareness training provides government officers, private veterinary practitioners and livestock industry members with an understanding of Australia's agreed response strategies.

Image credit: Theresa Robinson

Formal accredited training, covering the skills and knowledge needed to perform a function during an EAD response, is available for government officers through jurisdictional training programs, and for livestock industry members through AHA.

Governance

Oversight of AHA's EAD training program is provided by the National Animal Health Training Steering Committee (NAHTSC), comprising representatives from relevant government and livestock industry organisations. It facilitates national consistency in delivery of EAD preparedness and response training, and assists in prioritising AHA's training work program.

The elements of national EAD training are delivered by different organisations, as described in the following subsections.

Jurisdictional-response team training

Each state and territory is responsible for maintaining a team of personnel capable of responding to biosecurity emergencies. This 'first response' team manages the initial response to an EAD, including staffing control centres and beginning field activities. First-response team members receive training in their response functions from jurisdictional training programs.

Professional development for biosecurity response trainers

AHA sponsors the delivery of professional development programs for jurisdictional and industry biosecurity response trainers. A short workshop on training and assessment is held each year at the NAHTSC's annual meeting. In addition, AHA sponsors an annual workshop to promote continued professional development for trainers. This helps to ensure that biosecurity response trainers are qualified to deliver accredited training under the Australian Qualifications Framework.

In 2015, training personnel participated in a workshop on skills recognition and workplace assessment. The knowledge and skills gained in the workshop will allow trainers to support suitably experienced jurisdictional response personnel to achieve biosecurity qualifications through skills recognition or formal assessment 'on the job'.

Development and sharing of training materials

AHA facilitates the development of training resources that can be shared nationally, and are delivered by qualified and experienced trainers to government and industry response

staff. Training resources include online modules, induction training modules and face-to-face workshops. AHA's online Emergency Animal Disease Foundation course is a generic introduction to emergency response arrangements in Australia. It provides information on the basic principles of an EAD response, AUSVETPLAN, the responsibilities of people involved in a response, and the importance of communications and information management during a response.

In 2015, AHA collaborated with state and territory agencies to begin developing additional training resources for use in biosecurity responses.

CCEAD and NMG training

AHA holds twice-yearly workshops to prepare industry executives, technical specialists and senior government officers for service on the two key decision-making bodies – the NMG and the CCEAD (see Section 4.1.4) – during an EAD response.

Rapid Response Team

The national Rapid Response Team (RRT) is an Australian Government initiative that was originally developed to help smaller jurisdictions establish emergency control centres for disease outbreaks. The RRT is a group of 50 government response personnel with expertise in key control centre management positions. During their 3–5-year membership on the team, members take part in professional development activities to maintain and develop their response skills.

In 2015, the RRT participated in Exercise Slapstick, to apply FMD vaccination strategies, policies and procedures in a scenario-based exercise. Field components took place in Queensland. Outcomes of the exercise will inform preparedness for applying vaccination in an EAD response.

Private veterinary practitioner engagement

The states and territories hold regular EAD awareness workshops for private veterinary practitioners, to assist them with recognising EADs and to remind them of their reporting obligations. CSIRO-AAHL contributes to these training workshops.

Livestock industry training

In 2015, AHA collaborated with its members to develop a new model for training livestock industry personnel, following revision of the AUSVETPLAN *Control centres management manual* (see Section 4.1.2). Training for livestock industry personnel will be scenario based, allowing participants to learn and practise their response functions in a practical way.

4.2.3 Nepal real-time FMD training

The Department of Agriculture and Water Resources continued its agreement with the European Commission for the Control of Foot-and-Mouth Disease (EuFMD) for the provision of training in FMD detection and control. Costs of the program are shared between the Australian Government, some state governments, peak industry organisations and the New Zealand Ministry for Primary Industries. During 2015, the EuFMD held two courses in Nepal; five courses are planned for 2016. Since the first course in 2012, 152 Australian veterinarians and livestock workers have been trained in the detection and control of FMD, strengthening Australia's capacity for early warning of an FMD outbreak and response to an outbreak. After returning to Australia, all trainees are required to undertake extension activities to increase awareness about FMD among private veterinarians, livestock workers and producers.

4.2.4 International modelling studies to support planning for emergency animal diseases

To strengthen EAD preparedness, Australia collaborates with other countries on epidemiology and disease modelling. In 2015, a new modelling platform, the Australian Animal Disease Spread model (AADIS) came into operation to support EAD planning and preparedness in Australia. AADIS is a result of collaboration between the Department of Agriculture and Water Resources and the University of New England. It offers full national-scale modelling capability, and addresses the needs of disease managers to capture complex disease epidemiology, regional variability in transmission (e.g. due to different livestock movement patterns, production systems and climates) and different jurisdictional approaches to control. AADIS is being used in a project funded by the Centre of Excellence for Biosecurity Risk Analysis, 'Using decision support tools in emergency animal disease planning and response: foot-and-mouth disease'. This project will evaluate the effectiveness of control strategies, allowing for variable (and potentially conflicting) management objectives, such as eradicating the disease as soon as possible, minimising control costs and maintaining business continuity for uninfected producers. It is a collaborative project between the Department of Agriculture and Water Resources, New Zealand's Ministry for Primary Industries, AsureQuality (a

New Zealand–based biosecurity company) and the Australian National University.

Australia also continued to contribute actively to multicountry FMD modelling studies coordinated through the EpiTeam, a subgroup of the Emergency Management Working Group of the Quadrilateral countries (Australia, Canada, New Zealand and the United States). These countries, along with the United Kingdom and the Netherlands, are involved in a study to test the usefulness of information that is available early in an outbreak to estimate the subsequent size of the outbreak. If situations that are likely to lead to 'large' outbreaks can be identified, early deployment of additional control measures, such as vaccination, can be considered. By involving a number of countries and modelling platforms, the robustness of various criteria and frameworks can be assessed in different settings, so that the best approaches for particular countries can be identified.

Australia is also collaborating on an international project, led by researchers in the United States, to evaluate the use of ensemble modelling methods. This project attempts to improve the quality of model predictions by pooling findings from a range of models.

At a national level, modelling studies are being used to support animal health policies in Australia. These studies include evaluating approaches to improve early detection of an FMD incursion, vaccination policies and resource management. In 2015, the Department of Agriculture and Water Resources provided modelling support to Queensland to develop and test a decision-making framework for an FMD vaccination strategy.

4.2.5 Exercise Odysseus – Australia's national livestock standstill exercise

If an outbreak of FMD is strongly suspected or confirmed in Australia, a national livestock standstill will be implemented for at least 72 hours. The standstill will apply to all FMD-susceptible animals to reduce spread of the disease, and to allow response agencies to determine the nature and extent of the outbreak. To be effective, the standstill needs to be implemented rapidly.

Exercise Odysseus – a series of 48 discussion exercises and field-based activities – was held throughout 2014 and early 2015, to strengthen government and industry arrangements for implementation of a national livestock standstill. It assessed national, jurisdictional and industry arrangements, decision making, communication and coordination for implementing and managing a national livestock standstill.

More than 1600 people from government agencies and industry organisations participated in Exercise Odysseus, with many participating in multiple activities.

Exercise Odysseus has increased awareness and preparedness among potentially affected agencies, organisations and communities of the importance, role and potential impacts of a national livestock standstill during an outbreak of FMD. It also identified opportunities to improve preparedness. Government agencies and industry bodies are using the findings from Exercise Odysseus to guide preparedness at the national, state and territory, and local levels.

The Exercise Odysseus final report will be available in 2016.

4.2.6 Animal health diagnostic laboratories

Australia's animal health laboratories play a crucial role in national capability and capacity to respond to a disease emergency. State and territory government animal health laboratories, CSIRO-AAHL, university veterinary laboratories and private veterinary laboratories all participate in, and contribute to, national EAD response programs and initiatives. CSIRO-AAHL, and some state and university laboratories also serve as the national and/or World Organisation for Animal Health (OIE) reference laboratories for specific EADs, providing in-depth investigational, research and training capacities.

In 2015, the Sub-Committee on Animal Health Laboratory Standards was dissolved. Its essential functions have been streamlined to reflect the direct overseeing role of AHC and a needs-based operating approach. The Department of Agriculture and Water Resources has continued to provide coordination and administrative support to relevant ad hoc task groups, as needed.

AHA contributes to Australia's network of animal health laboratories by managing AUSVETPLAN, the National Animal Health Laboratory Coordination Program and the Australian Animal Pathology Standards Program (AAPSP).[80] These national programs meet future requirements for disease surveillance, in-depth case investigations, emergency responses, quality assurance and training. The AUSVETPLAN

80 www.animalhealthaustralia.com.au/what-we-do/laboratory-services/australian-animal-pathology-standards-program

Laboratory preparedness management manual[81] details current laboratory guidelines for an EAD response, and assists laboratories to prepare a contingency plan for a disease emergency.

Australian Animal Pathology Standards Program

The AAPSP Digital Slide Archive, comprising images of endemic and exotic diseases in a wide range of terrestrial and aquatic animal species, provides training and educational materials to AAPSP members. The archive steadily grew in 2015 and currently holds more than 5400 slides. Slides have been contributed mainly by CSIRO-AAHL, the United States Armed Forces Institute of Pathology, the Australian and New Zealand Aquatic Pathology Archive, and the National Registry of Domestic Animal Pathology (held by the Elizabeth Macarthur Agricultural Institute).

State and territory government and private veterinary laboratories participate in a quarterly histopathology proficiency testing program, which was launched in 2006. The testing covers morphological descriptions, and diagnosis using digital tissue sections. The assessment forms part of the performance records of accredited laboratories that are auditable by the National Association of Testing Authorities. In 2015, the AAPSP successfully maintained the standards for histopathology proficiency testing.

Laboratories for Emergency Animal Disease Diagnosis and Response network

The Laboratories for Emergency Animal Disease Diagnosis and Response (LEADDR) network consists of members from the Australian Government, CSIRO-AAHL, and state and territory government laboratories. The network, which reports to AHC, aims to standardise or harmonise testing performance for targeted EADs of terrestrial and aquatic animals in all member laboratories. This supports a nationally coordinated approach and maximises the availability of national resources to meet demands for large-scale testing in an EAD outbreak. The AUSVETPLAN *Laboratory preparedness* management manual details LEADDR's role in the overall EAD response procedure.

Since 2009, LEADDR has progressively added targeted diseases to its quality assurance programs. They include avian influenza, Newcastle disease, bluetongue, FMD, infection with Hendra virus, white spot syndrome and infection with ostreid herpesvirus 1 microvariant. As part of national FMD preparedness, LEADDR has established capability to screen for FMD using methods that do not require live virus, to increase laboratory biosecurity and reduce the biosafety risk.

During an EAD outbreak, the Laboratory Subcommittee – CCEAD will be formed to support the CCEAD or Aquatic CCEAD (see Chapter 5). The Laboratory Subcommittee – CCEAD consists of relevant experts from the LEADDR network and other laboratories, as required. CSIRO-AAHL remains the national diagnostic centre for exotic EADs and transfers AHC-agreed testing capabilities to suitable network laboratories under controlled quality assurance conditions.

In 2015, the Department of Agriculture and Water Resources continued to fund LEADDR. In addition to participating in various proficiency testing programs as part of its quality assurance program, LEADDR members met regularly, exchanged scientific and technical information, and discussed new technical issues as they arose.

Regional and international networking for laboratories

To strengthen Australia's preparedness for, and response to, major disease emergencies, and to ensure Australia's access to specific expertise or materials that are not immediately available in Australia, the LEADDR member laboratories maintain a strong working relationship with various overseas veterinary and public health laboratories. The OIE National Focal Point for Veterinary Laboratories, based in the Department of Agriculture and Water Resources, has continued to support Australia's OIE Delegate on various regional and international issues relating to animal health laboratories, including laboratory capacity building for disease emergencies (also see Chapter 9).

4.2.7 Swill-feeding activities

In 2015, nationally consistent minimum guidelines were finalised for monitoring compliance and enforcement actions relating to the prohibition on feeding swill (prohibited pig feed) to pigs. This work, facilitated by AHA, brought together the Australian, state and territory governments, and the pork industry (through Australian Pork Limited). Work is progressing to reflect previously agreed definitions in legislation.

81 www.animalhealthaustralia.com.au/our-publications/ausvetplan-manuals-and-documents

While the national guidelines were being developed, state work plans were implemented to ensure that the issues surrounding the feeding of prohibited pig feed were addressed.

4.2.8 International Animal Health Emergency Reserve

Australia is a signatory to the International Animal Health Emergency Reserve, an arrangement between Australia, Canada, Ireland, New Zealand, the United Kingdom and the United States to share personnel and resources during an EAD outbreak. In 2015, signatories commenced a project to develop an operational plan to assist with rapid deployments in an emergency.

4.3 INCREASING AWARENESS AND UNDERSTANDING

4.3.1 National communication arrangements for biosecurity incidents

The Biosecurity Incident National Communication Network (NCN) produces nationally consistent public information in response to exotic pest and disease outbreaks that affect Australia's livestock and plant industries. Members are communication managers from the Australian, state and territory government agencies responsible for biosecurity, and from animal and plant health organisations. In 2015, the NCN welcomed the National Farmers' Federation and Wildlife Health Australia as observers.

Following its participation in Exercise Odysseus (see Section 4.2.5), the NCN continues to work on preparedness activities for FMD. Most jurisdictions have developed response communication strategies and supporting public information materials. The NCN has a mechanism in place to share these materials with other jurisdictions and relevant industry groups. This will reduce duplicated effort and costs, and assist in providing nationally consistent messages.

The NCN is also sharing materials that have been developed to raise awareness of, and prevent, swill feeding to pigs. Victoria, Queensland and Western Australia have started targeted swill-feeding prevention campaigns that support their FMD prevention activities.

The NCN is continuing to engage with livestock industry groups when opportunities arise. It has offered to work with the Livestock Biosecurity Network[82] in 2016 to provide a more coordinated approach to activities aimed at improving on-farm biosecurity among small rural landholders. Some of the audiences being targeted with messages about small farm biosecurity may also engage in swill feeding.

In September 2015, the Outbreak website[83] was launched. The website is a central portal for information about exotic pests and diseases that are subject to national eradication programs. It contains information and resources that are useful to large-scale livestock and poultry producers, as well as people who keep these animals as pets. The website also provides tailored information that will be of interest to journalists, veterinarians and plant scientists.

Outbreak has information on:

- preventing pest and disease outbreaks
- how to report a suspect pest or disease
- how government and industry respond to outbreaks
- the actions people need to take when there is an outbreak on their property.

Outbreak can be accessed easily – it is now mobile phone and tablet friendly.

4.3.2 Farm Biosecurity campaign

Farm Biosecurity is a national awareness and engagement program that provides information to livestock producers and related service providers about on-farm biosecurity, and prevention of animal diseases and plant pests. The program is a joint initiative of AHA and Plant Health Australia. It encourages producers to identify risks to their livestock and plant products, and minimise these risks by incorporating on-farm biosecurity measures into their everyday operations.

Farm Biosecurity uses a number of channels to increase awareness of the six biosecurity essentials for good on-farm biosecurity. These channels include established and new electronic media, a range of educational materials and direct stakeholder engagement. The program promotes use of the Emergency Animal Disease Watch Hotline[84] and the Exotic

82 www.lbn.org.au

83 http://outbreak.gov.au

84 Emergency Animal Disease Watch Hotline: 1800 675 888


Image credit: CSIRO

Plant Pest Hotline[85] to report unusual signs of diseases or pests. In 2015, a number of activities took place, including the production and promotion of two new videos featuring information on biosecurity practices for producers. These are the fifth and sixth videos of a series of seven to be produced and made available on the Farm Biosecurity website and through other channels.

4.3.3 Strategic foresight

The Australian Chief Veterinary Officer (ACVO) is the primary representative of, and adviser to, the Australian Government on matters relating to the maintenance and improvement of Australia's animal health status and the systems that support it. The ACVO also addresses major issues of national interest, including animal welfare and the threat of antimicrobial resistance. This role is becoming more challenging as the complexity of issues and their rate of change increase. Strategic foresight is useful when managing uncertainty, both now and in the future. The Office of the Chief Veterinary Officer therefore leads a team, with input from many areas of the Department of Agriculture and Water Resources, using strategic foresight to consider emerging issues with the potential to affect animal health in Australia.

Methods of strategic foresight enable robust and resilient analysis, leading to better planning and policy advice. Emerging issues and trends are scanned, identified, analysed and interpreted from a range of perspectives. From this, a range of options is developed, and preferred responses are determined. This scanning assists the ACVO to identify, understand and respond to significant emerging issues before they establish or become critical.

Some of the strategic foresight activities in 2015 were:

- environmental scanning in areas such as biotechnology, emerging diseases, science and society, climate change and food safety
- production of the *Animal health scanning report*, which has the aim of early identification of emerging trends relevant to the management of animal health in the medium term in Australia. Emerging trends that have been identified include personalisation of food, medicine and nutrition; antimicrobial resistance; and use of gene editing in livestock
- consideration of key emerging issues using foresight techniques, to provide insights around topical issues and inform policy development
- cooperative work with Quadrilateral group partners on issues of mutual interest
- participation in the Australasian Joint Agencies Scanning Network, which consists of representatives from CSIRO; the Council of Rural Research and Development Corporations; the Australian Government Department of Agriculture and Water Resources; the Australian Government Department of Industry; the Defence

85 Exotic Plant Pest Hotline: 1800 084 881

Science and Technology Organisation; the Murray–Darling Basin Authority; Safe Work Australia; the South Australian Department of Environment, Water and Natural Resources; the Victorian Department of Economic Development, Jobs, Transport and Resources; the Victorian Department of Environment, Land, Water and Planning; the Victorian Environment Protection Authority; the University of New South Wales (Canberra) School of Physical, Environmental and Mathematical Sciences; LandCare New Zealand; Land Information New Zealand; the Natural Resources Sector Network (New Zealand); and Waikato Regional Council (New Zealand). The group is facilitated by a professional futurist, Kate Delaney.

4.4 BIOSECURITY PLANNING

Effective biosecurity at the enterprise and industry levels is extremely important in reducing the risk of introduction or spread of animal diseases. This is recognised by the Australian livestock industries and governments in the EADRA, which requires that all signatories develop, implement and maintain biosecurity plans at industry, regional and farm levels for their sector.

The farm-level biosecurity plans describe measures to mitigate the risks of disease entry or spread. The plan for each EADRA party is endorsed by the other EADRA parties, and is subject to ongoing review and maintenance.

AHA works with its members to ensure that the biosecurity plans are science based, relevant, cost effective and contemporary. Designed as an industry resource, the plans can be used by producers to gauge their own biosecurity requirements and implement biosecurity practices suitable for their particular circumstances. The practices listed in the plans have been incorporated as standards into an array of industry quality assurance and verification programs – these include the Australian Pork Industry Quality Assurance Program, EggCorp Assured and the National Feedlot Assurance Scheme (see Chapter 1). For these programs, a third party audits each of the participating producers annually against the standards.

All farm-level biosecurity plans can be found on the AHA[86] and Farm Biosecurity websites.[87]

86 www.animalhealthaustralia.com.au/what-we-do/biosecurity-services/biosecurity-planning-and-implementation

87 www.farmbiosecurity.com.au/toolkit/plans-manuals

4.5 PREPAREDNESS FOR SPECIFIC DISEASES

4.5.1 Foot-and-mouth disease

FMD is by far the most significant biosecurity threat to Australia's livestock industries. An outbreak in Australia could have devastating consequences for our community in lost production, trade and tourism. It would also have social consequences resulting from movement restrictions and response activities during an outbreak.

Following recommendations made by Mr Ken Matthews AO in *A review of Australia's preparedness for the threat of foot-and-mouth disease*,[88] Australia's National Biosecurity Committee agreed to develop a National Foot-and-Mouth Disease Action Plan. In 2015, AHC assumed responsibility for monitoring and overseeing progress on outstanding items.

AHC considers that preparedness for an outbreak of FMD is a high priority, and this view is shared by peak industry bodies. In 2015, AHC members collaborated on several areas of work, including:

- improving the likelihood of early detection, including co-investment in a training program for Australian veterinarians and livestock handlers in the real-time detection and control of FMD, run in Nepal by the EuFMD (see Section 4.2.3)
- developing Australia's arrangements to implement a national livestock standstill through Exercise Odysseus (see Section 4.2.5)
- raising awareness of the risks of illegal swill feeding, and developing a nationally consistent approach to legislation and compliance (see Section 4.2.7)
- undertaking targeted research and development activities to inform policy (see Section 4.2.4 and Section 10.1).

States and territories also worked to improve their FMD preparedness, particularly through their involvement in Exercise Odysseus and other specific activities. For example, Queensland is progressing a three-year Biosecurity Preparedness Program (FMD), which focuses on surveillance, prevention and response systems. Phase 1 of this program will be completed in 2016. The program includes developing surveillance and vaccination strategies,

88 www.agriculture.gov.au/animal-plant-health/pests-diseases-weeds/animal/fmd/review-foot-and-mouth-disease

addressing the challenges of mass animal destruction and disposal, and stakeholder engagement and awareness, with the aim of increasing awareness and preparedness for an FMD emergency at the whole-of-government, industry and community levels. Outputs from the program have been shared with other jurisdictions to improve national preparedness.

The Department of Agriculture and Water Resources, and the New Zealand Ministry for Primary Industries continued their strong collaboration on FMD preparedness activities in 2015 under the Trans-Tasman FMD Action Plan. In addition to an increased level of information and intelligence sharing, this plan has led to:

- the training of a further 11 New Zealand veterinarians under the Australian FMD real-time training program
- Australian Government and industry officials participating in a series of New Zealand workshops in July 2015 on industry biosecurity and the management of milk in an FMD outbreak
- the continuation of a collaborative modelling project on FMD, funded by the Centre of Excellence for Biosecurity Risk Analysis (see Section 4.2.4).

4.5.2 Avian influenza

In October 2013, an outbreak of highly pathogenic avian influenza (HPAI; subtype H7N2) occurred on two poultry farms near Young in New South Wales. On 21 February 2014, after resolution of the outbreak, Australia declared resumption of its status as a country free from HPAI, in accordance with Article 10.4.4 of the OIE *Terrestrial animal health code*.

Throughout 2015, reports continued of outbreaks of various strains of HPAI in wild birds, poultry and humans in Asia, Europe and North America. The H5N2 strain infected 200 farms in the United States in the first half of 2015, and 49 million poultry were killed during the response activities. In China, the low pathogenicity avian influenza (LPAI) H7N9 strain continued to cause human deaths. These outbreaks highlight the need for Australia to be prepared for HPAI.

Australia provides ongoing assistance with control of HPAI, and other zoonotic and emerging diseases in neighbouring countries, by delivering capacity-building programs that help countries to prevent, detect and respond to disease in animals.

Although HPAI H5N1 has never been detected in wild birds or poultry in Australia, preparedness is a high priority. Australian governments and AHA work with the Australian poultry industries to strengthen preparedness and response capacities for avian influenza on a continuous basis, and to maintain awareness of biosecurity among poultry owners. In 2013, AHC established a working group to provide advice on measures that might be adopted to reduce the ongoing occurrence of avian influenza outbreaks in Australian poultry. The working group identified a range of proposals covering surveillance programs, auditable biosecurity programs and possible changes to the way avian influenza is addressed in the EADRA. It also examined the influence of the expansion of free-range poultry farming. In April 2015, industry representatives endorsed the development of a biosecurity manual specifically targeting higher-risk free-range farms. In parallel, the Poultry Cooperative Research Centre began a research project in 2015 titled 'Avian influenza risk mitigation for the free-range sector of the Australian poultry industry'. Outputs from this project will be used to update industry biosecurity manuals[89] previously developed under the EADRA. The working group continues to investigate the potential to use the proposed revised manual as the basis for an audit system to improve biosecurity on free-range farms.

The Department of Agriculture and Water Resources also focuses on border security activities, to detect illegally imported poultry and poultry products.

Through Wildlife Health Australia, the Department of Agriculture and Water Resources coordinates a national surveillance program for avian influenza in wild birds (see Section 3.2.4). The program provides information on the prevalence and subtypes of avian influenza viruses in wild birds, and acts as an early warning system for the poultry industry. Samples were taken from 6522 wild birds during 2015, and a variety of LPAI virus subtypes (including H5 and H7) were found.

In 2015, surveillance of poultry flocks for avian influenza continued. Avian influenza was not detected in commercial poultry flocks in Australia during 2015.

89 www.farmbiosecurity.com.au/toolkit/plans-manuals

4.6 EMERGENCY ANIMAL DISEASE RESPONSES IN 2015

Appendix C lists investigations in animals during 2015 of certain nationally notifiable and emergency animal diseases. This section discusses a number of incidents and responses involving disease in livestock and companion animals. Significant disease events that primarily involved wildlife are discussed in Section 3.1.7.

4.6.1 Hendra virus in New South Wales and Queensland

Hendra virus is a zoonotic pathogen that has caused natural infection and disease in horses and humans. Numerous Hendra virus incidents have occurred in Queensland and New South Wales since 1994, involving more than 90 horses (see Section 2.4.9). Evidence of exposure to Hendra virus has also been detected in two dogs that were in close contact with infected horses. Both dogs remained clinically normal, with no occurrence of related illness, but were euthanased to manage public health risks.

In 2015, three incidents of Hendra virus infection in horses were reported: in June in Murwillumbah, New South Wales; in July in the Atherton Tableland, Queensland; and in September in Lismore, New South Wales. The Queensland[90] and New South Wales[91] governments implement well-established biosecurity and public health responses to Hendra virus incidents.

4.6.2 Anthrax in cattle in Victoria and New South Wales

Anthrax is well known to occur at irregular intervals in grazing livestock in the pastoral areas of New South Wales, northern Victoria and Gippsland (Victoria), where anthrax spores are able to persist in soils.

Anthrax affected one dairy cow on a property in Victoria in February 2015. In New South Wales, three separate incidents of anthrax occurred in 2015. These involved 1 bull in March 2015, and 9 and 19 cattle deaths, respectively, on separate properties in November 2015 (see Section 2.4.5).

In each case, control measures were implemented based on agreed national response policy, including quarantine and tracing, burning of carcasses and vaccination of livestock. The disease did not spread beyond the single affected property in each case. Human health authorities were notified, and public health precautions were implemented.

90 www.daf.qld.gov.au/animal-industries/animal-health-and-diseases/a-z-list/hendra-virus/general-information

91 www.dpi.nsw.gov.au/agriculture/livestock/horses/health/general/hendra-virus

Image credit: Patricia Thornhill

CHAPTER 5

Aquatic animal health

The health management of finfish, crustaceans and molluscs is an essential element of maintaining aquaculture productivity, fisheries resources and biodiversity in Australia.

This chapter provides details on the status of aquatic animal health in Australia, including details about national aquatic animal health policy and programs, aquatic animal disease emergency preparedness, disease events in 2015, research and development, and regional initiatives on aquatic animal health.

5.1 STATUS OF AQUATIC ANIMAL HEALTH IN AUSTRALIA

Australia has a reporting system for aquatic animal diseases of national significance. All the diseases currently reportable to the World Organisation for Animal Health (OIE) and other aquatic animal diseases of national significance are included on Australia's National List of Reportable Diseases of Aquatic Animals.[92]

In 2015, 10 fish diseases, 7 mollusc diseases, 8 crustacean diseases and 2 amphibian diseases were reportable to the OIE. Australia is free from most of these diseases. Australia's status for each OIE-listed aquatic animal disease in 2015 is shown in Table 5.1. The distribution of OIE-listed aquatic animal diseases that are present in Australia, based on reporting by states and territories, is shown in Figure 5.1.

Other aquatic animal diseases of national significance to Australia, and their status in 2015, are listed in Table 5.2.

Table 5.1 Australia's status for OIE-listed diseases of aquatic animals, 2015

Disease or agent	Status
Finfish diseases	
Epizootic haematopoietic necrosis disease	Locally present
Infection with *Aphanomyces invadans* (epizootic ulcerative syndrome)	Locally present
Infection with *Gyrodactylus salaris*	Never reported
Infection with HPR-deleted or HPR0 infectious salmon anaemia virus	Never reported
Infection with salmonid alphavirus	Never reported
Infectious haematopoietic necrosis	Never reported
Koi herpesvirus disease	Never reported
Red sea bream iridoviral disease	Never reported
Spring viraemia of carp	Never reported
Viral haemorrhagic septicaemia	Never reported
Mollusc diseases	
Infection with abalone herpesvirus	Locally present
Infection with *Bonamia exitiosa*	Never reported
Infection with *Bonamia ostreae*	Never reported
Infection with *Marteilia refringens*	Never reported
Infection with *Perkinsus marinus*	Never reported
Infection with *Perkinsus olseni*	Locally present
Infection with *Xenohaliotis californiensis*	Never reported
Crustacean diseases	
Crayfish plague (*Aphanomyces astaci*)	Never reported
Infection with yellowhead virus	Never reported
Infectious hypodermal and haematopoietic necrosis	Locally present
Infectious myonecrosis	Never reported

92 www.agriculture.gov.au/animal-plant-health/aquatic/reporting

Table 5.1 Australia's status for OIE-listed diseases of aquatic animals, 2015 *continued*	
Disease or agent	**Status**
Crustacean diseases *continued*	
Necrotising hepatopancreatitis	Never reported
Taura syndrome	Never reported
White spot disease	Never reported
White tail disease	Locally present
Amphibian diseases	
Infection with *Batrachochytrium dendrobatidis*	Locally present
Infection with ranavirus	Locally present

OIE = World Organisation for Animal Health
Note: Aquatic animal diseases that were reportable to the OIE in 2015 are those listed in the 2015 OIE *Aquatic animal health code*.

Image credit: FRDC

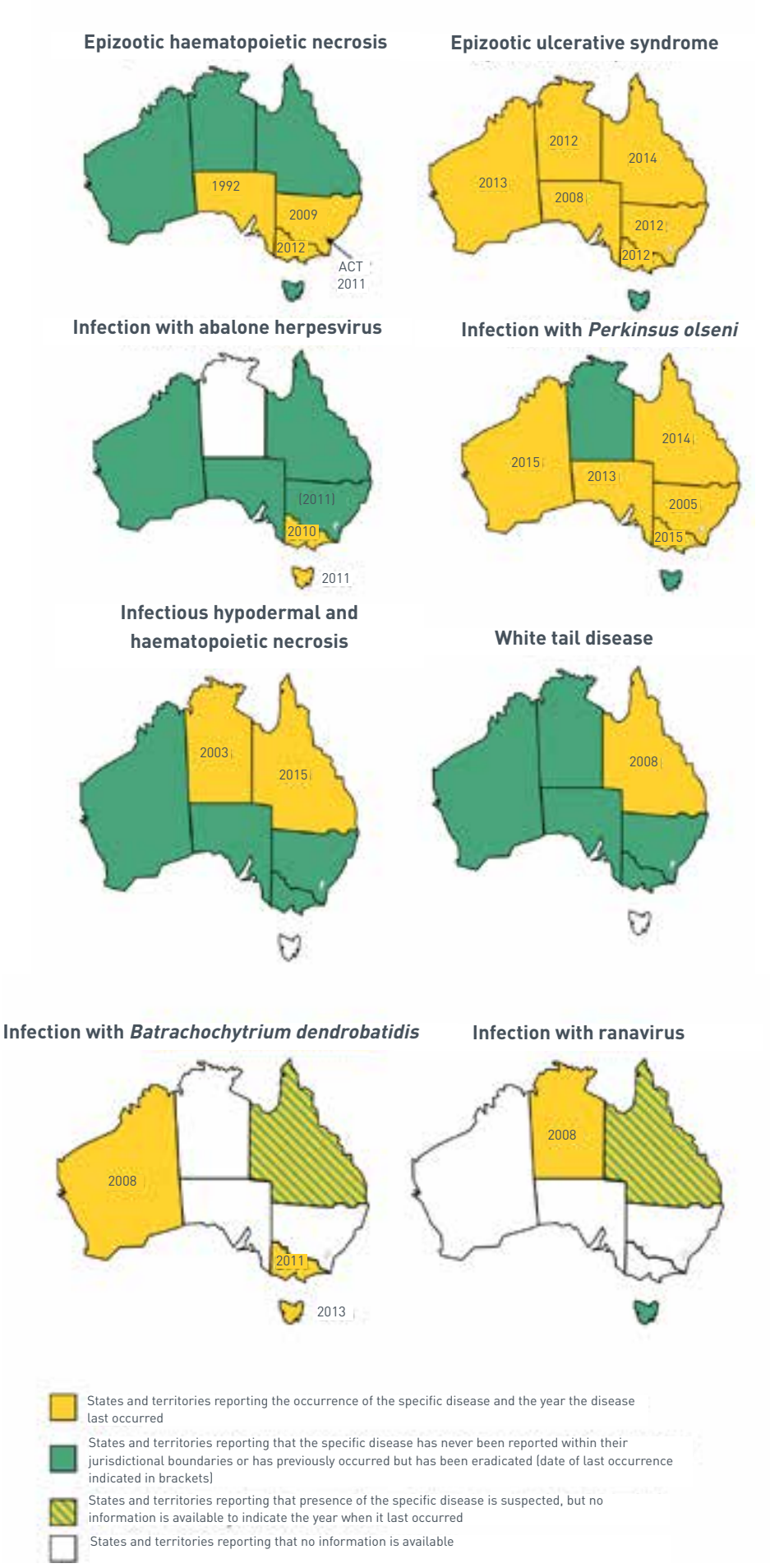


Figure 5.1 Distribution of OIE-listed aquatic diseases in Australia

Table 5.2 Australia's status for other significant diseases of aquatic animals, 2015	
Disease or agent	**Status**
Finfish diseases	
Aeromonas salmonicida – atypical strains	Locally present
Bacterial kidney disease (*Renibacterium salmoninarum*)	Never reported
Channel catfish virus disease	Never reported
Enteric redmouth disease (*Yersinia ruckeri* – Hagerman strain)	Never reported
Enteric septicaemia of catfish (*Edwardsiella ictaluri*)	Reported from wild native catfish in one river in 2014
Epizootic haematopoietic necrosis – European catfish virus/European sheatfish virus	Never reported
Furunculosis (*Aeromonas salmonicida* subsp. *salmonicida*)	Never reported
Grouper iridoviral disease	Never reported
Infectious spleen and kidney necrosis virus (ISKNV)–like viruses	Never detected in wild fish populations. Detected in imported aquarium fish
Infectious pancreatic necrosis	Never reported
Piscirickettsiosis (*Piscirickettsia salmonis*)	Never reported
Viral encephalopathy and retinopathy	Locally present
Whirling disease (*Myxobolus cerebralis*)	Never reported
Mollusc diseases	
Infection with *Bonamia* species	Locally present
Infection with *Marteilia sydneyi*	Locally present
Infection with *Marteilioides chungmuensis*	Never reported
Infection with *Mikrocytos mackini*	Never reported
Infection with ostreid herpesvirus 1 microvariant	Locally present
Iridoviroses	Never reported
Crustacean diseases	
Acute hepatopancreatic necrosis disease	Never reported
Gill-associated virus	Locally present
Monodon slow growth syndrome	Never reported

5.2 NATIONAL AQUATIC ANIMAL HEALTH POLICY AND PROGRAMS

Australia's Animal Health Committee (AHC) is responsible for public policy and government technical decision making on aquatic animal health. The Sub-Committee on Aquatic Animal Health (SCAAH) supports AHC in its policy deliberations by providing robust scientific and technical advice on aquatic animal health issues. Subcommittee members represent the Australian Government, the state and Northern Territory governments, the New Zealand Government, the Commonwealth Scientific and Industrial Research Organisation Australian Animal Health Laboratory (CSIRO-AAHL) and Australian universities (one representative). AHC reports to the National Biosecurity Committee for high-level endorsement of decisions and policy. (See Figure 1.1 in Chapter 1 for the structure of animal health management organisations and committees).

5.2.1 AQUAPLAN

AQUAPLAN 2014–2019[93] is Australia's third national strategic plan for aquatic animal health. It outlines the priorities to strengthen Australia's arrangements for managing aquatic animal health, and to support sustainability, productivity, market access and, ultimately, the profitability of Australia's aquatic animal industries. AQUAPLAN is a collaborative initiative that is developed and implemented by the Australian, state and territory governments, and aquatic animal industries. The Australian Government Department of Agriculture and Water Resources coordinates AQUAPLAN programs. AHC and SCAAH, in close collaboration with industry, oversee national implementation of AQUAPLAN activities and projects.

AQUAPLAN 2014–2019 has five objectives:

- improving regional and enterprise-level biosecurity
- strengthening emergency disease preparedness and response capability
- enhancing surveillance and diagnostic services
- improving availability of appropriate veterinary medicines
- improving education, training and awareness.

Each objective is supported by activities to address specific aquatic animal health management issues associated with infectious diseases of finfish, molluscs and crustaceans. The plan covers aquatic animal health issues relevant to aquaculture, commercial fisheries, recreational fisheries, the ornamental fish industry, the tourism industry and the environment.

In May 2015, AHC endorsed the AQUAPLAN communication strategy. The communication strategy will be reviewed annually by SCAAH to ensure that it remains appropriate and continues to meet stakeholder needs.

Significant achievements in 2015 included:

- development of a model aquaculture enterprise health accreditation scheme, using abalone aquaculture as an example (Activity 1.3)
- consideration of aquatic animal production issues to inform development of the National Antimicrobial Resistance Strategy 2015–2019.

5.2.2 New quarantine requirements for ornamental finfish – domestic approach

In 2015, the Department of Agriculture and Water Resources continued to focus on managing the biosecurity risks associated with imports of live ornamental fish. Consistent with recommendations from the import risk analysis for ornamental finfish with respect to gourami iridovirus and related viruses,[94] new import conditions will require aquatic animal health authorities of exporting countries to ensure that all fish belonging to the gourami, cichlid and poeciliid families are sourced from populations free from megalocytiviruses, or, alternatively, are batch tested and found to be free from the viruses before export. These changes to quarantine requirements will come into effect on 1 March 2016. The department worked closely with the aquatic animal health authorities of exporting countries during 2015 to ensure implementation of the new conditions with the least possible disruption to trade.

SCAAH members are developing a national policy that will describe a common national approach to surveillance and

93 www.agriculture.gov.au/animal-plant-health/aquatic/aquaplan

94 www.agriculture.gov.au/biosecurity/risk-analysis/ira/final-animal/ornamental-finfish

emergency response for megalocytiviruses that is consistent with the new quarantine measures.

5.2.3 National laboratory proficiency testing program

The Australian Laboratory Proficiency Testing Program for Aquatic Animal Diseases, established in 2010, has provided Australian laboratories with an opportunity to assess their capabilities to correctly detect priority aquatic animal diseases using molecular (polymerase chain reaction) methods. The program is funded by the Department of Agriculture and Water Resources. It is implemented by CSIRO-AAHL and the Australian National Quality Assurance Program, both of which are accredited by the National Association of Testing Authorities as proficiency testing providers.

Under the program, Australian laboratories can participate in proficiency testing for the following seven aquatic animal diseases:

- infection with ostreid herpesvirus 1 (OsHV-1) microvariant
- white spot disease of prawns
- abalone viral ganglioneuritis
- viral encephalopathy and retinopathy
- yellowhead disease
- gill-associated virus
- megalocytivirus (infectious spleen and kidney necrosis virus [ISKNV]–like viruses).

Program results for 2015 confirmed that Australia continues to have strong diagnostic capabilities for these seven diseases. The program was reviewed at the end of 2015 to describe elements that contribute to its success and to identify areas that could be improved to increase the program's cost effectiveness.

5.2.4 National guidelines for translocation of domestic bait and berley

SCAAH has produced *National policy guidelines for translocation of domestic bait and berley*.[95] The guidelines aim to guide development of nationally consistent state and territory policies on bait translocation, particularly as they apply to managing the risk of disease transmission within and between jurisdictions. The guidelines were published on the Department of Agriculture and Water Resources website in May 2015.

5.2.5 National policy guidelines for translocation of live aquatic animals

Aquatic animals are translocated for aquaculture breeding or grow-out, restocking of recreational fisheries or conservation purposes. Translocation can present risks of disease transmission, environmental impacts or issues from mixing different genetic stocks. These risks need to be managed in a way that allows translocations to occur after consideration and development of appropriate management measures. The *National policy guidelines for translocation of live aquatic organisms* (1999) are being revised to assist the development and revision of translocation policies across all states and territories. A cross-sectoral group, led by SCAAH, is considering the risks and potential impacts of translocation. The policy guidelines aim to increase national consistency in approaches to risk assessments associated with translocations, and provide clear guidelines on the assessment of proposed translocations.

5.2.6 Development of a biosecurity plan template

Activity 1.1 of *AQUAPLAN 2014–2019* involves development of a generic enterprise-level biosecurity plan template and guidance documents. The aim is to increase access to guidance on best-practice biosecurity planning, tailored to the needs of aquaculture and fisheries sectors. The generic document will be used to develop sector-specific biosecurity plans.

SCAAH has developed a generic biosecurity plan template, which was 'road tested' with selected aquaculture producers in 2015. The template is being revised to incorporate feedback from the road-testing activities, and will then be presented to industry and governments for endorsement.

95 www.agriculture.gov.au/animal/aquatic/guidelines-and-resources

5.3 AQUATIC ANIMAL DISEASE EMERGENCY PREPAREDNESS

Australia's national system for preparing for, and responding to, aquatic emergency animal diseases (EADs) encompasses all activities relating to disease surveillance, planning, monitoring and response. These activities are carried out by the Australian Government, state and territory governments, aquatic animal industries, universities, CSIRO, private veterinarians and laboratories.

The Aquatic Consultative Committee on Emergency Animal Diseases (Aquatic CCEAD) coordinates the national response to aquatic animal disease emergencies, which helps to ensure that the most effective technical response is implemented. The Aquatic CCEAD comprises:

- the Australian Chief Veterinary Officer
- representatives from the Department of Agriculture and Water Resources
- the chief veterinary officer (or the director of the fisheries department) in each state and territory government
- the head of CSIRO-AAHL.

Technical representatives from industry may also be invited to participate.

The Aquatic CCEAD met twice in 2015, to review the response to a disease in prawns, and to confirm diagnosis of infection with *Perkinsus olseni* in a new host species (native flat oysters – *Ostrea angasi*). These disease events are discussed in Section 5.4.

As with terrestrial animal disease emergencies, operational responsibility for the response to an aquatic EAD in an Australian state or territory primarily lies with the relevant jurisdiction. Each state and territory government will bring together a broad range of resources to help fisheries, aquaculture and aquatic animal health authorities address disease incidents. Experts from other jurisdictions may be called in to assist in the response, if required.

5.3.1 Development of aquatic animal disease response arrangements

Emergency response agreements outline how emergency responses to pest and disease outbreaks should be managed and paid for. Three emergency response agreements have been agreed in Australia: for animal diseases, for plant pests, and for pest and disease emergencies with predominantly environmental impacts. These are formal agreements between governments and – in the case of the animal disease

Image credit: Patricia Thornhill

and plant pest agreements – the industries that could potentially be affected by diseases or pests. Each agreement details the roles and responsibilities of participants, including who should contribute and what the contributions should be (according to agreed formulas).

Aquatic animal industries and governments have agreed on a work plan to develop formal industry–government arrangements for responses to aquatic EADs. The project, which is funded by the Department of Agriculture and Water Resources, and managed by Animal Health Australia, commenced in October 2014.

One work plan activity is to develop a set of principles and methodological approaches to apportion the public and private benefits of responses to aquatic EADs. The principles will reflect the unique risks and benefits in the aquatic animal sectors (aquaculture, commercial fisheries, recreational fisheries and environment), as well as the policy approaches used in existing agreements. The outputs of this activity will provide the basis for developing cost-sharing arrangements in a formal industry–government agreement.

5.3.2 AQUAVETPLAN

The Australian Aquatic Veterinary Emergency Plan (AQUAVETPLAN) is a series of technical response plans that describe the proposed Australian approach to an aquatic EAD event. The plans provide technical information and preferred policy approaches to guide responses to a disease outbreak in Australia. AQUAVETPLAN aligns with the Australian Veterinary Emergency Plan (AUSVETPLAN), which is for terrestrial animal disease responses. Disease strategy manuals provide guidance for animal health professionals to respond appropriately to outbreaks of specific EADs in Australia. Operational manuals address important procedural issues (e.g. destruction, disposal, decontamination) and complement the disease strategy manuals.

In April 2015, a new AQUAVETPLAN disease strategy manual for OsHV-1 microvariant was published online. The revised *Enterprise manual*, which provides brief information on industry practices and structures, and outlines approaches to be considered in the face of an aquatic EAD, was published in June 2015.

Manuals are considered for revision every five years or in the event of significant new developments. Revisions of four disease strategies commenced in 2015: viral encephalopathy and retinopathy, whirling disease, withering syndrome of abalone, and crayfish plague. In 2015, SCAAH agreed that revision of the infectious salmon anaemia disease strategy was warranted, given recent developments in scientific understanding of the disease.

AQUAVETPLAN manuals can be downloaded from the Department of Agriculture and Water Resources website.[96]

5.3.3 Surveillance

Each state and territory in Australia is responsible for surveillance activities within its borders. Passive surveillance includes regular health monitoring, investigating unusual fish mortality events, and reporting and investigating diseases listed on Australia's National List of Reportable Diseases of Aquatic Animals. Active surveillance is conducted for specific purposes – for example, export certification for particular industries or specific diseases of importance to Australia. Approaches to surveillance follow OIE standards, or the methods necessary to meet export market requirements or internal requirements for movement of animals in aquaculture or restocking (for fishery enhancement or conservation). Quarterly surveillance results are reported through the OIE Regional Representation for Asia and the Pacific, and the Network of Aquaculture Centres in Asia–Pacific (NACA).[97]

5.4 DISEASE EVENTS IN 2015

Perkinsus olseni is considered endemic to Australia, and has been reported from abalone and other molluscs. Annual surveillance in Victoria found histological evidence of *Perkinsus* infection in specimens of native flat oysters (*Ostrea angasi*). The oysters were in poor condition as a result of inadequate nutrition. Subsequent testing by a quantitative polymerase chain reaction (qPCR) screening test for *P. olseni* produced 3 positive results from 22 samples. The OIE *P. olseni*–specific PCR test produced one positive result from the three qPCR-positive samples. Sequencing of the amplicon showed that its similarity to *P. olseni* was greater than 99.3%. This was the first confirmed detection of *P. olseni* in native flat oysters and was reported to the OIE as an immediate notification on 30 April 2015.

96 www.agriculture.gov.au/animal-plant-health/aquatic/aquavetplan

97 www.enaca.org/modules/library/publication.php?tag_id=279&label_type=1&title=quarterly-aquatic-animal-disease-report

A syndrome of chronic mortalities of farmed prawns (*Penaeus monodon*) was investigated by Queensland authorities and CSIRO-AAHL. Affected prawns had septic hepatopancreatitis, but some prawns showed an unusual hepatopancreatic tubule degeneration in the absence of detectable pathogens. Extensive testing excluded acute hepatopancreatic necrosis disease (AHPND) as the cause of the mortalities, and the disease did not satisfy the case definition in the draft AHPND chapter of the OIE *Manual of diagnostic tests for aquatic animals*. Research is ongoing to establish the cause of the mortalities.

Pacific oyster mortality syndrome (POMS) was first reported from the Georges River, New South Wales, in late 2010, when a syndrome of increased mortality in farmed triploid Pacific oysters (*Crassostrea gigas*) was observed. The syndrome was also detected in Port Jackson (Parramatta River, New South Wales) in early 2011 in wild Pacific oysters. OsHV-1 microvariant was found in association with the mortalities. The disease was detected in the Hawkesbury River in January 2013 and caused extensive mortalities in oyster farms in the region. Testing has confirmed seasonal occurrence of the virus in research populations of Pacific oysters in subsequent years, most recently in the Georges River estuary in February 2015.

The ongoing response objective for POMS is containment of the disease to affected estuaries. Controls remain on movement of farmed oysters, oyster farming infrastructure and equipment from the Georges and Hawkesbury rivers, and Brisbane Water. There is also a total ban on recreational fishers taking oysters from the Georges River, Botany Bay, the Hawkesbury River and Port Jackson.

OsHV-1 microvariant was not detected elsewhere in Australia in 2015.

As part of the strategic approach to management and containment of POMS, projects to inform response to, and management of, the disease are under way. Information on these projects is available in the *Health Highlights* newsletter on the Fisheries Research and Development Corporation (FRDC) website.[98]

5.5 RESEARCH AND DEVELOPMENT

Australia's aquatic animal health research community includes personnel in government agencies, universities and industry. It has a strong reputation for delivering high-quality research outcomes.

The Aquatic Animal Health Subprogram of the FRDC was established to provide a cohesive and national approach to aquatic animal health research and development in Australia. The subprogram's objectives are to:

- coordinate research projects (e.g. project applications, project management, communication)
- set strategic directions for aquatic animal health research and development in Australia
- facilitate the dissemination of information on, and results from, aquatic animal health research and development.

Projects approved in 2015 included:

- investigation of bonamiasis
- development of mollusc cell culture lines for oysters
- investigation of YHV/GAV (yellowhead virus and gill-associated virus) variants, and validation of sensitive and specific tests for YHV-1.

In July 2015, the third FRDC Australasian Scientific Conference on Aquatic Animal Health was held in Cairns. Key themes of the conference were diseases in ornamental fish and molluscs, finfish and mollusc viruses, parasitology, and emergency disease response.

Information on the subprogram, including current projects and final reports of projects funded by the FRDC, are available on the FRDC website.[99]

98 http://frdc.com.au/research/aquatic_animal_health/Pages/default.aspx

99 http://frdc.com.au/research/aquatic_animal_health/Pages/default.aspx

5.6 REGIONAL AQUATIC ANIMAL HEALTH INITIATIVES

Australia collaborates with many countries – particularly its neighbours in the Asia–Pacific region – to help improve the health of their aquatic animals. Cooperation occurs through Australia's membership of NACA, the Food and Agriculture Organization of the United Nations (FAO), the Secretariat of the Pacific Community, the Association of Southeast Asian Nations and the Asia–Pacific Economic Cooperation forum. Participation in these forums ensures that Australia is actively engaged in projects that address aquatic animal disease threats to the region.

5.6.1 Network of Aquaculture Centres in Asia–Pacific

The Asia Regional Advisory Group on aquatic animal health was established under the auspices of NACA to provide advice to member countries on aquatic animal health management. Members of the advisory group include aquatic animal disease experts, the OIE, the FAO and collaborating regional organisations. An Australian Government officer participated in the group's 14th meeting in Bangkok, Thailand, in November 2015. At this meeting, the group reviewed the disease situation in Asia, considered the recent changes to OIE global standards, revised the list of diseases in the regional Quarterly Aquatic Animal Disease reporting system, and developed recommendations and action points for consideration by the NACA Secretariat and member governments. Further information is available on the NACA website.[100]

5.6.2 Regional Proficiency Testing Program for Aquatic Animal Disease Laboratories

The Regional Proficiency Testing Program for Aquatic Animal Disease Laboratories concluded in late 2014. A final report, which detailed aspects of the program's implementation, reviewed the program and provided recommendations for future programs, was published on the website of the Department of Agriculture and Water Resources in August 2015.[101] The program achieved its aim to strengthen regional capability to diagnose important aquatic animal diseases that could affect trade, industry sustainability or productivity. More than 40 laboratories in 12 NACA member countries in the region participated in the program, which assessed laboratory testing for 10 pathogens of significance. Data from the program demonstrated that diagnostic performance (proportion of correctly reported test results) improved for all 10 aquatic animal pathogens.

5.6.3 International standards

Australia continues to contribute strongly to the development of international aquatic animal health standards by the OIE. The Department of Agriculture and Water Resources seeks comment from a network of Australian experts on draft standards proposed by the OIE Aquatic Animal Health Standards Commission (Aquatic Animals Commission). Australia's official responses to the OIE are provided through Australia's delegate, the Australian Chief Veterinary Officer.

In 2015, the Australian member of the OIE Aquatic Animals Commission was elected President of the commission at the OIE General Session in May. He participated in the two meetings of the commission in 2015 (February–March and October), and represented the OIE at the Third Global Conference on Aquatic Animal Health and an OIE aquatic focal point meeting in Ho Chi Minh City, Vietnam, in January. Representing the OIE Aquatic Animals Commission, he delivered a keynote address on the factors needed for success in managing emerging aquatic animal diseases at the 29th conference of the OIE Regional Commission for Asia, the Far East and Oceania in Ulaanbaatar, Mongolia, in September.

100 www.enaca.org (under 'Publications' on the right-hand bar, then 'Health')

101 www.agriculture.gov.au/animal/aquatic/international_activities

Image credit: Department of Agriculture and Water Resources

CHAPTER 6

Trade

This chapter outlines the import- and export-related activities of the Australian Government Department of Agriculture and Water Resources in 2015. Six divisions of the department, one taskforce and the Office of the Chief Veterinary Officer were involved in trade matters.

The Biosecurity Animal, Biosecurity Plant and Exports divisions facilitate technical market access for exporters of agricultural products, including food, animal and plant byproducts, live animals and plants, and reproductive material. The Trade and Market Access Division provides a coordinating role, and pursues market access through bilateral and regional free trade agreement negotiations with Australia's trading partners. The Biosecurity Animal, Biosecurity Plant, Compliance, and Biosecurity Policy and Implementation divisions ensure that imports into Australia are safe from the perspective of food safety, and animal and plant health.

The Post Entry Quarantine Build Taskforce was responsible for overseeing the design of the new post-entry quarantine facility and transition of operations to the new facility.

The Australian Chief Veterinary Officer provides leadership in all facets of Australia's animal health status and policy.

6.1 INTERNATIONAL STANDARDS

The Department of Agriculture and Water Resources contributes to the development of international standards through its involvement in relevant multilateral organisations and groups. These include the World Trade Organization and its committees, the Animal Health Quadrilateral Group (comprising Australia, Canada, New Zealand and the United States), the World Organisation for Animal Health (OIE) and the Codex Alimentarius Commission (a joint commission of the World Health Organization, and the Food and Agriculture Organization of the United Nations).

The department's leadership and the active participation of Australia's delegations in these groups help to develop international rules and standards that reflect sound science and promote trade.

In 2015, the Australian Chief Veterinary Officer was elected, for a three-year term, as Vice President of the OIE World Assembly. Key issues addressed by the OIE Council in 2015 included continued improvements to organisation of the OIE General Session, finalisation of the OIE 6th Strategic Plan 2016–2020, review of OIE Reference Laboratories, official recognition of disease status procedures, and performance evaluation of OIE Specialist Commissions.

Other Australian experts were elected as President of the OIE Aquatic Animal Health Standards Commission (see Chapter 5), Vice President of the OIE Scientific Commission for Animal Diseases, and member of the OIE Biological Standards Commission. An Australian expert retained membership on the OIE Permanent Animal Welfare Working Group.

Several Australian officials participated in OIE expert groups, including the OIE ad hoc groups on:

- notification of animal disease and pathogens
- susceptibility of crustacean species to infection with OIE-listed diseases
- *Salmonella* in pigs and cattle
- evaluation of foot-and-mouth disease status of member countries.

6.2 OPENING TRADE OPPORTUNITIES

6.2.1 Free trade agreements

Free trade agreements (FTAs) provide a range of benefits to Australian agriculture, including new market opportunities, increased price competitiveness and a more level playing field with competitors that already have FTAs. The Department of Agriculture and Water Resources worked with industries and trading partners to better understand their priorities. It also worked with the Australian Government Department of Foreign Affairs and Trade to reach commercially meaningful outcomes for Australia's primary producers in the FTAs with the Republic of Korea, Japan, China and Trans-Pacific Partnership (TPP) countries. The department is analysing the existing North Asian FTAs and the TPP agreement to identify export opportunities for the agricultural sector.

Korea–Australia Free Trade Agreement

The Korea–Australia Free Trade Agreement (KAFTA) came into force on 12 December 2014. Australian exporters benefited from an immediate tariff cut and a second round of cuts on 1 January 2015.

KAFTA protects and promotes Australia's competitive position in our sixth largest agricultural export market. It eliminates tariffs across a range of agricultural and fisheries commodities, including removing a 40% beef tariff over the next 15 years. This is equivalent to the terms gained in 2012 by the United States, Australia's major competitor in this market, and will help maintain Australia's market share.

Korea will also progressively eliminate its 22.5% tariff on all sheep and goat meat by 1 January 2023. Tariffs on key pork exports of 22.5–25% will be progressively eliminated between 1 January 2018 and 1 January 2028.

Japan–Australia Economic Partnership Agreement

The Japan–Australia Economic Partnership Agreement (JAEPA) came into force on 15 January 2015. The agreement delivered an immediate tariff cut and a second round of cuts on 1 April 2015, which provide an advantage for Australia over competitors that do not have an economic partnership agreement with Japan.

Japan is Australia's third largest agricultural export market and second largest export market for beef. JAEPA has significantly reduced the tariffs on beef, from 38.5% to 31.5% for chilled beef and to 28.5% for frozen beef. These tariffs will be progressively reduced to 23.5% for chilled beef and 19% for frozen beef. Live cattle tariffs were also reduced by 20% when the agreement came into force.

JAEPA provides Australia with country-specific quotas across a range of cheeses, including duty-free quotas on natural cheese for processing and cheese for shredding. It eliminates tariffs of up to 8.5% on casein, lactose, albumen and milk protein concentrates.

The agreement also eliminated tariffs on a range of seafood exports, including abalone, prawns and rock lobster.

These outcomes will see further improvements under the TPP.

China–Australia Free Trade Agreement

The China–Australia Free Trade Agreement (ChAFTA) was signed on 17 June 2015. It will provide Australian exporters with an early advantage over major competitors without FTAs, such as the European Union and the United States. ChAFTA will also help restore Australia's competitive position against countries with an FTA, such as New Zealand.

When the agreement is fully implemented, 95% of Australian exports will enter China duty-free. The agreement eliminates tariffs on a range of key agricultural and fisheries products, mostly within 4–8 years. Tariffs of up to 25% on beef, sheepmeat, hides and skins, and tariffs on dairy products will be eliminated within 4–11 years, and all seafood tariffs will be eliminated within 4 years.

Australia will also receive a duty-free country-specific quota of 30 000 tonnes for wool, in addition to the existing World Trade Organization quota of 287 000 tonnes.

Trans-Pacific Partnership Agreement

The TPP agreement was agreed on 6 October 2015. It is a historic trade agreement between Australia, Brunei Darussalam, Canada, Chile, Japan, Malaysia, Mexico, Peru, New Zealand, Singapore, the United States and Vietnam, eliminating 98% of tariffs in the TPP region. Australian agricultural, fish and forestry exports to TPP countries were valued at approximately $15.6 billion in 2014, making up around one-third of Australia's total agriculture exports.

The TPP market access outcomes build on Australia's existing access with its FTA partners. They also create valuable new market access opportunities for Australian exporters in the three TPP countries where Australia does not have an FTA: Canada, Mexico and Peru.

The TPP offers improved access for beef, dairy, cotton, sugar, grains, horticulture, rice, seafood and wine. Upon entry into force, the TPP will eliminate tariffs on more than $4.3 billion of Australia's dutiable exports of agricultural goods to TPP countries.

Tariffs on sheepmeat exports to all TPP countries (excluding Mexico) and all remaining tariffs on Australian raw wool exports will be eliminated when the TPP agreement comes into force. Japan's beef tariffs will be reduced to 9% within 15 years. The agreement will significantly improve market access opportunities for the Australian dairy industry to Japan, Mexico and the highly protected Canadian market. Access to improved quota allocation, and the elimination or reduction of existing tariffs will provide new opportunities for Australia's dairy farmers and exporters. Dairy exports to TPP countries were valued at $994 million in 2014.

Agricultural counsellor network

The overseas network of the Department of Agriculture and Water Resources aims to remove distortions in international trade, progress and resolve market access issues for fishery and agricultural industries, facilitate targeted technical assistance and agricultural cooperation, and influence the development of international agricultural policies and standards for fishery and agricultural products and industries. Importantly, when technical barriers to trade are addressed, Australian producers can realise the benefits of tariff reductions provided through FTAs.

Through the Agricultural Competitiveness White Paper, the department is expanding its network of agricultural counsellors overseas. From January 2016, five new agriculture counsellors will be deployed in Vietnam, Malaysia, the Middle East, China and Thailand. This will improve the department's capacity to pursue international market access in important and emerging markets for Australian agricultural industries.

6.3 EXPORTS

The Department of Agriculture and Water Resources provides export services for animal genetic material, live animals, foods derived from animals and animal byproducts under the *Export Control Act 1982*.[102]

6.3.1 Managing Australian exports

Export certification and inspection services for live animals and reproductive material

The department regulates and issues export certification and documentation for a wide range of live animals and reproductive material being exported from Australia.

The Tracking Animal Certification for Export system (TRACE) supports the electronic submission of applications for export of livestock and reproductive material.

Assessment, inspection and certification processes include:

- verifying that Australian legislation and the importing country animal health requirements have been met
- inspecting livestock to confirm fitness for export in accordance with the *Australian standards for the export of livestock* and the importing country's animal health requirements
- issuing animal health certificates and export permits to Australian exporters of live animals and animal reproductive material
- licensing exporters of livestock
- registering and approving premises for the pre-export assembly, preparation and isolation of livestock intended for export
- auditing and approving facilities and personnel for the collection, processing and storage of animal reproductive material
- accrediting veterinarians for the preparation and inspection of livestock for export
- auditing licensed livestock exporters, operators of registered premises and accredited veterinarians.

Livestock export reform

The Department of Agriculture and Water Resources continues to deliver on the Australian Government's election commitments to cut red tape and reduce regulatory burden on livestock exporters, including through extensive consultation with industry. The department has improved the efficiency of the Exporter Supply Chain Assurance System (ESCAS) by simplifying administrative processes to reduce cost burdens on both the exporter and the department, while meeting the animal welfare objectives of the ESCAS framework.

Export certification for edible animal products and byproducts

The Department of Agriculture and Water Resources is responsible for regulating the export of edible animal products and animal byproducts prescribed under the *Export Control Act 1982*, such as meat, dairy, fish, eggs, wool, skins and hides. The department issues export documentation, including export permits and certificates. Producers and exporters must meet specified criteria confirming that their exports meet the requirements of importing countries before export documentation can be issued.

The export of animal products and byproducts is controlled by:

- licensing meat exporters
- registering businesses involved in the production of animal products for export, and businesses that export these products
- requiring all registered establishments to have Approved Arrangements; these are food safety plans, based on hazard analysis and critical control points (HACCP) principles, that ensure the safety of the product and compliance with importing country requirements
- auditing export establishments or verifying their performance, as appropriate.

Australia's export food establishments are subject to audit by trading partners. A number of audits are hosted each year (see Section 6.3.2).

6.3.2 Negotiating market access

The Department of Agriculture and Water Resources negotiates with trading partners to maintain and improve market access, and to open new markets for edible animal products (such as meat, fish, dairy and eggs) and animal

102 www.agriculture.gov.au/biosecurity/legislation/export

byproducts (such as rendered meals, pet food, skins and hides, wool, and technical and pharmaceutical goods). This includes responding to challenges associated with trade disruptions, and changes in importing country requirements, including changes in food safety requirements, changes in animal or public health status, and specialised requirements (such as halal slaughter).

In 2015, the department continued the ongoing task of reviewing the content in the Manual of Importing Country Requirements (MICoR).[103] MICoR is a database of importing country requirements for more than 100 trading partners for all export commodities regulated by the department. Exporters can apply for access to MICoR to obtain guidance on how to comply with the import requirements of their intended trading destination.

The department manages visits by competent authorities of trading partners, who regularly audit or inspect Australia's export systems and establishments. On average, the department hosts nine visits by trading partner delegations each year. These visits include system audits, where the entire export system is audited (including Australian legislation, compliance and enforcement, and establishments); and listing inspections, where individual establishments are inspected for compliance with the trading partner's import requirements. The department writes pre-visit submissions, advises visiting delegations on the Australian production and export system, and responds to audit and other findings. In 2014–15, delegations from China, Japan, Malaysia, the Republic of Korea, Taiwan and the United States audited Australia's export systems, and the European Union visited twice to inspect Australian export establishments and testing laboratories. These audits and inspections resulted in the maintenance of market access for Australian producers.

In 2015, the department established, maintained or improved market access for a range of commodities and markets, including:

- beef to Kazakhstan
- venison and camel meat to Iraq
- poultry meat to the Republic of Korea and Taiwan
- eggs and egg products to Singapore
- chilled meat to China
- meat casings to the European Union, Lebanon, Morocco and Mexico
- pet food and pet meat to the Republic of Korea.

Agreement was also reached with the Eurasian Customs Union on certificate content to facilitate trade in feathers, hides, skins, wool and other non-edible animal byproducts.

The department also assisted Australian exporters when problems arose in clearing consignments in importing countries.

6.3.3 Residue monitoring

Australian animal and plant industries participate in residue monitoring programs that assess whether existing controls on the use of pesticides and veterinary medicines are appropriate, and determine the levels of these chemicals and environmental contaminants in commodities. The programs are risk based, and are designed to identify and monitor chemical inputs into Australian agricultural production systems. Results from residue and contaminant monitoring are assessed against relevant Australian standards. Where a non-compliance is found, a traceback investigation by the relevant state or territory authority identifies and resolves the source of the non-compliance. The results of monitoring programs provide confidence for Australian consumers and overseas markets that Australian agricultural products meet relevant standards. Relevant industry peak councils are consulted to ensure that monitoring programs address any specific export market access requirements, as well as domestic requirements.

The National Residue Survey (NRS), within the Department of Agriculture and Water Resources, has residue monitoring programs for the cattle, sheep, goat and pig industries, and for camels, deer, horses, kangaroos, poultry, ratites (ostriches and emus), wild boar, honey, eggs and aquatic species. Results of NRS monitoring programs are available on the department's website.[104]

The National Association of Testing Authorities accredits laboratories involved in residue monitoring. For programs managed by the NRS, laboratories undergo proficiency testing before being contracted and throughout the contractual period.

The Australian Milk Residue Analysis (AMRA) survey provides a national, independent monitoring program for residues of

103 http://micor.agriculture.gov.au/Pages/default.aspx

104 www.agriculture.gov.au/ag-farm-food/food/nrs

agricultural and veterinary chemicals, and environmental contaminants in raw cows' milk. Dairy Food Safety Victoria coordinates the survey on behalf of the Australian dairy industry. The AMRA survey plays an important role in the Australian dairy industry by gathering and compiling information on the chemical residue status of Australian milk. In doing so, it assesses the effectiveness of the control measures that are in place for the use of chemicals in the dairy industry to ensure food safety outcomes.

6.3.4 Animal health requirements for market access

In 2015, the Department of Agriculture and Water Resources assisted with 44 issues relating to animal health requirements involving more than 34 countries. These included negotiating animal health requirements for the export of:

- alpaca to China
- barramundi fingerlings to Indonesia and Sri Lanka
- bovine embryos to India, Mexico, New Caledonia, Peru and Thailand
- bovine semen to Chile, India, Mexico, New Caledonia, Peru and Thailand
- buffalo for breeding purposes to Indonesia
- camelids to China
- carp to the United Kingdom
- cattle to Cambodia, China, Indonesia, Myanmar, Timor-Leste, Thailand, Turkey and the United States
- dairy bulls to India
- deer to Malaysia
- dogs and cats to the European Union, New Zealand and South Africa
- fertile poultry eggs to New Zealand and Taiwan
- giant clams to the Cocos (Keeling) Islands
- goats to Canada, the Philippines, the Republic of Korea and Turkey
- heifers for breeding purposes to Indonesia
- horses to China, Malaysia, Papua New Guinea, the Philippines, the Republic of Korea and Taiwan
- live aquatic animals to China and Singapore
- live freshwater crayfish and eggs for aquaculture purposes to China and Thailand
- live lungfish to Thailand
- live marron and redclaw for aquaculture purposes to Thailand
- ornamental fish to New Zealand
- ovine and caprine embryos to Chile, Colombia and Mexico
- ovine and caprine semen to Colombia, the Falkland Islands, Kazakhstan, Mexico, Peru and the United States
- quail to the United Arab Emirates
- rabbits to India
- reptiles to Colombia
- ruminant genetic material to Argentina, Kazakhstan, Paraguay and Uruguay
- sheep to Canada, the Philippines, the Republic of Korea and Turkey
- worms for composting to Christmas Island.

6.3.5 Agricultural export regulation review

The Department of Agriculture and Water Resources began a review of agricultural export regulation on 15 July 2015.

The current framework of export legislation has served Australian exporters well over the past 30 years. It enables Australia to provide assurance of the integrity of its agricultural exports to overseas markets, helping to capture and maintain market access.

The review was established to identify ways to improve the framework to better meet the contemporary needs of Australian farmers and exporters. Following extensive consultation, the review found scope to improve the regulatory framework to better support farmers and exporters by minimising non-tariff trade barriers to meet importing country requirements.

The Australian Government endorsed the recommended improvements to agricultural export legislation in December 2015. The improvements will establish a contemporary, flexible and efficient export legislative framework that will facilitate market access. It will include:

- a simpler legislative structure that is easy to understand and administer, and can flexibly respond to a range of situations and contemporary issues (including changes in importing country requirements)

- a broader range of monitoring, investigation and enforcement powers to deal with breaches or acts of non-compliance (including infringement notices, enforceable undertakings, civil penalties, and greater penalties for aggravated conduct)
- clearer provisions for verification activities (such as audits and inspections) across the supply chain
- clearer requirements relating to the appointment and obligations of authorised officers who perform functions and exercise powers under the legislation.

Since this is a major exercise, which requires extensive stakeholder consultation throughout the development and implementation process, the department is developing the legislation over the next few years. The improvements to the agricultural export legislation will be implemented before April 2020, when the delegated legislation in the current framework will sunset.

6.4 IMPORTS

Importation of animals and animal products into Australia is regulated by the Department of Agriculture and Water Resources under the *Quarantine Act 1908* and its subordinate legislation, and by the Australian Government Department of the Environment under the *Environment Protection and Biodiversity Conservation Act 1999* and its subordinate legislation.

On 16 June 2016, the *Quarantine Act 1908* will be replaced by the *Biosecurity Act 2015*. The Biosecurity Bill 2014 and supporting legislation received royal assent from the Governor-General on 16 June 2015, and will commence 12 months after that date. The 12-month delay in commencement will enable the department to ensure that clients, staff and other stakeholders understand their rights and responsibilities under the new Act, and that the transition is smooth.

6.4.1 Opening of post-entry quarantine facility

The Post Entry Quarantine Build Taskforce oversaw the construction and operation of a new post-entry quarantine facility at Mickleham, Victoria. The new 144-hectare facility will replace Australia's current ageing post-entry quarantine stations at Eastern Creek (New South Wales), Torrens Island (South Australia), and Knoxfield and Spotswood (Victoria).

A single site enables greater efficiencies in operations and consolidation of staff expertise, and will better meet Australia's post-entry quarantine needs.

Construction commenced in early 2014 on phase 1 of the project, which has delivered facilities for the quarantine of plants, bees, dogs, cats and horses. The new Mickleham site was officially opened by the Hon. Barnaby Joyce, Minister for Agriculture and Water Resources, on 26 October 2015. The bee facility, plant compounds, horse compounds, and the first stage of the dog and cat compounds were operational in late 2015. Transition of quarantine operations from the existing facilities to the new site is well under way and will cause minimal disruption to importers.

Phase 2 is scheduled for completion towards the end of 2018. This will extend the cat and dog capacity, and provide quarantine facilities for fertile poultry eggs, live pigeons and alpacas.

6.4.2 Import risk analyses

Many of Australia's biosecurity requirements are based on standards, guidelines and recommendations established by international organisations, including the OIE. Additional measures are sometimes needed to reduce biosecurity risk. Import conditions are only applied to the extent necessary to protect human, animal and plant health, and Australia's agriculture sector and unique environment.

In determining whether additional measures are needed, the Department of Agriculture and Water Resources undertakes import risk analyses (IRAs) using a variety of methods, including biosecurity import risk analyses (BIRAs) and policy reviews, appropriate to the risk being analysed and other relevant considerations.

Examination of the IRA process, development of a new biosecurity Regulation and new BIRA guidelines

The Department of Agriculture and Water Resources released a report on its examination of Australia's IRA process in July 2015, delivering on an Australian Government election commitment. The report included a summary of stakeholder concerns, issues raised and the findings of the examination process. Consultation with industry, clients and governments about the BIRA process continued during 2015. Feedback provided during this process, and the findings and related actions were used in the development of a draft Biosecurity (Biosecurity Import Risk Analyses) Regulation 2015 (BIRA Regulation) under the *Biosecurity Act 2015*. In August 2015,

the draft BIRA Regulation was published on the department's website, giving interested clients and stakeholders the opportunity to provide feedback on how BIRAs will be conducted when the new Act takes effect in June 2016. In October 2015, the department released draft BIRA guidelines for comment. The BIRA guidelines are an administrative document that provide further information on the regulated BIRA process, and matters to be taken into account when conducting a BIRA under both the *Biosecurity Act 2015* and the BIRA Regulation.

Any recommendations for administrative and regulatory changes as a result of this consultation process will be considered by the Australian Government.

6.4.3 Policy reviews and competent authority evaluations

The Department of Agriculture and Water Resources progressed the following reviews of animal biosecurity policy in 2015:

- A review of the biosecurity risks associated with importing cooked turkey meat from the United States began in December 2014 and continued throughout 2015. A draft report is anticipated in 2016.
- A review of the 2003 policy on imported stockfeed with regard to transmissible spongiform encephalopathies was completed in September 2015. Stockfeed imports are able to continue under the revised policy.
- After assessing relevant technical information, the department announced in September 2015 that imports of pre-cooked (microwave) bacon from approved countries will be allowed. Processing of pre-cooked (microwave) bacon within specific parameters provides an equivalent level of biosecurity risk management to the recommendations of the *Generic import risk analysis (IRA) for pig meat: final import risk analysis report* (February 2004).
- The interim dairy policy and associated biosecurity risks were reviewed, resulting in improved access for dairy products from sources free from foot-and-mouth disease.
- A policy review of honey bee semen was initiated in response to requests from stakeholders. A draft report was circulated to stakeholders in September 2015, with an invitation to comment on the technical aspects of the proposed risk management measures associated with importation of honey bee semen. It is anticipated that the information received will be considered and the review finalised early in 2016.
- A policy review of fresh (chilled or frozen) beef from Japan, the Netherlands, the United States, New Zealand and Vanuatu began in late 2015.

The department evaluates the animal disease status of trading partners and potential trading partners, and the competency of their veterinary authorities. The evaluations are typically comprehensive desk assessments, followed by on-site (in-country) verification visits. To gain access to Australia, the veterinary authorities of trading partners must demonstrate their ability to manage biosecurity risks in their country and to comply with Australia's import requirements for the commodities that they want to export to Australia.

In 2015, the department's competent authority assessment program included reviews of chicken meat, pigmeat, pre-export testing of prawns for human consumption, certification of the disease status of ornamental fish, maintenance of disease-free compartments for prawns, and third-country processing of Australian prawns for re-export to Australia.

6.4.4 Imports of biological products, live animals and reproductive material

The Department of Agriculture and Water Resources is responsible for assessing, granting and varying import permits for biological commodities, live animals and reproductive material. Commodities include animal- and microbial-derived products, such as foods, human and animal therapeutics, laboratory materials, animal feed, veterinary vaccines, horses, dogs, cats, hatching eggs, live birds, aquatic animals, laboratory animals, zoo animals, ruminants and bees.

The *Biosecurity Act 2015* will replace the *Quarantine Act 1908* on 16 June 2016 (see above). Both Acts regulate the importation of animals and biological products into Australia, prohibiting the importation of many of these commodities unless an import permit is granted. Import permits are issued for specific products following an assessment of the associated risks. This assessment takes into account:

- the biological components of the product
- the relevant animal health status of the country of origin
- manufacturing processes that might mitigate risk
- the proposed end use of the product.

The department works across the biosecurity continuum to manage biosecurity risks from imported biological products by:

- seeking policy advice from within the department and from other agencies
- developing import conditions for commodities, based on policy advice
- auditing overseas facilities to verify the integrity of manufacturers' systems for sourcing raw materials, processing, preventing contamination and tracing products
- assessing information provided with each application to decide whether the ingredients used in each product and the processing undertaken create an acceptably low biosecurity risk
- liaising with international veterinary authorities
- granting import permits, if the relevant conditions are met
- applying conditions to each import permit that reduce the biosecurity risk to an acceptably low level.

Import permits may be suspended, revoked or amended if there are changes to the biosecurity risk – for example, an outbreak of an exotic disease in a country from which biological components are sourced.

Australia imports live animals – including dogs, cats, horses, ruminants, hatching eggs, live pigeons, ornamental fish and bees – for the improvement of genetic stocks in agricultural industries, for racing purposes, or for use as assistance, military or companion animals.

The department implements import policies for live animals and reproductive material. Before importation, the department provides advice to prospective importers on processes and requirements for importing live animals and reproductive material, assesses applications to import animals, and issues import permits with appropriate conditions. For some animal species, the department inspects and approves overseas pre-export quarantine facilities. It liaises with overseas competent authorities to verify that certification is consistent with import conditions and international standards for the live animal trade.

In 2015, the department received approximately 11 500 import permit applications (5500 biological and 6000 animal), provided advice in response to approximately 38 000 email enquiries (18 000 biological and 20 000 animal) and responded to about 11 550 phone calls (6000 biological and 5550 animal) through the public helpline.

Stakeholder engagement through formal and informal consultations was a key focus for the department in 2015. The aim of consultation is to help importers and users of imported products comply with biosecurity requirements. Stakeholders include government agencies, importers, industries, community interest groups, producers, processors, consumers and users of imported products, research and development organisations, and travellers.

Biological product stakeholders are represented on the Biological Consultative Group, which met in March and September 2015. The group's role is to ensure that all components of the biological importing system work together to serve the interests of Australia.

Image credit: DAF Qld

Image credit: Department of Agriculture and Water Resources

CHAPTER 7

Consumer protection – food

Food must be safe, whether it is imported, exported or traded domestically. The Australian Government, state and territory regulatory authorities, and the food industry work together to ensure the safety of food consumed in Australia or exported.

Food Standards Australia New Zealand (FSANZ),[105] the Australian Government Department of Agriculture and Water Resources,[106] the Australian Government Department of Health,[107] state and territory government authorities, and Animal Health Australia[108] all undertake activities to protect public health and safety. Activities that help to protect consumers include:

- nationally consistent Australian food standards, based on international food standards
- monitoring of microbial pathogens, chemical residues and environmental contaminants in products
- systems that deliver hygienic food products to the marketplace
- identification, surveillance, prevention and control of outbreaks of foodborne illness.

105 www.foodstandards.gov.au
106 www.agriculture.gov.au
107 www.health.gov.au
108 www.animalhealthaustralia.com.au

7.1 NATIONAL ARRANGEMENTS AND CONSULTATION

The Australian domestic food regulatory system covers three distinct areas: developing policy, setting food standards, and implementing and enforcing food standards. An intergovernmental agreement ensures an effective and cooperative national approach to food safety and regulation in Australia. A treaty between Australia and New Zealand provides for many common food standards in the two countries.

Policy agreed by the Australia and New Zealand Ministerial Forum on Food Regulation is taken into account by FSANZ when it develops food standards for the Australia New Zealand Food Standards Code. The forum is chaired by the Australian Minister for Health (or delegate) and consists of representatives from the Australian, state and territory, and New Zealand governments.

Australian food safety policies focus on a 'farm to fork' preventive approach, to ensure that risks to public health are managed at the most effective point in the food supply chain. This builds consumer confidence, safeguards international trade in food and improves levels of food safety for the consumer.

7.2 FOOD STANDARDS

7.2.1 Australian and New Zealand standards

The food standards in the Australia New Zealand Food Standards Code cover the use of ingredients, processing aids, colourings, additives, vitamins and minerals. They also contain requirements relating to the composition of some foods – such as dairy, meat and beverages – and to new technologies. The standards include labelling requirements for both packaged and unpackaged foods, including specific mandatory warnings or advisory labels. An example is mandatory declarations of certain substances in food (e.g. allergens), which are required for all packaged foods containing a defined list of substances as ingredients, food additives or processing aids.

The Food Standards Code also contains Australian-only standards. An example is Chapter 3, which contains food safety standards that place obligations on all Australian food businesses to produce food that is safe and suitable to eat. The standards, which also contain health and hygiene obligations for food handlers, aim to lower the incidence of foodborne illness.

In Chapter 4 of the code, FSANZ has developed separate standards for certain sectors involved in primary production and processing. Primary production and processing standards have been developed to extend the evidence-based standard-setting process to the primary production sector. They aim to strengthen food safety and traceability throughout the food supply chain, from paddock to plate. Standards are in place for seafood, meat and meat products (including game meat, ready-to-eat meat and poultry meat), dairy products (including raw milk dairy products), eggs and egg products, and seed sprouts.

7.2.2 International standards – Codex Alimentarius Commission

The Codex Alimentarius Commission is the international body for setting food standards; it was established by the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO). Codex develops internationally recognised food standards, guidelines, codes of practice and other recommendations relating to foods, food production and food safety. These aim to protect the health of consumers and ensure fair practices in international food trade.

Australia plays a strong leadership role in developing international evidence-based food standards through Codex and its subsidiary bodies. Australia also contributes to the work of Codex committees dealing with export inspection and certification, food additives and contaminants, animal feed, residues of veterinary drugs and pesticides, food hygiene, food labelling, nutrition, and food for special dietary uses. In 2015, Australia's participation continued to ensure that Codex outcomes are based on the principles of sound scientific analysis and evidence.

7.2.3 Scientifically based risk analysis process

Changes in food supply as a result of new technologies, expanding trade opportunities, ethnic diversity in the population and changing diets mean that government, industry and consumers must be vigilant to maintain food safety.

Food regulators aim to ensure that health and safety risks from food are negligible for the whole population, and that consumers can make informed choices. This maintains public confidence in the effectiveness of food regulation.

FSANZ uses an internationally accepted risk analysis process to develop standards, and to assess, manage and communicate food-related health risks. This applies to monitoring and surveillance activities, assessing food technology practices and considering emerging food safety issues. Use of the risk analysis process ensures effective regulatory decisions and encourages communication between all interested parties, including consumers.

The FSANZ risk analysis process (Figure 7.1) includes:

- risk assessment – determining the likelihood and severity of hazards
- risk management – weighing and selecting management options of greatest net benefit to the community in a consultative decision-making process
- risk communication – ensuring that stakeholders are aware of, and understand, the risk being addressed and the control measures.

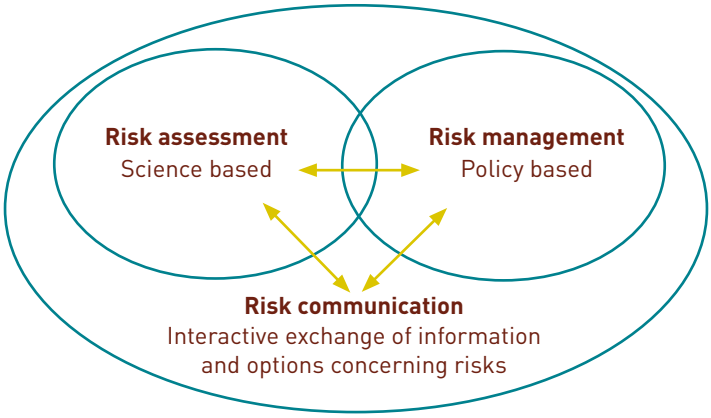


Figure 7.1 Risk analysis process

7.2.4 FSANZ applications and proposals

The Australian food industry is very innovative and regularly applies to FSANZ for changes to the Food Standards Code to accommodate new foods and food substances, and new production processes. Any individual or organisation can apply to FSANZ to have the code amended. Applicants need to provide evidence to support their reasons for requesting an amendment. FSANZ also initiates action to amend the code, mainly for public health and safety reasons. These changes are made through proposals.

7.3 MICROBIOLOGICAL LIMITS, MAXIMUM RESIDUE LIMITS AND CONTAMINANT LEVELS

7.3.1 Microbiological limits

FSANZ recently initiated a project to review the role of microbiological testing and the use of existing microbiological limits in food safety management. The project will use internationally recognised principles, such as those of Codex, to review microbiological criteria, and establish criteria for food safety and process hygiene.

Guidance is currently being developed on applying microbiological criteria in the context of through-chain controls (i.e. food safety standards, and primary production and processing standards already in the Code) to:

- support and verify effective application of controls
- provide information to food business operators on microbiological levels that should be achieved when best practices are applied
- assist in identifying situations (products and processes) requiring investigative and/or control action.

FSANZ and the Australian Pesticides and Veterinary Medicines Authority have shared responsibilities for establishing the maximum residue limits (MRLs) for agricultural and veterinary chemicals listed in Standard 1.4.2 of the Food Standards Code. From March 2016, Standard 1.4.2 will be replaced by Schedule 20 of the revised code.

7.3.2 Maximum residue limits

MRLs are set using internationally recognised methodology, consistent with Codex guidelines, for specific combinations of chemicals and food commodities. This involves a rigorous risk assessment, including case-by-case dietary exposure assessments (see Section 7.10). The process is methodical, streamlined and transparent, and includes public consultation. MRLs, including those arising from requests from stakeholders for import tolerance purposes, are included in the Food Standards Code only if the level of chemical residue in the food does not pose any health risks or safety risks to consumers.

7.3.3 Contaminant levels

FSANZ sets maximum levels for specified metal and non-metal contaminants, and natural toxicants in nominated foods in Standard 1.4.1 of the Food Standards Code. However, regardless of whether or not a maximum level exists, the ALARA ('as low as reasonably achievable') principle applies to levels of contaminants in all foods. The levels set are based on international methodologies and best practice, such as those of the Joint FAO/WHO Expert Committee on Food Additives, and are consistent with public health and safety requirements.

7.4 ANTIMICROBIAL RESISTANCE

7.4.1 Antimicrobial resistance mitigation

Antimicrobial resistance (AMR) is a global risk that poses a serious and imminent threat to human and animal health. AMR cannot be addressed through unilateral action; significant effort in both the human and animal health fields will be required to reverse the trend.

Australia has a good track record on AMR from an animal health perspective, as a result of strict regulation of the use of antimicrobials in animals. The Department of Agriculture and Water Resources has a leadership role in this area.

At an international level, the department is involved in the work of several multilateral organisations, such as the World Organisation for Animal Health (OIE) and the FAO. These organisations provide global guidance on the best way to limit AMR.

At a national level, the Department of Agriculture and Water Resources worked with the Department of Health to release Australia's first National Antimicrobial Resistance Strategy on 2 June 2015.[109] Work is under way to develop an implementation plan for the strategy, which will provide the details of specific actions and timeframes.

The Department of Agriculture and Water Resources also participates in:

- the Antimicrobial Resistance Prevention and Containment Steering Group, which is jointly chaired by the secretaries of both departments, and includes the Australian Chief Medical Officer and Chief Veterinary Officer – provides governance and leadership on AMR issues, and oversees the development and implementation of the national strategy
- the Australian Strategic and Technical Advisory Group on Antimicrobial Resistance, an expert group from the health and veterinary sectors, which is co-chaired by the Australian Chief Medical Officer and Chief Veterinary Officer – provides strategic, technical, scientific and clinical advice to the steering group
- the Antimicrobial Resistance Surveillance Task Group, which includes animal health industry participants – focuses on implementing Australia's AMR surveillance program for livestock
- the Antibiotic Awareness Week working group, which is led by the Australian Commission on Safety and Quality in Health Care – supports an annual global initiative endorsed by WHO (see Section 7.4.2).

7.4.2 National Antibiotic Awareness Week

National Antibiotic Awareness Week took place on 16–22 November 2015. It formed part of the first World Antibiotic Awareness Week, declared by WHO and supported by the OIE to increase global public awareness of the importance of AMR as a One Health issue. The department was involved in activities,[110] including:

- a National Antimicrobial Resistance Forum jointly run with the Department of Health
- a global Twitter chat on AMR

109 http://agriculture.gov.au/animal/health/amr

110 www.agriculture.gov.au/animal/health/amr/antibiotic-awareness-week

Image credit: DAF Qld

- encouraging the animal health community to take the pledge to manage AMR
- release of a video message from the Australian Chief Veterinary Officer on AMR in animals in Australia.

7.5 NATIONAL RESPONSE FRAMEWORK

The entire food regulatory system needs to be able to respond rapidly to food emergencies resulting from a variety of food safety risks.

A food incident is defined as 'any situation within the food supply chain where there is a risk, potential risk or perceived risk of illness or confirmed illness, associated with the consumption of a food or foods and relates to an issue that could, or is expected to, impact on multiple government jurisdictions'.[111] A food incident can be identified in a number of ways – for example, food recalls; investigation of a multijurisdictional disease outbreak; and intelligence from industry, local or state government agencies, or international agencies. When a food incident occurs, action is coordinated through the Bi-National Food Safety Network, which comprises the Australian, state and territory, and New Zealand food enforcement agencies, and FSANZ.

Responses to food incidents are implemented under food laws and response plans or protocols in the states and territories, and the New Zealand Ministry for Primary Industries. In some cases, the National Food Incident Response Protocol will be triggered. The protocol provides guidance on the response to national food incidents linked to microbiological, chemical, radiological, physical or unknown hazards. It provides a link between the protocols of the Australian, state and territory government agencies that are responsible for food safety.

It is vital that government and industry work together during an incident. The appropriate government and industry groups need to be alerted as early as possible to an emerging issue, so that necessary action can occur; this is critical to maintaining the confidence of consumers and trading partners, and reducing the flow-on effects on resources. One of the main ways that industry can be prepared for an incident is to have a recall plan that clearly defines roles and responsibilities, and ensures that businesses can respond quickly, when necessary.

Internationally, FSANZ has maintained close contact with Australia's international partners, and has been an active participant in the FAO/WHO International Food Safety Authorities Network (INFOSAN).

111 National Food Incident Response Protocol: www.health.gov.au/internet/main/publishing.nsf/Content/foodsecretariat-isc-food.htm

Recent domestic and international food incidents have highlighted the importance of traceability. The complexity of supply chains makes the process of product tracking slow and inefficient in times of crisis. Chapters 3 (Food Safety Standards) and 4 (Primary Production and Processing Standards) of the Food Standards Code specify requirements for food businesses to ensure that they can trace food that they receive and sell. These requirements are consistent with international (Codex) principles of being able to trace food products 'one step back' and 'one step forward' in the food supply chain.

7.6 FOOD RECALLS

A food recall removes food that may pose a health or safety risk from distribution, sale and consumption. FSANZ coordinates and monitors food recalls in Australia. Recalls occur as a result of consultation between state and territory governments and a sponsor (usually the food product's manufacturer or importer).

A food recall may occur because of a report or complaint from manufacturers, wholesalers, retailers, government or consumers. It may also occur as a result of internal testing and auditing by a food business. Food recalls can be at the trade or consumer level.

A food withdrawal, which is different from a food recall, removes food from the supply chain for reasons other than protection of public health and safety – for example, if the food is underweight.

When a food safety issue is identified, food businesses must be able to quickly remove unsafe food from the marketplace to protect the health and safety of consumers. FSANZ helps food businesses to recall unsafe food in Australia by communicating recall information to state and territory government agencies, and industry groups. Food businesses are responsible for ensuring that the public is notified of a recall.

7.7 BOVINE SPONGIFORM ENCEPHALOPATHY CONTROL FOR BEEF IMPORTS

Bovine spongiform encephalopathy (BSE) is a transmissible and fatal neurodegenerative disease that affects cattle. Variant Creutzfeldt–Jakob disease, a rare and fatal human neurodegenerative condition, results from exposure to the BSE agent by consuming beef or beef products that are contaminated with the agent. Since BSE was identified as a major risk to human health in 1996, Australia has had comprehensive arrangements in place to protect consumers from exposure to the BSE agent through contaminated food. Clause 11 of Standard 2.2.1 of the Food Standards Code specifies that only bovine meat and meat products derived from animals free from BSE can be sold in Australia.

In 2009, the Australian Government announced a revised policy on BSE that established new requirements for imported beef and beef products. Under this policy, which was implemented in March 2010, countries wishing to export beef to Australia must apply to the Australian BSE Food Safety Assessment Committee for a country BSE food safety assessment. FSANZ completes the assessment, which includes, when necessary, an in-country inspection. An in-country inspection examines the effectiveness of BSE preventive measures in the exporting country to ensure the safety of beef and beef products to be exported to Australia. In addition, the Department of Agriculture and Water Resources implements import certification requirements at the border.

Under the revised policy, FSANZ has received applications from 16 countries. As of October 2015, FSANZ had completed BSE food safety assessments for Argentina, Brazil, Chile, Croatia, Japan, Latvia, Lithuania, Mexico, the Netherlands, New Zealand, the United States and Vanuatu. The BSE risk status assigned to these countries, together with the full assessment reports, can be found on the FSANZ website.[112] Applicant countries assigned Category 1 or Category 2 BSE food safety risk status may export beef products to Australia. These countries are required to provide an annual update of BSE surveillance and BSE control information to FSANZ.

112 www.foodstandards.gov.au/industry/bse/bsestatus/Pages/default.aspx

7.8 IMPORTED FOOD RISK ASSESSMENT

The Department of Agriculture and Water Resources inspects imported food to check that it meets Australian public health and safety requirements, and that it complies with the Australia New Zealand Food Standards Code. There are biosecurity restrictions on food such as meat, fruit, eggs, vegetables and dairy products from certain countries; any foods that do not meet biosecurity requirements are not allowed into Australia.

FSANZ provides risk assessment advice to the Department of Agriculture and Water Resources on the level of public health risk associated with imported food. The department uses this risk advice to determine appropriate risk management measures at the Australian border for imported food products.

FSANZ is currently reviewing the risk advice on 'risk category' foods (i.e. medium–high risk, as listed in the Imported Food Control Order 2001). The review process has identified that the food safety risks of certain food–hazard combinations have changed from previous advice as a result of new scientific and import compliance data, as well as refinements to some food categories and hazards. The completed risk statements for the 'risk category' foods are published on the FSANZ website.[113]

7.9 INTERNATIONAL ENGAGEMENT

Collaboration with international agencies involved in ensuring food safety is becoming increasingly important as the food supply expands and becomes more global. FSANZ collaborates with many international scientific and regulatory bodies to develop methods for data collection and analysis. Although food-related risks around the world may vary, sharing of information, data and best practices on food science regulation can promote consistent approaches to analysing risk.

The Asia–Pacific Economic Cooperation Food Safety Cooperation Forum seeks to build robust food safety systems in the Asia–Pacific region. The forum, whose members represent food safety regulators, is co-chaired by Australia (FSANZ) and China.

Australian Government representatives, including from FSANZ and the Department of Agriculture and Water Resources, actively lead and participate in various Codex committees (see Section 7.2.2).

FSANZ also supports the work of WHO and the FAO by participating in a number of expert committees and meetings. These include the Joint FAO/WHO Expert Committee on Food Additives and the Joint FAO/WHO Meeting on Pesticide Residues. FSANZ is also a WHO Collaborating Centre for Food Contamination Monitoring.

In addition, FSANZ collaborates extensively with other international risk assessment and regulatory agencies through established networks, such as the International Food Chemical Safety Liaison Group, the International Microbiological Food Safety Liaison Group, the Food Safety Regulatory Economics Working Group and the Social Sciences International Liaison Group, which comprise international experts in their given areas.

7.10 DIETARY EXPOSURE ASSESSMENT

Dietary exposure assessments are a key part of FSANZ's risk assessment and risk analysis process, which contributes to evidence-based decision making. A dietary exposure assessment estimates how much of a food chemical a population, or population subgroup, consumes. FSANZ uses internationally accepted dietary modelling techniques for the dietary exposure assessments. These assessments consider the potential exposure of the Australian and New Zealand populations to chemicals such as food additives, agricultural and veterinary chemical residues (pesticides), and other chemical contaminants, as well as nutrients, food ingredients and other substances that have a nutritional or health purpose.

Dietary exposure to (or intake of) food chemicals is estimated by combining the amount of food consumed with the concentration of the food chemical, and includes all foods that contain the chemical of interest. The estimated dietary exposure to a food chemical is compared with a known

113 www.foodstandards.gov.au/consumer/importedfoods/Pages/FSANZ-advice-on-imported-food.aspx

health-based guidance value to determine the potential level of risk to the population. Health-based guidance values indicate the amount of the substance that can be consumed daily without adverse health effects. An example of a health-based guidance value is an acceptable daily intake, which is used for pesticides and veterinary drugs.

The food consumption data used for dietary exposure assessments are derived from the latest national nutrition surveys in Australia and New Zealand. The data contain information from individual records about specific foods and amounts consumed over either one or two days. Concentrations of food chemicals in both plant- and animal-based products consumed in the diet are obtained from a number of sources. These include analysis of foods through food surveys or monitoring programs – for example, food manufacturers' levels of use of food additives, agricultural trials, and assessment against the Food Standards Code for MRLs for agricultural and veterinary chemicals.

Estimated dietary exposures and information about the main dietary sources of food chemicals provide essential information for standards setting, inform consumers about appropriate food consumption patterns, and enable targeted planning for food survey and monitoring programs.

FSANZ also collects food surveillance data, including the results of general compliance testing and targeted surveys conducted by public health units in jurisdictions across Australia and New Zealand. Australia's most comprehensive assessment of consumers' dietary exposure to (intake of) pesticide residues, contaminants and other substances is the Australian Total Diet Study (ATDS). The ATDS, formerly known as the Australian Market Basket Survey, looks at consumers' dietary exposure to a range of pesticide residues, contaminants and other substances found in food every 2–3 years. Through this major study, FSANZ monitors the national food supply to ensure that existing food regulatory measures adequately protect consumer health and safety.

FSANZ may also undertake surveys as part of its work on the Food Standards Code – for example, when it develops food additive standards, or in response to emerging issues and national food incidents.

Other Australian food regulatory agencies undertake regular monitoring activities that may inform FSANZ's process for setting standards. For example, under the National Residue Survey, the Department of Agriculture and Water Resources tests food for export for residues of agricultural and veterinary chemicals, and environmental contaminants.

7.11 MONITORING SAFETY OF THE FOOD SUPPLY

The Australian Government, and state and territory food safety authorities provide consumer protection through audit, inspection and monitoring. Good hygienic practices and food safety systems, based on the principles of hazard analysis and critical control points (HACCP), are used to ensure that meat, dairy, seafood, eggs and the products made from these commodities are safe for human consumption. Premises used for processing and storing these types of foods for export must be registered with the Department of Agriculture and Water Resources.

FSANZ and other Australian and New Zealand government agencies continuously monitor the food supply to ensure that it is safe, and that foods comply with standards for microbiological contaminants, pesticide residues and chemical contamination. FSANZ monitors nutrients in the Australian food supply, compiling the results in databases that are available to the public.

7.12 FOODBORNE DISEASE SURVEILLANCE

7.12.1 OzFoodNet

In 2002, the then Department of Health and Ageing, in collaboration with state and territory health agencies, established OzFoodNet to improve the national surveillance of foodborne disease. This collaborative network of epidemiologists, microbiologists and food safety specialists conducts applied research into foodborne disease and methods for improving surveillance. Reports from OzFoodNet are provided fortnightly to the Communicable Diseases Network Australia (CDNA) and are published in *Communicable Diseases Intelligence*, a quarterly publication of the Department of Health.[114]

114 www.health.gov.au/internet/main/publishing.nsf/Content/cda-pubs-cdi-cdiintro.htm

Image credit: iStock

OzFoodNet identifies outbreaks, and provides early warning, of foodborne illnesses in Australia. It ensures a consistent national response to such outbreaks, and reduces the number of incidents and spread of foodborne illness by prompt preventive action.

7.12.2 Communicable Diseases Network Australia

The CDNA[115] provides national leadership and coordination for the surveillance, prevention and control of communicable human diseases that pose a threat to public health. Its members include the Australian Government, state and territory governments, and key non-government organisations concerned with communicable diseases. The network provides advice to governments and other bodies on public health strategies to minimise the effect of communicable diseases, and oversees the development of nationally consistent public health guidelines to guide the public health response to outbreaks of communicable diseases. The CDNA reports to the Australian Health Ministers' Advisory Council through the Australian Health Protection Principal Committee.

115 www.health.gov.au/internet/main/publishing.nsf/content/cda-cdna-cdna.htm

Image credit: iStock

CHAPTER 8

Animal welfare

The Australian, state and territory governments work with the Australian livestock industry to improve the productivity and profitability of the industry, and farmgate returns.

The strong link between animal welfare and livestock industry profitability results in improved animal welfare that contributes to:

- increased productivity – improved animal welfare practices lead to contented, healthier animals that produce a higher-quality, higher-value and safer product
- improved competitiveness – systems that are underpinned by robust animal welfare arrangements are likely to improve access of products to domestic and export markets, and achieve higher prices
- sustainability – community acceptance of livestock animal welfare arrangements leads to better market access, higher prices and greater long-term sustainability of livestock industries.

The success of Australia's livestock industries will be increasingly influenced by research, development and strategies that improve animal welfare outcomes.

8.1 JURISDICTIONAL UPDATES

8.1.1 Australian Government

Australia's three tiers of government each have animal welfare responsibilities, which vary between jurisdictions. Legislative responsibility for animal welfare in Australia rests primarily with state and territory governments, and local governments. The Australian Government's responsibilities for animal welfare arise from specific powers in relation to external trade and treaties that encompass some animal welfare issues.

The Australian Government:

- administers a regulatory framework that seeks to ensure that animals in the live export trade are handled and slaughtered in accordance with standards set by the World Organisation for Animal Health (OIE), and that export abattoirs meet state and territory requirements and animal welfare laws
- issues export certificates for all live animals – including commercial livestock species, companion and assistance animals (including greyhounds), and horses – to meet importing country requirements; these include ensuring that the animal is fit to travel
- participates in international animal welfare matters by engaging at the global, regional and country levels
- supports the development of nationally consistent animal welfare arrangements, such as animal welfare standards and guidelines, biosecurity arrangements, and national approaches to policy matters such as reducing the incidence of farm trespass
- works with state and territory governments, which are responsible for domestic animal welfare legislation, including for livestock; animals used in research and teaching; aquatic animals; native and introduced wildlife; animals used for work, recreation, entertainment and display; and companion animals
- supports livestock industries in improving animal health and welfare through matched funding for research and development
- supports the implementation of the Australian Animal Welfare Strategy as the national blueprint for sustainable improvements in animal welfare.

8.1.2 Australian Capital Territory

In 2015, the Australian Capital Territory (ACT) Government introduced a number of legislative reforms in relation to animal welfare. The Domestic Animals (Breeding) Legislation Amendment Bill 2015 was passed by the ACT Legislative Assembly. This requires dog and cat breeders to comply with a new breeding standard containing rules relating to an animal's minimum breeding age, the number of litters an animal may have, and the frequency with which an animal may be bred within a particular period. Amendments to the *Animal Welfare Act 1992* and the *Domestic Animals Act 2000* make non-compliance with the breeding standard an offence. The new breeding laws, which commenced on 15 September 2015, aim to prevent intensive breeding operations that exploit animals for profit, and ensure appropriate standards of care for dogs and cats bred in the ACT.

In response to animal welfare prosecutions concluded in the ACT during 2015, changes to the *Animal Welfare Act 1992* are being considered to ensure that the Act appropriately reflects community expectations regarding an animal owner's duty to care for an animal.

The ACT's Animal Welfare Advisory Committee continued to progress work on four codes of practice in 2015. Public consultation was undertaken on the draft *Code of practice for the welfare of native wildlife: rescue, rehabilitation and release* and the draft *Code of practice for the private keeping of native reptiles*. Public consultation on the draft *Code of practice for the welfare of dogs in the ACT* is expected to commence in the first quarter of 2016. Work is also progressing on the draft *Code of practice for the welfare of cats in the ACT*.

8.1.3 New South Wales

The New South Wales Department of Primary Industries is the contract manager on behalf of the Animal Welfare Task Group for the review of the *Model code of practice for the welfare of animals: domestic poultry*. The department is also leading the project to develop national standards and guidelines for abattoirs. (See Sections 8.4.4 and 8.4.5 for more information on these guideline documents.)

The New South Wales Animal Welfare Advisory Council is reviewing its work plan and will be setting priorities for the development of state-based codes and standards.

The following policies and guidelines relating to the use of animals in research were developed or revised during 2015:

- consideration of high-impact projects by animal ethics committees
- grievance procedures
- criteria for assessing animal ethics committee membership
- wildlife surveys.

8.1.4 Northern Territory

The Animal Welfare Branch, the administrative arm of the Animal Welfare Authority, is part of the Northern Territory Department of Primary Industry and Fisheries (DPIF).

The Northern Territory's *Animal Welfare Act 2000* came into effect in March 2000 with the following objectives:

- ensure that animals are treated humanely
- prevent cruelty to animals
- promote community awareness of animal welfare.

The Northern Territory Government has devised a two-stage approach to amending the Act, with the first stage involving drafting amendments to strengthen provisions of the existing Act. In February 2013, the *Animal Welfare Amendment Act 2012* was passed by the Legislative Assembly and included the following amendments:

- introduction of the concept of a minimum level of care that must be provided to an animal
- introduction of three levels of offences – 'breach of the duty of care', 'cruelty to an animal' and 'aggravated cruelty to an animal'
- extension of the time limit for commencing proceedings under the Act from one year to two years
- provision for increased penalties for offenders
- clarification of the roles, functions and powers of the Animal Welfare Authority.

The second stage of the reform process is the full review of the current Act. In February 2014, a discussion paper – 'Review of the Animal Welfare Act' – was released for public consultation, targeting specific stakeholder and industry groups, as well as the broader public. Twenty formal comments were received, and submissions and drafting instructions have been prepared in readiness for amendments to be introduced in the March 2016 parliamentary sittings.

This second stage of the reform process will ensure that the Northern Territory's animal welfare legislation is contemporary and reflects national best practice. A full regulatory impact statement is being prepared for assessment. Development of the Act aligns with a number of strategic government policies, including:

- the Framing the Future strategic plan – to develop a strong society
- the DPIF Industry Development Plan – to encourage and support best practice in animal welfare
- the Red Tape Reduction Initiative – to improve the efficiency of compliance activities under animal welfare legislation.

In 2015, DPIF implemented a Caring for your Dogs and Horses program. The program encourages responsible pet ownership and promotes the wellbeing of all community animals. It is currently being delivered throughout remote Indigenous communities, with the assistance of the Central Land Council, local shires and the communities. A barbecue event held by inspectors from the Animal Welfare Branch encouraged a large, supportive and positive gathering of locals and community members.

Other community engagements included the RSPCA Million Paws Walk, the show circuit and stakeholder information sessions, and distribution of merchandise (including frisbees, dog collars and water bottles). The Animal Welfare Branch is continuing to train the Northern Territory Police on their responsibilities and powers in relation to animal welfare, and provisions of the Act.

8.1.5 Queensland

The *Animal Care and Protection Act 2001* is the core animal welfare legislation in Queensland. The Queensland Government is currently considering a number of legislative reforms in animal welfare.

In 2015, the Act was amended to remove the requirement for a person to be a 'prescribed entity' to administer a substance to an animal to euthanase it. However, a person must be authorised under the *Health Act 1937*.

Options are being developed to regulate dog breeding in Queensland. Results from public consultation showed strong support for compulsory breeder registration and identification, and for breeder identification numbers to be included on microchips.

Image credit: AHA

In October 2015, a new teaching resource to increase Indigenous students' understanding of animal welfare and empathy for animals was released. The *Seven* series of educational books has been developed to raise awareness of welfare issues in dogs in Indigenous communities.

The Queensland Government continues to work with scientific users of animals to implement the current edition of the *Australian code for the care and use of animals for scientific purposes*.[116]

The Queensland Government also contributed to various national processes throughout 2015, including:

- reference group meetings for the development of Australian animal welfare standards and guidelines for cattle, sheep, and livestock at saleyards and depots
- the Animal Welfare Task Group
- development of the National Primary Industries Animal Welfare Research, Development and Extension Strategy (see Section 8.5)
- the Australian Veterinary Association Animal Welfare Roundtable.

8.1.6 South Australia

In July 2014, the South Australian Government proposed major reforms to all government boards and committees to make government more accessible and efficient. Parliament has decided that the Animal Welfare Advisory Committee will be retained, but its members will be appointed by the relevant minister rather than the governor. This decision has been implemented through amendments to the *Animal Welfare Act 1985*. Reforms to the appointment of members to animal ethics committees were also announced in 2014: these committees would be established and their members appointed by the licensed institution, rather than by the minister. Legislative and administrative changes to reflect this decision were implemented in 2015.

Legislative amendments in 2015 included the following:

- In response to allegations of live animal baiting and cruelty in the Australian greyhound racing industry, the Act was amended to expand the existing provisions relating to organised animal fights to live baiting. Live baiting has always been an offence in South Australia, and the amendments ensure that the associated activities – such as possession of implements, allowing use of premises and being present at these events – are also offences. In addition, three other minor issues were

116 www.nhmrc.gov.au/guidelines-publications/ea28

identified, which were rectified through amendment of the Animal Welfare Regulations 2012.

- The Act provides that employees of a licensee do not require their own licence to undertake research, experimentation or teaching using animals. Through amendment of the Regulations, this exemption was expanded to include students, volunteers and other affiliates working under the supervision of a licensee.
- The Regulations require that any person who sets a steel-jawed trap for a dog must steep the jaws in sufficient strychnine to kill the dog. This requirement has been amended to allow the use of any toxin approved by the minister, so that when, or if, a more humane alternative to strychnine becomes available, it can be used immediately rather than strychnine having to be used until the Regulations can be changed.
- Threatened species programs and research into feral cats identified a need for steel-jawed traps. It was previously an offence under the Regulations to use these devices on cats. The Regulations have been amended to allow their use in specific programs with the permission of the minister or an animal ethics committee.

To meet the government's election commitment, standards and guidelines have been developed to address the breeding and sale of dogs and cats. This document will be regulated by reference in legislation, along with an updated set of standards and guidelines addressing the sale of other species through pet shops.

The memorandum of understanding between South Australia's Department of Environment, Water and Natural Resources, Primary Industries and Regions South Australia and RSPCA Australia has been reviewed and endorsed, and negotiations for a new funding agreement with the RSPCA for enforcement of the Act have commenced. This agreement must be finalised by 30 June 2016.

8.1.7 Tasmania

In 2015, the Tasmanian Parliament passed an amendment to the *Animal Welfare Act 1993* that increased penalties for offences under the Act, improved accountability and professional standards for animal welfare officers, and streamlined the operation of the Tasmanian Animal Welfare Advisory Committee. Other aspects of the Act are being reviewed, and further amendments will be introduced, if necessary.

Animal Welfare (Dogs) Regulations are being written, based on the welfare standards for dogs that were developed by the Animal Welfare Advisory Committee. The Regulations will operate in two parts: one that applies to all dogs, and another that applies only to dogs kept in domestic animal enterprises, such as commercial breeding establishments.

Animal welfare compliance in Tasmania is delivered through a partnership between the Department of Primary Industries, Parks, Water and Environment, and RSPCA Australia. The RSPCA receives all reports of animal cruelty, and undertakes investigation and compliance activity in most instances. Where commercial livestock are involved, the matter is referred to the department for investigation.

Random inspections of intensive piggeries and poultry farms continue, as well as inspection of vehicles used to transport livestock within Tasmania. Biosecurity officers at the border inspect animal trucks and trailers for animal welfare issues as they enter the state.

8.1.8 Victoria

Amendments in 2015 to the *Prevention of Cruelty to Animals Act 1986* (POCTAA) will improve the ability to respond to large-scale animal welfare incidents; strengthen enforceability of the Act; and improve licensing, cost recovery, and monitoring and compliance reporting of animal research and teaching establishments. The amendments provide additional powers to deal with dog and cock fighting, and increased penalties for these offences.

The Victorian Government has committed to implementing the recommendations of the Chief Veterinary Officer's *Investigation into animal welfare and cruelty in the Victorian greyhound industry*.[117] These include amendments to the blooding and luring provisions of POCTAA, an increase in the statute of limitations for these offences to three years, and significant changes to the functioning of the *Domestic Animals Act 1994* (DAA). A new mandatory code of practice for the management and care of all greyhounds in the racing industry will be developed under the DAA. Victoria also commissioned a review of the development, use and effectiveness of codes of practice made under the POCTAA.

117 http://economicdevelopment.vic.gov.au/__data/assets/pdf_file/0018/1108026/GreyhoundReport_final_12Nov2015_v9.pdf

Under the DAA's mandatory *Code of practice for the operation of breeding and rearing businesses 2014*,[118] Victoria introduced several measures to improve the welfare and management of domestic animals, including pre-mating veterinary health checks for breeding dogs. Grants totalling $360 000 were awarded to not-for-profit agencies to improve animal welfare, and the Making Victoria Better for Pets campaign was launched. In addition, Victoria campaigned to improve public access for guide dog puppies, and introduced record-keeping requirements for pet shops.

8.1.9 Western Australia

The Department of Agriculture and Food Western Australia (DAFWA) is responsible for administering the *Animal Welfare Act 2002*. General Inspectors appointed under the Act enforce the provisions relating to offences against animals.

General Inspectors appointed by RSPCA Australia and the Livestock Compliance Unit within DAFWA are the main providers of compliance and enforcement activity. However, public sector officers in the Department of Parks and Wildlife, the Department of Commerce and some local governments are also appointed as General Inspectors. All Western Australia Police officers have the powers of a General Inspector.

DAFWA takes the lead in commercial livestock matters through regular inspections at aggregation points such as saleyards, ports and abattoirs. The RSPCA is responsible for receiving and assessing public complaints about animal cruelty, and providing an enforcement service for non-commercial livestock and companion animals.

During 2015, DAFWA engaged with industry representatives to develop and implement animal welfare standards and guidelines for livestock species and enterprises. Work continued on clarifying roles and responsibilities for the welfare of companion animals, livestock and wildlife during an emergency such as bushfire or flood.

In May 2015, the Western Australian Minister for Agriculture and Food, the Hon. Ken Baston MLC, appointed an independent review panel to examine and make recommendations on the investment in, and administration of, animal welfare. The purpose was to determine the best return on funding in achieving animal welfare outcomes, including appropriate investment in a regulatory framework. The panel provided a report to the minister in October 2015, but no public announcements about the review were available at the time of writing.

8.2 INDUSTRY UPDATES

8.2.1 Australian Lot Feeders' Association

The Australian Lot Feeders' Association (ALFA) is the peak body for the cattle feedlot industry. A key strength of the Australian cattle feedlot industry is its systems – including the National Feedlot Accreditation Scheme (NFAS) – that underpin its reputation as a producer of beef that is free from disease, safe and healthy, and produced under world-leading animal husbandry practices.

In addition to the NFAS, the cattle feedlot industry has comprehensive training, and research, development and extension (RD&E) arrangements in place to manage and improve animal welfare on feedlots:

- ALFA hosts an annual feedlot conference, which highlights research and best-management practices from Australia and around the world, and aims to improve knowledge, systems, awareness and uptake of issues such as animal health and welfare. In 2015, presentations included information on humane euthanasia, feedlot acclimation and treatment of lameness.
- Through prestigious annual awards, the industry recognises feedlot excellence on issues such as animal welfare, thereby encouraging further improvement within the sector.
- The cattle feedlot industry invests significantly in RD&E in animal welfare. In 2015, this work, undertaken by Meat & Livestock Australia (MLA), included improving the industry's understanding and management of heat stress, bedding options, humane euthanasia, cattle acclimation, backgrounding and objective welfare measures.
- ALFA uses the expertise of Australian and international feedlot veterinarians to deliver workshops across Australia that provide practical information on best-practice management of animal health and welfare on feedlots. ALFA and MLA also develop extension materials – including DVDs, fact sheets, manuals and suggested templates – to deliver information on animal health,

118 http://agriculture.vic.gov.au/pets/domestic-animal-businesses/breeding-and-rearing-businesses/code-of-practice-for-the-operation-of-breeding-and-rearing-businesses-revision-1

welfare, biosecurity and other matters. In 2015, following the development of feedlot-specific certified animal welfare training, 137 feedlot staff successfully completed the training requirements. Further training will be conducted each year.

- ALFA has identified that many lot feeders do not have the time, resources or networks to continually keep abreast of developments in legislation, best-practice management and the NFAS. In response, ALFA has appointed a Technical Services Officer to provide free on-the-ground assistance to all lot feeders. In 2015, this contract was extended for a further two years, following wide support among the sector.

ALFA regularly meets with RSPCA Australia and supermarkets to explain its activities and to learn about potential trends in animal welfare, including changing consumer expectations, that the industry may need to address.

8.2.2 Australian Dairy Industry Council

The Australian Dairy Industry Council is the peak body representing dairy farmers and dairy processors. It has in place a National Dairy Industry Animal Welfare Strategy, and a vision that 'every dairy animal is well cared for'.

To support this vision, the National Dairy Industry Animal Welfare Strategy sets out husbandry principles and practices to guide farmers in the care of their animals. In fostering improvements in animal husbandry practices, the strategy seeks to:

- ensure that farmers have adequate information to enable them to understand and adopt good animal welfare practices
- provide governments, the community and consumers with confidence in Australian dairy husbandry practices and welfare outcomes
- ensure that effective processes are in place to identify priorities and respond to animal welfare issues.

The strategy highlights priority areas to support farmers in achieving high standards of animal health and wellbeing. These priority areas drive the industry's objectives and action plans, and have clear performance goals. The dairy industry focus includes:

- legislation, standards, assurance and training
- calf management across the supply chain
- minimising lameness
- phasing out routine calving induction
- eliminating tail docking
- minimising pain associated with horn removal
- managing sick or injured cows.

The Australian Dairy Industry Council has endorsed a series of targets and performance measures under the Australian Dairy Industry Sustainability Framework, including a target for animal welfare: 'to provide the best care for all animals'. To assess whether the industry is making progress against this target, the following 2020 performance measures have been established:

- 100% of industry complying with legislated animal welfare standards
- 100% of industry adopting relevant industry-recommended practices for animal care
- 75% of consumers believe that dairy farmers do a good job in caring for animals.

8.2.3 Cattle Council of Australia

In anticipation of widespread adoption of the Australian animal welfare standards and guidelines for cattle in early 2016, the Cattle Council of Australia has led a team charged with developing and offering a formal unit of competency for lay spayers using the dropped ovary technique (DOT). When the standards and guidelines become law at state and territory level, spaying of cattle may only be done by accredited operators. Flank spaying will be discouraged; when done, it must be performed by a veterinary surgeon. Spaying using the DOT will be available to lay operators who become accredited under the new course. Spayers who have been performing this operation for some years with excellent results can use their experience as a formal path to accreditation.

With MLA, the Cattle Council continues to strive for the replacement of surgical procedures in cattle management with non-surgical methods. Success has been achieved with the discovery of the poll gene; wider adoption is being pursued. (The current genetic test for pollness – that is, no horns – has been commercially available for five years and is currently achieving accuracy of 99% in Brahmans and between 72% and 74% in other tropical breeds.) Other areas of research are replacements for surgical castration and spaying, and fire branding. Although good animal welfare is

a primary motivator, successful outcomes will most likely come from the change being presented as a positive-value proposition, so economic analyses will prove very important.

In the meantime, the Cattle Council is pursuing widespread use of pain relief to accompany essential surgical management procedures, such as dehorning and DOT spaying. A major step in this process has been encouraging the Australian Pesticides and Veterinary Medicines Authority to recognise the urgent need for registering particular analgesics for use with cattle by non-veterinarians. Registration of such analgesics is expected in 2016.

8.2.4 Australian Racing Board Limited

In 2014, an Australian Rule of Racing was introduced, requiring owners and trainers to inform Racing Australia of the retirement of their horse and its destination. As a result, data show that 9 out of 10 retired horses go to the breeding and equestrian sectors.

Racing Australia will commence traceability for all thoroughbreds from birth until retirement as a racehorse. This will include ownership details, which will be fully disclosed on a Mare Return 30 days after birth and on every subsequent transfer of ownership form. Racing Australia's aim is to be accountable for every thoroughbred throughout its life as a racehorse. Full traceability of thoroughbreds is important for both integrity and animal welfare reasons.

8.2.5 Australian Livestock Exports Council

Australia is the only country that has implemented a supply chain–based welfare assurance system for livestock exports, and the only country investing directly in infrastructure and training in stock handling. The Australian livestock industry also participates in research and development, with potential outputs including the development of welfare indicators and the Livestock Global Assurance Program (LGAP).

The LGAP is a research project that is developing a global assurance and conformity assessment program to foster world's best practice in the welfare and management of livestock. Its aim is to improve animal welfare in foreign markets, as well as in Australian livestock. If implemented, it will provide exporters with a further level of assurance above that of the Exporter Supply Chain Assurance System, as well as a pathway for facilities anywhere in the world to demonstrate their compliance with OIE international animal welfare standards, as a minimum.

More than 8000 people around the world have adopted better handling and slaughter practices as a result of industry-funded and industry-initiated hands-on training through the MLA/LiveCorp Live Export Program. Although challenges are ongoing, experience suggests that improving the way livestock are treated is best done by working with and supporting people to modernise practices and change attitudes.

Image credit: Clint Scholz

In 2014–15, more than $7 million was invested by LiveCorp and MLA, with matching Australian Government contributions, in research and development activities, including in animal health and welfare programs.

As a result of the industry's investment in RD&E, mortality rates within the trade have declined substantially over time. Although the mortality rates of cattle exported by sea have historically been low (since 1995, the total annual mortality rate has varied between 0.1% and 0.42%), recent mortality rates have been closer to 0.1%.

Development of a commercial, modified live *Salmonella* vaccine that is safe and well tolerated, and confers robust cross-protection in vaccinated animals, is in progress. This project has constructed derivatives of *Salmonella* DAM (DNA adenine methylase) vaccines that reduce the risk of the vaccine resulting in clinical disease in vaccinated animals without compromising effectiveness. The vaccine is being developed to allow oral administration; this would support its potential use in vaccinating large numbers of sheep before export. Rigorous studies demonstrate a high level of vaccine safety and efficacy, with minimal toxicity. Regulatory approval has been granted to return the derivatives of *Salmonella* DAM to Australia from the United States. An industry partner will then undertake large animal studies, with the aim of producing a commercial vaccine for sheep that can be delivered orally. The aim is to have a vaccine commercially available in early 2017.

8.2.6 Australian Pork Limited

The Australian Pork Industry Quality Assurance Program (APIQ✓®) covers 91.0% of the industry (by sow herd). This program includes standards that align with the *Model code of practice for the welfare of animals: pigs*.[119] Each year, participating producers are independently audited against these standards and must also complete an internal audit. State governments are responsible for ensuring compliance with the standards for producers who do not participate in the program.

An additional voluntary component to the standards verifies that sows are kept in loose housing from five days after mating to one week before farrowing ('gestation stall free'); 70.2% of Australian sows are housed in a manner compliant with this standard, as verified by APIQ✓® audits. This is in line with the commitment of Australian pork producers to voluntarily transition to this housing system by 2017.

8.2.7 Zoo and Aquarium Association

The Zoo and Aquarium Association (ZAA) launched its Animal Welfare Position Statement[120] (AWPS) in 2013, with the support of the Australian Animal Welfare Strategy. The purpose of the AWPS is to outline future directions for the welfare of animals managed within the zoo and aquarium industry in Australia. The AWPS introduced the Five Domains Model as the framework for assessing welfare; it focuses on the affective state of the animal, with positive states being established as key to good welfare.

Underpinned by the AWPS, the ZAA has incorporated the welfare framework into its Accreditation Program, which provides an industry-specific approach (including New Zealand) for assessing welfare. Since accreditation is a condition of membership of the ZAA, the opportunity for development and awareness in this area is ongoing. A first for the zoo sector, the purpose of the Accreditation Program is to validate and highlight an organisation's achievements in promoting positive animal welfare. The program supersedes a previously practice-focused system (targeting care, husbandry and management) that could not, in itself, ascertain the likelihood of good welfare (the animal's actual experiences).

Two years into its first three-year cycle, the Accreditation Program has produced workshops, a training program, preparation resources and assessment materials. A self-assessment component was introduced in 2015 as a means of cultivating greater understanding of welfare. Association members now assess their own animals and practices, with their findings externally sighted and reviewed. Welfare knowledge among members is developing through ZAA support, guided learning, and consolidation of reference points, definitions and language. Well over half of the ZAA's members have participated in the accreditation process; the remainder are expected to participate in 2016.

Emerging benchmarks in the ZAA's Accreditation Program are in the areas of proactive care, alignment with natural living and the opportunity to engage in a full range of species-appropriate behaviours. These are integral elements of positive welfare, well beyond a quality of life where negative welfare is merely minimised.

119 www.publish.csiro.au/pid/5698.htm

120 www.zooaquarium.org.au/index.php/press-releases/position-statements

8.3 ANIMAL WELFARE TASK GROUP

The Agriculture Ministers' Forum and the Agriculture Senior Officials Committee were formed in 2014 to make decisions on agricultural issues of national significance. The role of the Animal Welfare Task Group is to deliver priorities referred to it by the Agriculture Senior Officials Committee. The task group, which is the national successor to the Animal Welfare Committee, comprises representatives from each Australian state and territory, and New Zealand.

The Animal Welfare Task Group focuses on animal welfare issues that support improved long-term and sustainable economic, social and environmental outcomes; are informed by community expectations; and are of national interest or concern. The task group oversees the development of national animal welfare policies across the broad scope of animal sectors covered by the Australian Animal Welfare Strategy, with a focus on livestock industry sectors.

8.4 STANDARDS AND GUIDELINES

The Animal Welfare Task Group continues to oversee the development and implementation of Australian animal welfare standards and guidelines for cattle, sheep, poultry, exhibited animals, and livestock at saleyards, depots and abattoirs. A number of these standards and guidelines are nearly final.

8.4.1 Australian animal welfare standards and guidelines for cattle and sheep

Agriculture ministers have considered the cattle and sheep standards and guidelines, and each state and territory will implement them, as appropriate.

The standards and guidelines were developed with input from industry, governments, scientists, animal welfare organisations and the community. They are based on current scientific knowledge, recommended industry practice and community expectations. A comprehensive regulatory impact analysis and extensive public consultation underpinned the development of the standards and guidelines.

8.4.2 Australian animal welfare standards and guidelines for exhibited animals

New South Wales continued to coordinate the project on national standards and guidelines for exhibited animals. The project team completed its assessment of public comments on the standards and guidelines documents, and the draft decision regulatory impact statement. The project consultant began assessing the impact of the changes proposed in response to the comments.

Proposed amendments to clarify off-exhibit holding requirements for exhibited animals were finalised following industry consultation. Consultation with industry groups relevant to exhibited animals was also completed with respect to the draft policies for the controlled breeding of species and escape management requirements for exhibitors of large cats.

8.4.3 Australian animal welfare standards and guidelines for saleyards and depots

The development of national animal welfare standards and guidelines for livestock at saleyards and depots is well advanced. The post-consultation version of the standards and guidelines has been endorsed by the standards advisory group, and a decision regulatory impact statement is nearly final.

8.4.4 Australian animal welfare standards and guidelines for poultry

The Animal Welfare Task Group endorsed the business plan for the review of the *Model code of practice for the welfare of animals: domestic poultry*[121] at its meeting in March 2015. The New South Wales Department of Primary Industries has been appointed as the contract manager on behalf of the Animal Welfare Task Group, and Animal Health Australia has been appointed as the project manager.

121 www.publish.csiro.au/Books/download.cfm?ID=3451

The development of Australian animal welfare standards and guidelines for poultry began in June 2015. It is supported and funded by all governments, the Australian Chicken Meat Federation, the Australian Egg Corporation Limited, the Australian Duck Meat Association, and the Australian Turkey Federation.

A regulatory impact statement will be developed, for endorsement by the Office of Best Practice Regulation. The regulatory impact statement assesses the proposed standards, and incorporates feedback from public consultation and changes agreed by the majority of the project Stakeholder Advisory Group. This independently chaired group comprises government representatives, industry representatives from all sectors, and research and animal welfare organisations.

The document will cover all aspects of the welfare of poultry, including poultry for meat processing, and ducks, turkeys, geese, pheasants, guinea fowl, partridge, quail and pigeons.

8.4.5 Australian animal welfare standards and guidelines for abattoirs

New South Wales continues to coordinate the development of national standards and guidelines for abattoirs. The writing team has met with the Australian Meat Industry Council, which is working through the draft standards. The draft will then be forwarded to a wider advisory group of industry and government stakeholders for comment.

8.5 NATIONAL PRIMARY INDUSTRIES ANIMAL WELFARE RESEARCH, DEVELOPMENT AND EXTENSION STRATEGY

The National Primary Industries Animal Welfare Research, Development and Extension Strategy encourages greater co-investment and collaboration on a national basis to improve the efficient use of RD&E resources in the field of animal welfare.

The strategy is overseen by a steering committee that guides the development of programs. The steering committee comprises 17 major funding partners and providers of animal welfare research relating to the Australian farm sector, including representatives from the Australian Government, and state and territory governments:

- Animal Welfare Science Centre, University of Melbourne
- Australian Egg Corporation Limited
- Australian Meat Processor Corporation
- Australian Pork Limited
- Australian Wool Innovation
- Commonwealth Scientific and Industrial Research Organisation (CSIRO)
- Dairy Australia
- Australian Livestock Export Corporation Limited (LiveCorp)
- Meat & Livestock Australia
- Murdoch University
- Queensland Department of Agriculture and Fisheries
- Rural Industries Research and Development Corporation (Chicken Meat Program)
- Animal Welfare Science Centre, South Australian Research and Development Institute
- Animal Welfare Science Centre, University of Adelaide
- University of Queensland
- University of Western Australia
- Victorian Department of Economic Development, Jobs, Transport and Resources.

Active projects commissioned by the strategy include the following:

- 'Novel markers of pain in animals' (University of Adelaide) will produce a comprehensive literature review focusing on advances in the measurement of pain in animals and humans.
- 'National Animal Welfare RD&E Project Register' (Animal Welfare Science Centre, University of Melbourne) is an ongoing project that collates animal welfare RD&E carried out in the Australian livestock sector.

- 'Public views' (Animal Welfare Science Centre, University of Melbourne) will develop and test a web-based forum that can be used to address specific issues. The project will help to identify current or future issues surrounding a particular topic. Observing and measuring the discussion within groups can also provide information on the amount of divergence across stakeholders.
- 'Toolkit to guide livestock animal welfare contingency planning' (Robor Pty Ltd) will develop a business contingency planning toolkit to assist livestock businesses to develop a single plan encompassing all risks and hazards to their business, with the emphasis on managing an on-farm animal welfare crisis situation. An implementation plan and a promotional plan will be developed that will include generic and industry-specific promotional documentation and farmer educational material.

On 27 August 2015, the 5th National Animal Welfare RD&E Strategy Forum was held at the Victorian Department of Economic Development, Jobs, Transport and Resources at Attwood. More than 50 participants from industry groups, governments and research providers met to develop a greater understanding of current Australian RD&E projects in the area of primary industry animal welfare and to consider future RD&E priorities.

8.6 INTERNATIONAL ANIMAL WELFARE

8.6.1 World Organisation for Animal Health

Since May 2005, the World Assembly of OIE Delegates (representing the 180 member countries of the OIE) has adopted 10 animal welfare standards in the *Terrestrial animal health code* and 4 animal welfare standards in the *Aquatic animal health code*.

Australia supports the OIE's development of scientifically based international animal welfare standards and guidelines. These standards and guidelines are not intended to strengthen non-tariff barriers to international trade through prescriptive animal welfare requirements. The Australian Government consults closely with the livestock industries and non-government organisations when developing Australia's positions on issues being discussed in the OIE forum.

OIE Collaborating Centres are appointed by the OIE as centres of expertise in a specific designated sphere of competence. The OIE Collaborating Centre for Animal Welfare Science and Bioethical Analysis is a partnership between:

- the Animal Welfare Science and Bioethics Centre at Massey University (New Zealand)
- AgResearch (New Zealand)
- the Animal Welfare Science Centre (University of Melbourne)
- the Centre for Animal Welfare and Ethics (University of Queensland)
- CSIRO Animal, Food and Health Sciences (Armidale, New South Wales).

In April 2014, the Collaborating Centre Management Committee published a scientific and technical review on the future of animal welfare, titled *Animal welfare: focusing on the future*.[122]

The committee is also cooperating with partners in Southeast Asia to build animal welfare science capacity in the region through a training program: the OIE Standards & Guidelines (Slaughter & Transport) Collaborative Project South East Asia.[123] This project has funding from the Australian, Malaysian and New Zealand governments; Universiti Putra Malaysia; the European Union; and World Animal Protection (formerly the World Society for the Protection of Animals). As part of this training program, initial knowledge workshops for facilitators commenced in March 2015. By October 2015, all training workshops had been delivered across China, Malaysia, Thailand and Vietnam. Forty workshops were held, for approximately 800 stakeholders. The project now enters the data analysis phase, which aims to produce some helpful research papers.

122 http://web.oie.int/boutique/index.php?page=ficprod&id_produit=1307&fichrech=1

123 www.animalwelfarestandards.org

8.6.2 Regional Animal Welfare Strategy for Asia, the Far East and Oceania

On 26–27 March 2015, the 9th Regional Animal Welfare Strategy (RAWS) Coordination Group meeting was held in Kuala Lumpur, Malaysia. At this meeting, the Coordination Group:

- updated the *RAWS action plan*, in line with countries' animal welfare activities[124]
- formed a small writing group to strategically review and update the action plan, and provide advice on its future management
- reinforced the importance of RAWS, and agreed that the OIE Regional Commission for Asia, the Far East and Oceania should assume responsibility for ongoing RAWS activities, including establishing future terms of reference, the modus operandi and an advisory group.

On 29–30 July 2015, the 10th RAWS Coordination Group Meeting was held in Bangkok, Thailand. The meeting was preceded by an action plan writing group meeting on 28 July in Bangkok. This meeting prepared a supplementary paper and draft revised RAWS action plan for consideration at the RAWS Coordination Group Meeting.

At its meeting, the Coordination Group:

- agreed to the establishment of a RAWS advisory group as soon as practical to enable the work of RAWS to be progressed
- agreed to the proposed terms of reference and modus operandi of the advisory group
- provided advice on the chair of the advisory group for consideration by the OIE Director General
- agreed that the revised action plan be used as a resource document by the advisory group and member countries
- discussed approaches for funding and future activities.

Image credit: iStock, Richard Wozniak

124 http://www.rr-asia.oie.int/fileadmin/Regional_Representation/Programme/RAWS/Revised_Action_Plan_March_2015.pdf

Image credit: Department of Agriculture and Water Resources

CHAPTER 9

Regional animal health initiatives

Australia collaborates with many developing countries in the Asia–Pacific region to improve the health of their livestock, thereby improving livelihoods. This work includes increasing awareness of, preparedness for, and control of, exotic and zoonotic diseases.

This chapter summarises Australia's main areas of international engagement in terrestrial animal health in the Asia–Pacific and African regions. Information on regional aquatic animal health initiatives is provided in Chapter 5.

Australia conducts collaborative surveillance, capacity-building, aid and research activities in neighbouring countries and some African countries. These activities occur in collaboration with overseas government agencies, veterinary associations and private organisations. They aim to improve the control of animal diseases, including zoonoses, thereby improving livelihoods in partner countries. Aid and research activities are primarily resourced through the Australian Government Department of Foreign Affairs and Trade (DFAT[125]) and the Australian Centre for International Agricultural Research (ACIAR[126]).

Australia also provides leadership, and technical and financial assistance at global and regional levels. It supports the World Health Organization, the World Bank, the World Organisation for Animal Health (OIE), the Food and Agriculture Organization of the United Nations (FAO) – including the FAO's Animal Health and Production Commission for Asia and the Pacific – and the Secretariat of the Pacific Community. Australia's support for international collaborators ensures that regional projects address animal health issues and requirements that are important for both the collaborating countries and Australia.

9.1 REGIONAL REPRESENTATION

The Australian Chief Veterinary Officer and Delegate to the OIE, Dr Mark Schipp, is Vice President of the OIE World Assembly, where he represents the OIE region for Asia, the Far East and Oceania. Consultation undertaken by Dr Schipp on issues that will be presented to the OIE Council for consideration has increased engagement and cooperation within the region.

Dr Schipp, along with other Australian experts, participated in the 29th Conference of the OIE Regional Commission for Asia, the Far East and Oceania, held in Ulaanbaatar, Mongolia, on 14–18 September 2015. A Regional Work Plan Framework 2016–2020[127] was adopted at this meeting, to align with the OIE 6th Strategic Plan adopted in May 2015. The framework outlines a vision for the region and establishes a work plan of activities to be undertaken during the period.

125 http://dfat.gov.au/aid

126 www.aciar.gov.au

127 www.rr-asia.oie.int/strategies/regional-work-plan-framework

9.2 PRE-BORDER SURVEILLANCE AND CAPACITY BUILDING

9.2.1 Papua New Guinea and Timor-Leste

Australia assists its near neighbours Papua New Guinea (PNG) and Timor-Leste with field surveillance for significant animal diseases. The Australian Government Department of Agriculture and Water Resources undertakes these activities in collaboration with the PNG National Agriculture Quarantine and Inspection Authority (NAQIA) and the Timor-Leste Ministry of Agriculture and Fisheries (MAF).

In 2015, joint animal health surveys took place in Madang Province in PNG, and in Aileu district and the Special Administrative Region of Oecusse in Timor-Leste.

The Department of Agriculture and Water Resources also funded:

- a review of PNG's list of high-priority animal diseases and pests, and the diagnostic capacity of the veterinary laboratory, including a development plan for its future
- database training for six MAF animal health staff
- biosecurity public awareness activities in border villages in Timor-Leste
- exotic animal disease training for other Timor-Leste border agencies, such as Customs and Immigration
- dangerous goods packaging certification for five MAF staff who send biological specimens to international laboratories for diagnostic testing
- laboratory training for two MAF staff with the Berrimah Veterinary Laboratory in Darwin
- pilot studies in Timor-Leste of serological responses in pigs to classical swine fever vaccination
- rabies public awareness activities in high-risk coastal areas in Timor-Leste; Timor-Leste is currently free from rabies, and these activities aimed to help maintain that status.

These activities provide information about the presence and distribution of animal diseases that are important to Australia and its near neighbours, including risk factors for their spread. Participants develop skills in surveillance and public awareness raising, thereby improving animal health management in the

region. They also increase the capacity of the PNG NAQIA and the Timor-Leste MAF to identify and respond to animal disease emergencies, and help to reduce exotic animal disease threats to Australia.

9.3 OVERSEAS AID

Emerging infectious diseases derived from animals, such as severe acute respiratory syndrome and avian influenza, are a growing health challenge for the region. Outbreaks of such diseases have adverse economic, health and social impacts, particularly for countries with weak human and animal health systems.

The Australian Government's Health for Development Strategy 2015–2020, released in June 2015, has two strategic outcomes: building country-level systems and services that are responsive to people's health needs, and strengthening regional preparedness and capacity to respond to emerging health threats. The strategy acknowledges the need to strengthen links between the human and animal health systems to prevent, promptly detect, and respond to emerging diseases that can pass from animals to people.

Australia will use a range of mechanisms to achieve these two strategic outcomes, including political advocacy through DFAT's diplomatic, trade and aid agendas; and DFAT investments in overseas development assistance. The work of the Asia Pacific Leaders Malaria Alliance, co-chaired by the prime ministers of Vietnam and Australia, illustrates the contribution of health diplomacy to regional collaboration on malaria elimination. This has resulted in leaders at the 9th East Asia Summit in November 2014 endorsing the goal of an Asia–Pacific region free from malaria by 2030, and the development of an elimination road map for the 10th East Asia Summit.

Australia contributed more than $37 million to the international response to Ebola (another animal-derived disease), including $2.3 million for Ebola preparedness in PNG and the Pacific. Australia has also made a number of regional and bilateral aid investments that are helping to strengthen human and animal health systems in the Asia–Pacific region, and is in the process of developing strategic guidance for future investments in this area.

9.3.1 Stop Transboundary Animal Diseases and Zoonoses

The Australian-funded Stop Transboundary Animal Diseases and Zoonoses (STANDZ) initiative in Southeast Asia was launched in September 2011 and is being implemented by the OIE. Its goal is to reduce the impact of emerging infectious diseases (EIDs), transboundary animal diseases and zoonoses on food security, human health and livelihoods. STANDZ supports regional and in-country foot-and-mouth disease (FMD) control efforts, guided by the revised South-East Asia and China Foot and Mouth Disease 2020 Roadmap;

Image credit: Department of Agriculture and Water Resources

rabies prevention and control efforts through One Health program approaches; strengthening of national veterinary services; and subregional program management and OIE representation.

In 2015, STANDZ funded the following in-country activities to control FMD and rabies:

- FMD vaccination projects in high-risk districts in northern Laos and central Myanmar
- implementation of the Philippines National Rabies Control and Prevention Strategy, including dog vaccination and public awareness campaigns.

The Department of Agriculture and Water Resources continues to provide technical and governance support to DFAT for the STANDZ initiative. DFAT has agreed to an application from the OIE for a no-cost extension of the program until December 2017.

9.3.2 PREVENT Community-based Emerging Infectious Disease Risk Reduction in the Mekong

The Australian Government partnered with the United States Agency for International Development (USAID) to deliver the PREVENT Community-based Emerging Infectious Disease Risk Reduction in the Mekong project (2012–15). PREVENT's operational research focuses on generating new knowledge on transmission of EIDs from wildlife. It also examines the context-specific (e.g. socioeconomic, political, cultural) factors motivating the behaviours of people and organisations that expose them to higher risk of EID infection. Australian support is earmarked to community-based programming in priority countries, including Cambodia, Laos, Myanmar and Vietnam.

Research that identified the groups most vulnerable to EID exposure and the behaviours that put them at risk is being used to develop and implement interventions to reduce risky practices. For example, research on the human–animal interface has yielded rich data on rates of exposure to different animals among Lao and Hmong populations in Laos. These data will inform rapid appraisals of approaches to reducing exposure to bats and rodents, which will in turn inform specific behaviour change and risk reduction interventions. In Vietnam and Cambodia, research on market practices, and biosecurity assessments of wildlife farms and the meat trade have provided a better understanding of the human–animal interface. Building on this, risk reduction training has been provided to local, industry and government stakeholders.

Australia's funding for PREVENT has also supported immediate responses to EID outbreaks. In 2013, the governments of Cambodia, Laos and Vietnam sought PREVENT's support in responding to avian influenza. In Myanmar, initial field visits and stakeholder meetings resulted in a detailed program of action to target risk communication and community-level capacity building relating to avian influenza from 2014. In early 2014, in response to a human case of H7N9 avian influenza in Guangxi province, China, PREVENT worked with the FAO to rapidly produce a risk reduction communication package for use in poultry markets along the Chinese border in Laos, Myanmar and Vietnam.

The PREVENT activity concluded in July 2015. DFAT is exploring options to reallocate remaining funds to other USAID community-based EID activities in the Greater Mekong subregion.

9.3.3 Australia Indonesia Partnership for Emerging Infectious Diseases: Animal Health Program

The objective of the Australia Indonesia Partnership for Emerging Infectious Diseases (AIP-EID) Animal Health Program is to strengthen Indonesian Government veterinary services to prevent and control EIDs. Guided by the principles of partnership and sustainability, the AIP-EID program is delivering outcomes of mutual benefit to Australia, Indonesia and the region. These outcomes support animal health and biosecurity, public health, food security and economic development. The program is implemented by the Australian Government Department of Agriculture and Water Resources in partnership with the Indonesian Ministry of Agriculture.

Phase I of the program, which ended on 30 June 2015, made significant achievements and generated a strong bilateral relationship. As a result of the success of the program, DFAT has agreed to fund a successor program: AIP-EID Phase II ($6.9 million over three financial years – 2015–18).

Achievements of the AIP-EID program in 2015 included:

- improved policies for emergency disease preparedness and response

- greater coordination across government agencies and technical capacity to deliver disease control programs at the subnational level
- development and establishment of an integrated national animal health information system (iSIKHNAS)
- stronger roles, capacity of the laboratory network and technical skills to diagnose important diseases such as rabies, brucellosis, anthrax and avian influenza
- implementation of the Indonesia Veterinary Leadership initiative to strengthen leadership and management within the Ministry of Agriculture
- development of guidelines for rapid risk assessment
- finalisation of technical training courses in epidemiology, surveillance, geographic information systems, data analysis, disease investigation and budget advocacy
- training in planning and budgeting to support the delivery of local (district) veterinary services.

Activities funded from phase II will build on the activities of phase I but will be more targeted; they will cover:

- strengthened emergency management
- an improved iSIKHNAS, and the effective use of information to support surveillance, veterinary service delivery, policy development and advocacy
- strengthened leadership and management by Indonesia's Veterinary Service.

9.3.4 Government Partnerships for Development Program

The DFAT-funded Government Partnerships for Development Program funds the Timor-Leste Village Poultry Health and Biosecurity Program. This program, which began in March 2014 and will run until January 2017, is a joint program between the Australian Government Department of Agriculture and Water Resources and the Timor-Leste MAF, working with experts from the University of Sydney and the Northern Territory Government's Berrimah Veterinary Laboratory. It aims to improve food availability by controlling diseases through improved vaccination for Newcastle disease and poultry management techniques in three pilot villages, and to strengthen biosecurity arrangements in Timor-Leste using poultry disease risks as a focus.

Achievements to date include:

- delivering four Newcastle disease vaccination campaigns in each pilot village
- cold-chain training to develop standards and an understanding of the importance of a sustainable cold chain in maintaining vaccine effectiveness
- laboratory training to improve the skills of staff to undertake Newcastle disease tests
- a review of Timor-Leste's biosecurity system, which has led to development of a training program for MAF's National Directorate for Quarantine and Biosecurity.

9.4 INTERNATIONAL ANIMAL HEALTH RESEARCH

Australia funds international animal health research through several agencies, including ACIAR and DFAT. Since 1982, ACIAR has supported research on animal health and production of smallholder livestock, and created partnerships in many countries in Asia, the Pacific region and Africa. Research projects, typically of 3–5 years duration, are funded to meet the priorities of partner countries and Australia. ACIAR's animal health projects are linked with other research and development programs, including those of other Australian organisations (e.g. DFAT, the Department of Agriculture and Water Resources) and international organisations (e.g. the FAO, the OIE, the International Livestock Research Institute).

ACIAR's animal health program supports research organisations in Australia and partner countries to use multidisciplinary approaches to solve problems in smallholder animal health and production. The program focuses on Indonesia, the Mekong region, the Philippines, PNG and southern Africa. Progress and final reports of projects are published on the ACIAR website[128] and via other media.

9.4.1 Indonesia and Timor-Leste

Research is being undertaken to support strategies to manage animal diseases in Indonesia and Timor-Leste, including:

- two new large projects – in rain-fed agricultural farming systems and plantation farming systems, respectively – to improve the health and production of smallholder beef

128 www.aciar.gov.au

cattle, and the marketing of beef

- a new project on smallholder pig health and production in eastern Indonesia and Timor-Leste, including a focus on the control of classical swine fever
- a project in Timor-Leste on the health and production of beef cattle, with a focus on improving the productivity of smallholder cattle producers.

9.4.2 Mekong region

Major livestock diseases such as FMD can severely reduce household income, and prevent smallholders in the Mekong region from participating in emerging local and regional markets for beef and other animal products. Research includes:

- a project on village-based biosecurity in Cambodia
- a project on risk management of transboundary animal diseases in Laos
- a project on development of a biosecure market-driven beef production system in Laos
- a project on pig health and production in Laos, and market opportunities for trade into Vietnam and China, which includes a focus on the control of a tapeworm (*Taenia solium*) that spreads through pigmeat and can cause serious neurological disease in people
- a project in Myanmar that aims to improve the health and production of smallholder livestock and poultry in the Central Dry Zone
- a project, implemented through the OIE, that will examine livestock movement and the control of transboundary animal diseases in countries covered by the South-East Asia and China Foot and Mouth Disease Campaign.

9.4.3 Philippines

A project in the Philippines is building on previous work on respiratory diseases of pigs. It aims to improve the production and competitiveness of smallholder pig production systems through better health and biosecurity.

9.4.4 Papua New Guinea and Pacific island countries

A new project in PNG will explore ways to strengthen animal health services to improve the health and production of livestock, as a means of improving the livelihood of smallholder livestock producers and their communities.

In Vanuatu, a project is examining the health and production of smallholder beef cattle, and mechanisms to improve the marketing of beef.

9.4.5 Eastern and southern Africa

In Botswana, a new project implemented through the International Livestock Research Institute builds on previous work on smallholder cattle, and will focus on improving the health, production and marketing of small ruminants.

In Tanzania and Zambia, a project aims to demonstrate that improving poultry health and production by controlling Newcastle disease, combined with closer integration of village poultry and crop production systems, can lead to improved household nutrition, and better maternal and child health outcomes.

Image credit: Department of Agriculture and Water Resources

Image credit: CSIRO

CHAPTER 10

Research and development

The Commonwealth Scientific and Industrial Research Organisation (CSIRO), the cooperative research centres, Australia's veterinary schools, and industry-based research and development corporations have active research programs in livestock health.

10.1 NATIONAL ANIMAL BIOSECURITY RESEARCH, DEVELOPMENT AND EXTENSION STRATEGY

Biosecurity is the management of risks to the economy, the environment and the community from pests and diseases entering, emerging, establishing or spreading in Australia. Australia's livestock, fisheries and aquaculture sectors remain free from many of the pests and diseases that can affect agriculture, natural environments and people. This favourable biosecurity status enables Australia to produce agricultural goods in a safe, efficient and sustainable manner. However, ongoing investment and collaboration in biosecurity research, development and extension (RD&E) are crucial to ensure that Australia has the capability and resources to prepare for, respond to and recover from disease, pest and weed incursions.

Innovation and RD&E are key drivers to improving productivity and competitiveness in the primary industries sector, and making best use of Australia's natural resources under a changing climate. To address animal biosecurity RD&E needs, the Australian Government engaged Animal Health Australia to develop and coordinate the implementation of the National Animal Biosecurity RD&E Strategy. This strategy serves a dual purpose that meets the requirements of the National Primary Industries RD&E Framework and Schedule 8 of the Intergovernmental Agreement on Biosecurity.

The National Primary Industries RD&E Framework aims to promote a more collaborative national RD&E model. It is designed to facilitate greater coordination among the Australian, state and territory governments; CSIRO; rural research and development (R&D) corporations; industry; and the university sector. This will enable these organisations to better harmonise their roles in RD&E relating to primary industries and work together effectively to maximise net benefits to Australia. The framework strengthens national research capability to better address sector and cross-sector issues (including animal biosecurity), and focuses RD&E resources so they are used in a more effective, efficient and collaborative way, thereby reducing capability gaps, fragmentation and unnecessary duplication.

Published in July 2013, the National Animal Biosecurity RD&E Strategy has been endorsed by all stakeholders – the Australian Government, state and territory governments, nine animal-based R&D corporations, seven universities with veterinary schools and CSIRO – and is supported by Animal Health Australia's industry members. The strategy establishes the future direction for improving the focus, efficiency and effectiveness of RD&E in supporting biosecurity in Australia's animal industries, wildlife and recreational sectors over the next five years.

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10.2 CSIRO AUSTRALIAN ANIMAL HEALTH LABORATORY, AND CSIRO HEALTH AND BIOSECURITY

With increasing global trade and connections, Australia is facing a greater challenge in protecting itself against biosecurity threats. Diseases, pests, invasive animals and plants can inflict damage on Australia's livestock, crops, farm profits, unique environment and human health. CSIRO assembles strong multidisciplinary research teams – spanning animal, plant and environmental sciences – that focus on tackling major national and international biosecurity challenges that confront Australia's agricultural sustainability, and environmental and human health. The overall aim is a biosecurity system that is pre-emptive, responsive, resilient, and based on cutting-edge surveillance, informatics and new technologies for integrated responses.

Australia's high-containment facility – the CSIRO Australian Animal Health Laboratory (CSIRO-AAHL) – is designed to allow scientific research into the most dangerous infectious agents in the world. As a national facility, CSIRO-AAHL's

responsibilities to industry and government stakeholders include:

- research – to understand and help manage new and emerging infectious diseases that affect both animals and people
- policy advice and training – to state and territory, national and international biosecurity and health agencies on disease management and mitigation strategies
- diagnosis, surveillance and response – to identify, monitor and respond to outbreaks of disease.

CSIRO-AAHL scientists have well-established collaborative networks with many international research organisations.

In recent years, CSIRO-AAHL has become a world-leading One Health laboratory through its substantial work on zoonotic agents (disease agents that can pass from animals to humans). It works extensively on avian influenza, and its scientists were instrumental in identifying and characterising Hendra and Nipah viruses; they also helped identify that the virus responsible for severe acute respiratory syndrome (SARS) originated in bats.

CSIRO scientists have expertise in working with, and understanding, foot-and-mouth disease (FMD). Since research with live FMD virus is not permitted in Australia, this work is done with collaborators in other countries, including Argentina, Canada, the Netherlands, Thailand, the United Kingdom, the United States and Vietnam. The FMD risk management project focuses largely on testing vaccines in the Australian vaccine bank against FMD viruses currently circulating in Southeast Asia.[129] Studies in cattle, sheep and pigs have investigated whether the vaccines protect animals against FMD, and how the virus behaves in the different animal models. For example, this work has determined the disease-causing potential of the viruses tested and the extent to which virus can be shared via saliva, nasal fluid and faeces from infected animals.

This information will improve Australia's ability to respond to an FMD outbreak and minimise disruptions due to quarantine and trade restrictions. Continuing to test the available vaccines will help to ensure that the current vaccine bank provides protection against newly emerging strains of this evolving virus.

CSIRO-AAHL receives funding from CSIRO, the Australian Government Department of Agriculture and Water Resources, and external funding bodies.

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10.3 CENTRE OF EXCELLENCE FOR BIOSECURITY RISK ANALYSIS

The Centre of Excellence for Biosecurity Risk Analysis (CEBRA) was established on 1 July 2013 through an agreement between the University of Melbourne, the Australian Government Department of Agriculture and Water Resources, and the New Zealand Ministry for Primary Industries.

Biosecurity is a critical issue for Australia. Australia's expansive borders and proximity to Asia mean that effective biosecurity policies and management tools are essential to protect the health of the population and our unique ecosystems, as well as the viability of essential sectors of the Australian economy.

CEBRA is a key initiative in the Australian Government's response to biosecurity risks. Its primary goal is to deliver practical solutions and advice for assessing and managing such risks. This will ensure that policy interventions and tools are underpinned by world-class research and understanding of issues, risks and response mechanisms. By providing collaborative, relevant and practical research outcomes, CEBRA plays a vital role in ensuring that governments remain at the forefront of practical risk assessment. CEBRA will also play a crucial role in improving communication between government, business and the community about biosecurity. It works closely with the Department of Agriculture and Water Resources, and the New Zealand Ministry for Primary Industries to develop priorities that serve the practical needs of regulators and government scientists.

129 Funding was provided partly by the livestock industries in Australia, through Animal Health Australia. The relevant industry bodies include the Cattle Council of Australia, Australian Dairy Farmers, the Australian Lot Feeders' Association, WoolProducers Australia, the Sheepmeat Council of Australia, Australian Pork Limited and the Goat Industry Council of Australia. The Animal Health Australia funds are matched through the Meat & Livestock Australia Donor Company by the Australian Government under MLA project P.PSH 0652.

CEBRA develops tools, methods, guidelines and protocols to deliver the following key outcomes:

- fewer pests and diseases entering Australia
- reduced costs of risk intervention and treatment, and improved export prospects for Australian agriculture
- effective quarantine and intervention, and more reliable procedures that are better understood
- sound strategic decisions by the Department of Agriculture and Water Resources to invest in ways that anticipate emerging threats
- improved environmental quality and economic advantage
- provision of well-trained professional scientists with direct experience in solving biosecurity problems
- training for the next generation of risk analysis and biosecurity practitioners.

Website: http://cebra.unimelb.edu.au

10.4 COOPERATIVE RESEARCH CENTRES

10.4.1 Cooperative Research Centre for High Integrity Australian Pork

The Cooperative Research Centre (CRC) for High Integrity Australian Pork (Pork CRC) invests in improving animal health and reducing antibiotic use through Program 2 (Animal Health Management) of its research portfolio. Program 2 has three subprograms:

- SP-1 – Diagnostic and health monitoring systems to control disease. Research effort is concentrated on real-time diagnostics, monitoring pathogen challenge loads in the environment and the pig, and establishing the antibiotic sensitivity and resistance patterns of respiratory and enteric pathogens affecting the Australian pork industry.
- SP-2 – New pig genotypes and genetic technologies to enhance immune competence, and disease resilience and robustness in Australian pig genetics. The program is based on existing and unique overseas lines, genomic and phenotypic relationships, and statistical methods for incorporating environmental and pathogen challenge data in current breeding programs.
- SP-3 – Integrated alternative health strategies and technologies to reduce the reliance on antibiotics.

Pork CRC research projects funded between 2011 and 2015 are detailed on the Pork CRC website.

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10.4.2 Poultry Cooperative Research Centre

The key challenge for the Poultry CRC is to achieve sustainable, ethical poultry production using fewer resources with reduced environmental impacts. In late 2009, the Poultry CRC secured an extension of funding from the Australian Government, including a $27 million cash grant, giving it resources totalling nearly $87 million to mid-2017.

The Poultry CRC, a joint venture between seven essential participants, has its headquarters at the University of New England in Armidale, New South Wales. The CRC has an extensive collaborative network of researchers, educators and support staff from more than 40 participating organisations.

Three programs, with integrated research, development and education components, address the major challenge of meeting increasing demand for 'clean and green' poultry products, while maintaining food security in the face of climate change and a growing population:

- Program 1 (Health & Welfare) uses frontier science to deliver poultry health products and evidence-based welfare methods to industry.
- Program 2 (Nutrition & Environment) undertakes research to link the fundamental aspects of feeding to environmental outcomes.
- Program 3 (Safe & Quality Food Production) aims to control foodborne illness associated with poultry products.

An Education Program has also supplied financial support to 50 postgraduate students and 18 honours students, as well as developing educational resources for the school and vocational education and training sectors. As part of this program, a digital animation[130] was created to show the development of a chick embryo inside an egg. This freely

130 www.poultryhub.org/embryo-2

accessible animation has been viewed more than a million times by a global audience, and used in many educational and commercial settings.

As the end date for the CRC draws nearer, attention is being directed to the formation of a transition body, Poultry Hub Australia, which will be hosted at the University of New England. The new organisation will ensure that the effective collaborative network and other legacies of the Poultry CRC can continue to benefit the poultry industry, which is the largest contributor of quality animal protein to Australia's food basket.

Information about the CRC's progress is available from the Poultry CRC and Poultry Hub websites, and by subscribing to the *eChook* newsletter.

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Websites: www.poultrycrc.com.au, www.poultryhub.org

10.5 UNIVERSITY RESEARCH PROGRAMS

10.5.1 Charles Sturt University

Charles Sturt University has an ongoing commitment to rural Australia and its livestock industries, as well as an international focus. The School of Animal & Veterinary Sciences has Australian partners and collaborators through research centres such as the Graham Centre for Agricultural Innovation; and international partners in countries including China, Fiji, India, Indonesia, Pakistan and Papua New Guinea. These links allow the school to offer a breadth of exciting PhD training opportunities to Australian and international students.

Academic staff at the School of Animal & Veterinary Sciences have research interests in animal health across a range of species and disciplines. Research focuses on five research clusters: epidemiology, public health and biosecurity; animal health and disease diagnosis; farming systems; translational and clinical sciences; and learning and education. The school offers research training, with an emphasis on sustainable livestock production systems, equine medicine and surgery, and wildlife medicine. It has developed novel approaches to curriculum delivery to ensure that graduates benefit from leading-edge pedagogy, and uses research to inform further development of its educational programs.

Charles Sturt University has recently developed the National Life Sciences Hub on its Wagga Wagga campus. The hub provides world-class research laboratory facilities, and a site for interaction and collaboration between researchers from the various schools on the campus and other research organisations.

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10.5.2 University of Adelaide

The School of Animal and Veterinary Sciences at the University of Adelaide began enrolling veterinary students in early 2008 and graduated its first veterinary cohort in late 2013. The school provides an outstanding environment for research, with high-quality infrastructure, and access to industry and research facilities. Staff members are internationally recognised for their contributions to scientific and veterinary research.

The school is involved in several CRCs and has well-established links with partner organisations that add considerably to the available research opportunities. Partner organisations include the South Australian Research and Development Institute, Primary Industries and Regions South Australia, the Pig and Poultry Production Institute, and Martindale Holdings. In addition, the school is continuing to build partnerships with Zoos South Australia, TAFE South Australia, and the Institute of Medical and Veterinary Science.

In 2015, the research interests of the school were embedded in five broad research themes to recognise and highlight the school's research strengths:

- infectious diseases and public health
- animal health and welfare
- veterinary and animal science education
- anatomy, physiology and nutrition
- reproduction and genetics.

Research interests include:

- animal anatomy and structural biology
- animal genetics

- animal models of human disease
- animal nutrition and physiology
- animal reproductive biology
- animal welfare, behaviour and ethics
- equine science
- pathobiology
- production animal health
- veterinary population and public health
- veterinary science and surgery
- wildlife ecology, health and disease.

The research profile of the school continues to expand. In 2014, a new leader in Equine Science and Medicine was appointed. In 2015, Professor Wayne Hein was appointed as the new Head of School and inaugural Dean of the Roseworthy Campus of the University of Adelaide.

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Website: http://sciences.adelaide.edu.au/research/vet

10.5.3 University of Melbourne

The Faculty of Veterinary and Agricultural Sciences at the University of Melbourne has research strengths in the diagnosis, prevention and control of infectious disease; morphology and cell biology; animal biotechnology; animal production systems and reproduction; and clinical studies. The faculty has a particular interest in:

- developing new vaccines, approaches to control and diagnostic methods for infectious diseases
- understanding the genomics and genetics of viruses, prokaryotes, protists and parasitic worms
- understanding the roles of the extracellular matrix in bone and joint pathology, and the role of protease-activated receptors in musculoskeletal development and inflammatory disease
- developing new approaches to vaccination and assessing novel adjuvants
- developing animal models of asthma
- improving sheep farm profitability and reducing production risk
- assessing and improving production animal welfare
- understanding the epidemiology of mastitis in sheep and cattle
- pharmacology of vasoactive agents and pathophysiology of laminitis
- wildlife disease surveillance.

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10.5.4 University of New England

ParaBoss

In February 2014, the licence to manage ParaBoss was competitively awarded by the CRC for Sheep Industry Innovation (Sheep CRC) to the University of New England.

ParaBoss is the national organisation that leads the development and extension of best-practice information, training and tools to improve parasite management of sheep. ParaBoss manages the websites WormBoss, FlyBoss and LiceBoss. These websites continue to experience rapid growth; they now attract 10 500 unique visitors each month, who collectively view 30 000 pages. Boss websites provide an active problem-solving approach, and support users to solve parasite problems and establish ongoing programs. They also provide demand-driven information through new online learning programs. Decision support tools and decision guides with flow-through to product information form the basis of the problem-solving approach.

The ParaBoss online Technical Forum has 150 members and is open to professionals involved in sheep parasite research, extension, advisory or consulting work. The forum is used to debate important and contentious issues, with the aim of improving practices and identifying R&D priorities.

ParaBoss is supported by a Technical Committee, which provides specialist expertise in the control of worms, flies and lice across all sheep-producing regions, and close connections with industry. The Technical Committee has members that represent the state departments of agriculture, universities, the private advisory sector, the pharmaceutical sector and industry R&D corporations.

ParaBoss was developed as a Sheep CRC project, and is hosted by the University of New England, with support from Australian Wool Innovation and Meat & Livestock Australia.

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10.5.5 University of Sydney

Research interests of the Faculty of Veterinary Science, University of Sydney, span animal health, livestock production science and wildlife research. The faculty has strong links with rural R&D corporations. Its researchers are supported by a range of funding sources, including the Australian Research Council, the National Health and Medical Research Council, and CRCs. Food production and food security research connects the faculty to an international program supported by Australian and international aid and development agencies. Similarly, research in veterinary public health and biosecurity provides a link to collaborative programs in Southeast Asia and Africa. The faculty is an international leader in research relating to companion animal health, welfare and behaviour, and comparative oncology.

The faculty's research strengths are concentrated in the following areas:

- animal health
  - animal behaviour and welfare
  - comparative oncology
  - farm animal and veterinary public health
  - equine research
  - inherited disorders
  - livestock services and research
  - microbiology
  - molecular and diagnostic parasitology
  - pathobiology
  - photobiology
  - small animal clinical research
  - animal production
  - animal reproduction
  - Dairy Research Foundation
  - genetics and genomics
  - Poultry Research Foundation
- wildlife conservation
  - Australasian wildlife genomics
  - educational research and practice management
  - koala disease research
  - wildlife and animal genetics
  - wildlife health and conservation.

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10.6 RESEARCH AND DEVELOPMENT CORPORATIONS

The R&D corporations listed in this section invest in research by various service providers – CSIRO, universities, commercial research organisations, government departments and CRCs – but do not undertake research themselves.

10.6.1 Australian Egg Corporation Limited

The Australian Egg Corporation Limited (AECL) is a public, unlisted company limited by guarantee and established under the *Egg Industry Service Provision Act 2002*. AECL integrates on-farm, through-chain and market service provision for the benefit of all stakeholders. AECL is mainly funded through statutory promotional and R&D levies, received from all egg farmers and collected under the *Primary Industries (Excise) Levies Act 1999*, and through Australian Government funds for R&D activities in agreed program areas, including animal health.

The egg industry has experienced incursions of emergency animal diseases, with devastating consequences for egg producers through a loss in egg production and a decline in consumer confidence. Minimising disease outbreaks and managing adverse public opinion are essential to the ongoing sustainability of Australia's egg industry. This includes ensuring effective levels of on-farm biosecurity, developing industry's understanding of disease characteristics and developing vaccines that are readily available.

AECL invests directly with research institutions in projects and activities that affect the health of the laying flock, including:

- ensuring effective levels of on-farm quarantine and biosecurity
- preventing and mitigating outbreaks of diseases such as Newcastle disease, infectious bursal disease, egg drop syndrome and avian influenza
- ensuring the availability of effective vaccines and medicines
- managing and enhancing rapid diagnosis of hen health problems
- ensuring that disease research, which acts as an industry 'insurance policy', is conducted
- engaging an Animal Health Technical Working Group to provide industry with expertise, through feedback and advice, on animal health and maintenance of biosecurity.

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10.6.2 Australian Wool Innovation Limited

The mission of Australian Wool Innovation Limited is to invest in R&D, and marketing and promotion to:

- increase the profitability, international competitiveness and sustainability of the Australian wool industry
- increase demand and market access for Australian wool.

The 2015 calendar year was covered by the operational plan for 2014–15. On-farm R&D focused on:

- sheep health, welfare and productivity (Strategy 1)
  - parasites and disease (consolidation of extension tools, support for regional grower groups focused on parasite control, research into new disease control technologies, and participation in the National Animal Biosecurity RD&E Strategy)
  - wild dog predation (investments in local and regional wild dog control efforts, and predation research)
  - invasive husbandry (reducing adverse impacts and developing alternatives)
  - genetics and genomics (e.g. across-flock benchmarking, new traits)
  - reproduction (support for grower training in all sheep production states)
- wool harvesting and quality preparation (Strategy 2)
  - support for in-shed training of shearers and wool handlers
  - promotion of excellence in the shearing industry
  - support for trainer development and national consistency
- production systems and eco-credentials
  - resource base (especially nitrogen and phosphorus use, and perennialisation)
  - carbon (policy monitoring, and involvement in the Climate Change Research Strategy for Primary Industries)
- education and extension
  - improving grower skills capacity (including support for grower extension networks)
  - stakeholder engagement and education (including leadership development and conduct of forums).

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10.6.3 Fisheries Research and Development Corporation – Aquatic Animal Health Subprogram

The Fisheries Research and Development Corporation (FRDC) invests in areas of R&D that aim to benefit all sectors of Australian fisheries: the commercial sector (wild catch, aquaculture and post-harvest), the recreational sector and the Indigenous sector. The FRDC's Aquatic Animal Health Subprogram was established specifically to develop, support and manage a portfolio of aquatic animal health research projects, in consultation with the fisheries and aquaculture industry. The focus of the subprogram is infectious (viral, bacterial, fungal and parasitic) diseases of finfish, crustaceans and molluscs.

Australian aquaculture continues to grow and currently contributes 43% ($1.03 billion) of Australian fisheries' gross value of production ($2.41 billion). Although aquaculture is an important industry sector, R&D for aquatic animal health is required for all aquatic animal sectors, including the wild-catch, recreational and ornamental sectors, as well as

non-commercial finfish, mollusc and crustacean (wildlife) stocks. The requirement for expert health services and advice, and therefore R&D activities, continues to increase. These are essential for the profitability, productivity and sustainability of Australia's aquatic animal industries, and to protect Australia's natural resources.

The Aquatic Animal Health Subprogram R&D Plan specifies six key research areas:

- nature of disease and host–pathogen interaction
- aquatic animal health management
- diagnostics for endemic and exotic aquatic animal diseases
- surveillance and monitoring
- aquatic animal disease therapy and prophylaxis
- training and capacity building.

More information can be found on the subprogram website. The Aquatic Animal Health Subprogram R&D Plan can be obtained by contacting the subprogram leader.

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Email: mark.crane@csiro.au
Website: http://frdc.com.au/research/aquatic_animal_health/Pages/default.aspx

10.6.4 Meat & Livestock Australia

Meat & Livestock Australia (MLA) invests in animal health research – including endemic, emerging and exotic diseases – to improve the profitability and sustainability of the beef cattle, sheep and goat industries in Australia. It also invests in research with a welfare focus, particularly aversive husbandry practices and on-farm mortality.

MLA invests in research into:

- Johne's disease – diagnostics, prevention, epidemiology and economics
- respiratory disease in feedlot cattle
- bovine ephemeral fever
- toxic plants
- nutritional and trace mineral deficiencies
- internal and external parasites in cattle, goats and sheep – prophylaxis, management, diagnosis and epidemiology
- vector-borne diseases such as *Theileria orientalis* – diagnosis, epidemiology and treatment
- control of scouring in sheep and young calves
- reproductive diseases of cattle
- sheep footrot – diagnosis and vaccination
- replacement of aversive husbandry practices, refinement of practices, best practice and pain relief
- reducing mortality through improved predator control, and improved lamb and calf survival.

MLA also invests in research that will improve disease surveillance, to demonstrate freedom from disease and improve biosecurity. This includes better tools for screw-worm fly diagnosis and incursion control, bluetongue diagnosis and assessment of vector distribution, response to FMD, and capripox diagnosis.

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10.6.5 Rural Industries Research and Development Corporation

The Rural Industries Research and Development Corporation (RIRDC) works with industry and government to increase knowledge that fosters sustainable, productive and profitable new and existing rural industries, and furthers understanding of national rural issues.

Most projects relating to animal health fall within the following RIRDC programs of RD&E: Chicken meat; Honey bee and pollination; Horse (including Hendra); and Animal industries – new, developing and maturing.

In 2015, a substantial number of reports from completed projects relating to animal health were published. These can be accessed on the RIRDC website, together with details of projects in progress.

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Image credit: AHA

APPENDIXES

APPENDIX A LIVESTOCK INDUSTRIES IN AUSTRALIA[131]

Australia is a major producer and exporter of livestock and livestock products. Animal production in Australia is based largely on extensive grazing, and is dominated by the beef, dairy, wool and sheepmeat industries. Australia also has intensive pig and poultry industries.

Changes in livestock numbers since 2011–12 are shown in Table A1. Values for previous years may differ from those shown in previous publications as a result of revisions by the Australian Bureau of Statistics.

Table A1 Australian livestock numbers (millions)

Livestock species	2011–12	2012–13	2013–14	2014–15
Sheep	74.7	75.5	72.6	69.9
Cattle				
Beef	25.7	26.5	26.3	24.3
Dairy	2.7	2.8	2.8	2.9
Total	*28.4*	*29.3*	*29.1*	*27.2*
Pigs	2.3	2.3	2.1	2.2
Poultry[a]				
Laying hens	13.4	14.6	15.3	na
Meat chickens	80.8	84.0	na	na
Total	*94.2*	*98.6*	*na*	*na*

na = not available

a Meat chickens and laying hens only

Sources: Australian Bureau of Agricultural and Resource Economics and Sciences (2016). *Agricultural commodities: March quarter 2016*, ABARES, Canberra, www.agriculture.gov.au/abares/publications/display?url=http://143.188.17.20/anrdl/DAFFService/display.php?fid=pb_agcomd9abcc20160301_cQe9T.xml.

Australian Bureau of Statistics (2015). *Agricultural commodities, Australia, 2013–14*, cat. no. 7121.0, ABS, Canberra, www.abs.gov.au/AUSSTATS/abs@.nsf/ProductsbyCatalogue/97B95C93A7FD9B75CA2573FE00162CAF?OpenDocument (for poultry data only).

131 All figures provided in the tables in this appendix are based on Australian financial years, which run from 1 July to 30 June.

Livestock industries are located across most agricultural and pastoral areas of Australia.

In 2014–15, the gross value of Australian livestock and livestock products is estimated to have been $26.7 billion. Exports of livestock and livestock products were worth $21.9 billion.

Meat, wool and eggs

Australia has a highly developed meat industry. In 2014–15, the gross value of Australian livestock slaughtering is estimated to have been $16.7 billion.

In 2014–15, Australian exports of beef, veal, sheepmeat, poultry and pork (not including live animals) were worth $11.5 billion. Selected export statistics are shown in Table A2. Australia is the world's second largest exporter of beef, veal and sheepmeat.

Table A2 Volume of Australian meat exports (kilotonnes of shipped weight)

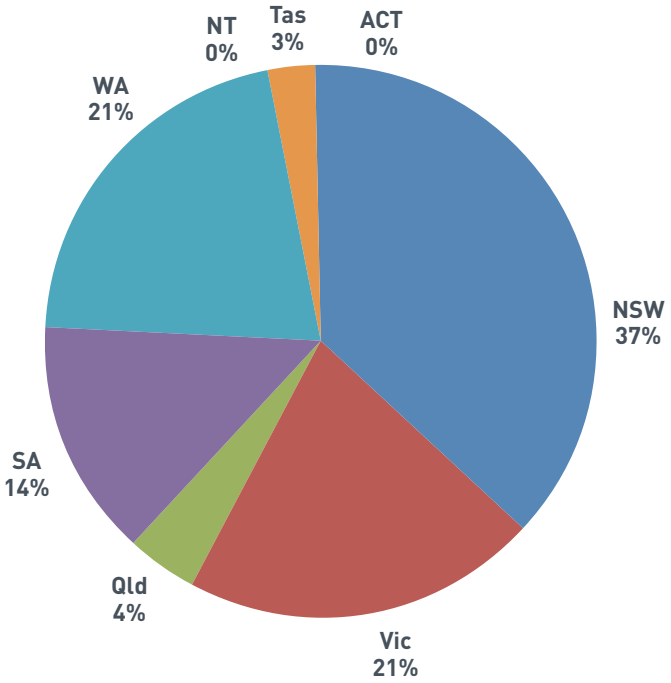
Type of meat	2011–12	2012–13	2013–14	2014–15
Beef and veal	948	1014	1184	1349
Mutton	89	144	183	169
Lamb	174	201	226	242
Pork	29	26	27	27
Poultry	38	32	37	36

Source: Australian Bureau of Agricultural and Resource Economics and Sciences (2016). *Agricultural commodities: March quarter 2016*, ABARES, Canberra, www.agriculture.gov.au/abares/publications/display?url=http://143.188.17.20/anrdl/DAFFService/display.php?fid=pb_agcomd9abcc20160301_cQe9T.xml.

Australia also produces and exports smaller quantities of meat from goats, kangaroos, emus, ostriches, deer, wild boars, possums, crocodiles and camels. It exports substantial quantities of animal products, such as wool, hides, skins, rendered meals and animal food.

Sheepmeat and wool

Sheep are used to produce meat and wool over a wide range of environments in Australia, from the arid and semi-arid inland to the higher-rainfall areas of south-eastern Australia (Figure A1). Most Australian sheep are produced as part of mixed-farming enterprises, frequently along with cropping and beef production.



ACT = Australian Capital Territory; NSW = New South Wales; NT = Northern Territory; Qld = Queensland; SA = South Australia; Tas = Tasmania; Vic = Victoria; WA = Western Australia

Source: Australian Bureau of Statistics (2015). *Agricultural commodities, Australia, 2013–14*, cat. no. 7121.0, ABS, Canberra, www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/7121.02013-14?OpenDocument.

Figure A1 Sheep distribution by state and territory, 30 June 2014

In 2014–15, sheep numbers are estimated to have declined by 4% from the previous year to 70 million. This is the second consecutive year of decline in the sheep flock. High saleyard prices and unfavourable seasonal conditions in some regions provided strong incentives for producers to maintain a high turn-off rate, particularly for lambs.

Over the past decade, the emphasis on wool production has decreased. A long-term decline in the demand for raw wool, coupled with growing demand for Australian lamb exports by the United States, Europe, the Middle East and Asia, has led to a greater emphasis on prime lamb production. Flock numbers steadily declined as significant numbers of wethers (non-breeding adult sheep), previously used in wool production, were turned off. Farming of specialty meat breeds, such as Dorper and Damara (which do not produce any harvestable wool), is a small but growing sector.

Total wool production is estimated to have risen by 2% in 2014–15 to 427 000 tonnes. Average wool cut per head is estimated to have increased by 3% to 4.5 kilograms per sheep. Total wool exports increased by 7% to 458 600 tonnes in greasy equivalent, while the value of wool exports increased by almost 10% to $3.2 billion. Selected production and export figures for the wool and sheepmeat industries are shown in Table A3.

Table A3 Australian sheep industry production

Sheep production	2012–13	2013–14	2014–15
Sheep numbers (millions)	75.5	72.6	69.9
Sheep slaughterings (millions)	8.2	10.1	9.0
Lamb slaughterings (millions)	21.1	21.9	22.9
Total wool production (kilotonnes)	426.6	419.5	427.2
Mutton production (kilotonnes carcase weight)	183.2	227.9	214.4
Lamb production (kilotonnes carcase weight)	457.0	474.3	506.6
Sheepmeat exports (kilotonnes shipped weight)	344.7	409.5	411.1
Value of sheepmeat exports ($ million)	1565.4	2226.4	2472.7
Live sheep exports (millions)	2.0	2.0	2.2
Value of wool exports ($ million)	2869.0	2877.0	3154.0

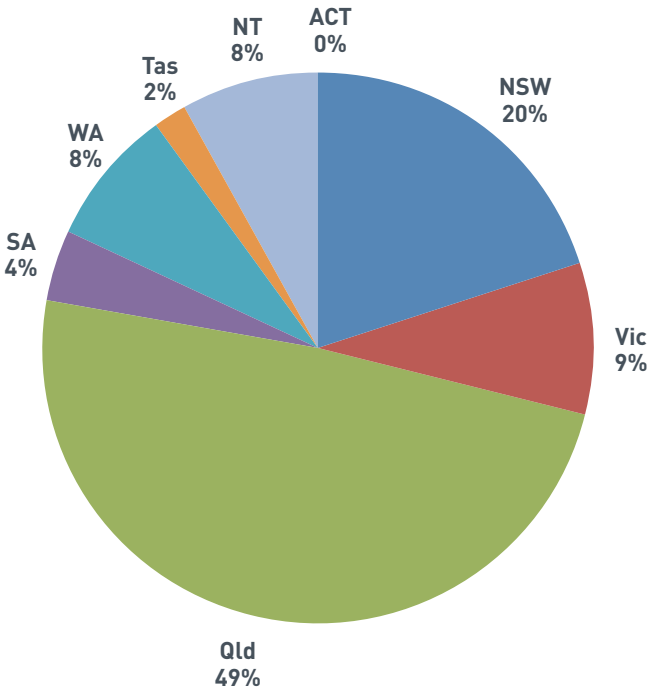
Source: Australian Bureau of Agricultural and Resource Economics and Sciences (2016). *Agricultural commodities: March quarter 2016*, ABARES, Canberra, www.agriculture.gov.au/abares/publications/display?url=http://143.188.17.20/anrdl/DAFFService/display.php?fid=pb_agcomd9abcc20160301_cQe9T.xml.

Beef cattle

Cattle are raised over much of Australia (Figure A2). The main outputs are beef, animals for lot feeding and live cattle for export.

Across northern Australia, cattle are produced on large holdings, where they graze native pastures at low stocking rates. *Bos indicus* breeds dominate because they are better adapted to the tropical conditions in the north.

In southern Australia, cattle are produced on smaller holdings than in the north. Breeds derived from *B. taurus* dominate.



ACT = Australian Capital Territory; NSW = New South Wales; NT = Northern Territory; Qld = Queensland; SA = South Australia; Tas = Tasmania; Vic = Victoria; WA = Western Australia

Source: Australian Bureau of Statistics (2015). *Agricultural commodities, Australia, 2013–14*, cat. no. 7121.0, ABS, Canberra, www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/7121.02013-14?OpenDocument.

Figure A2 Beef cattle distribution by state and territory, 30 June 2014

Improved seasonal conditions in south-eastern and northern Australia between 2010 and 2012 encouraged restocking and reduced cattle turn-off. The improved conditions contributed to an increase in the national herd of approximately 2 million animals in 2010–11, to 25.9 million. However, dry seasonal conditions in 2013–14 and 2014–15, particularly in northern Australia, led to a decline to an estimated 24.3 million animals.

The volume of Australian beef exports increased by 14% in 2014–15 to approximately 1.3 million tonnes. The value of these exports increased by 41% to approximately $8.9 billion. The number of live cattle exported for slaughter increased by 29% in 2014–15 to 1 295 481 animals (Table A4).

Table A4 Australian beef industry production

Beef cattle production	2012–13	2013–14	2014–15
Total beef cattle (millions)	26.5	26.3	24.3
Slaughterings (millions)	8.5	9.5	10.1
Beef and veal production (kilotonnes carcase weight)	2245.0	2464.1	2661.6
Live cattle exports (thousands)[a]	513.1	1005.7	1295.5
Value of live cattle exports ($ million)[a]	338.6	794.5	1163.3
Beef exports (kilotonnes shipped weight)	1013.9	1184.4	1349.0
Value of beef exports ($ million)	4871.0	6264.9	8858.4

a Live exports of feeder and slaughter cattle only; excludes breeder cattle

Source: Australian Bureau of Agricultural and Resource Economics and Sciences (2016). *Agricultural commodities: March quarter 2016*, ABARES, Canberra, www.agriculture.gov.au/abares/publications/display?url=http://143.188.17.20/anrdl/DAFFService/display.php?fid=pb_agcomd9abcc20160301_cQe9T.xml.

Pigs

The number of pigs slaughtered increased by 3% in 2014–15 compared with 2013–14, to 4.9 million (Table A5). Pigmeat production increased by approximately 3% to 371 200 tonnes, while the volume of Australian pigmeat exported increased by approximately 3% to 27 500 tonnes (shipped weight). In 2014–15, exports (in carcase weight equivalent) accounted for approximately 12% of the total volume of Australian pigmeat production.

Table A5 Australian pig industry production

Pig production	2012–13	2013–14	2014–15
Total pigs (millions)[a]	2.1	2.3	2.4
Breeding sows, including gilts (thousands)	260.0	266.2	273.0
Slaughterings (millions)	4.7	4.8	4.9
Pigmeat production (kilotonnes carcase weight)	355.8	359.8	371.2
Pigmeat exports (kilotonnes shipped weight)	26.2	26.8	27.5
Value of pigmeat exports ($ million)	81.2	84.6	102.4
Gross value of production ($ million)	933.7	1081.1	1156.3

a Livestock holdings as at June

Sources: Australian Bureau of Agricultural and Resource Economics and Sciences (2016). *Agricultural commodities: March quarter 2016*, ABARES, Canberra, www.agriculture.gov.au/abares/publications/display?url=http://143.188.17.20/anrdl/DAFFService/display.php?fid=pb_agcomd9abcc20160301_cQe9T.xml.

Australian Bureau of Agricultural and Resource Economics and Sciences (2015). *Agricultural commodity statistics 2015*, ABARES, Canberra, www.agriculture.gov.au/abares/publications/display?url=http://143.188.17.20/anrdl/DAFFService/display.php?fid=pb_agcstd9abcc0022015_11a.xml (for breeding sow data only).

In recent years, the number of farms with pigs has declined. The Australian Bureau of Statistics indicates that, at 30 June 2014, Australia had 1508 pig farms, holding 266 180 sows.[132] This compares with 1625 pig farms in 2007–08 and 263 000 sows. In 2013–14, New South Wales had the largest number of pigs, followed by Victoria and Queensland.

Poultry meat and eggs

Poultry farming in Australia is an intensive industry, producing birds for meat and egg production. Meat chickens comprise approximately 85% of the flock, and layer hens approximately 15%. The chicken meat industry is dominated by two large companies and several medium-sized operators. Most operations are within 50 kilometres of capital cities.

In 2013–14, an estimated 5256 businesses produced more than 320 million dozen eggs for human consumption. Approximately 50% of eggs are produced under intensive production systems, with the balance from free-range, barn-laid and organic systems.

The value of egg production is estimated to have declined by approximately 3% in 2014–15 to $687 million (Table A6).

Table A6 Australian poultry industry production

Poultry production	2012–13	2013–14	2014–15
Meat chickens (millions)[a]	84.0	na	na
Layer hens and pullets for egg production (millions)	14.6	15.3	na
Chicken slaughterings (millions)	563.3	579.9	590.6
Chicken meat production (kilotonnes carcase weight)	1046.2	1084.3	1115.5
Exports of poultry meat (kilotonnes shipped weight)[b]	31.9	36.7	35.7
Value of poultry meat exports ($ million)[b]	42.8	49.7	56.1
Value of egg production ($ million)	653.0	709.6	687.0
Value of meat production ($ million)	2213.8	2344.0	2429.7

na = not available

a Livestock holdings as at June

b Excludes processed poultry meat

Sources: Australian Bureau of Agricultural and Resource Economics and Sciences (2016). *Agricultural commodities: March quarter 2016*, ABARES, Canberra, www.agriculture.gov.au/abares/publications/display?url=http://143.188.17.20/anrdl/DAFFService/display.php?fid=pb_agcomd9abcc20160301_cQe9T.xml.

Australian Bureau of Statistics (2015). *Agricultural commodities, Australia, 2013–14*, cat. no. 7121.0, ABS, Canberra, www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/7121.02013-14?OpenDocument (for meat chicken, layer hen and pullet data only).

Australian Bureau of Statistics (2015). *Livestock products, Australia, September 2015*, cat. no. 7215.0, ABS, Canberra, http://abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/7215.0Sep%202015?OpenDocument (for chicken slaughtering data only).

132 Australian Bureau of Statistics (2015). *Agricultural commodities, Australia*, 2013–14, cat. no. 7121.0, ABS, Canberra, www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/7121.02013-14?OpenDocument.

Goats

Australia is the world's largest exporter of goat meat. In 2014–15, 2.1 million goats were slaughtered, with meat exports of 36 488 tonnes, valued at $258.2 million. The two largest export markets by volume for Australian goat meat in the three years to 2014–15 were the United States and Taiwan, which accounted for 48% and 12% of these exports, respectively. Additionally, 90 950 live goats were exported in 2014–15, with an estimated value of $9.6 million. The largest markets for live goat exports in the three years to 2014–15 were Malaysia and Singapore, which accounted for 84% and 8% of these exports, respectively.

Australia also produces small quantities of goat milk, cashmere and mohair. The total value of these industries, mainly from production of goat milk, was estimated to be approximately $13 million in 2011–12.

Game animals

Australia produces high-quality game meats from animals grazed on native grasslands. Game meat products include venison, kangaroo and buffalo. Milk is also produced from buffalo.

Venison

In 2010–11, the latest year for which data are available, Australia had 1436 deer farms, carrying 45 073 animals. Deer farms are located throughout Australia, but production is concentrated in Queensland, Victoria, New South Wales and Tasmania. The estimated gross value of production of the industry in 2011–12 was $1.66 million, mainly from production of meat and antler velvet. The number of deer processed in 2011–12 was 5784, down from almost 47 000 in 2002–03. The combination of extended drought and lower prices in recent years for both venison and deer velvet have resulted in deer farmers leaving the industry.

Kangaroo

The gross value of production of the kangaroo industry in 2013–14, the latest year for which data are available, was $36 million, down from a peak of $54 million in 2005–06.

Approximately 1.72 million kangaroos were harvested for meat in 2013, yielding approximately 18 000 tonnes of meat for human consumption and pet food. The value of kangaroo meat exports for human consumption was $18.9 million, down from a peak of around $44 million in 2006–07. In the past, more than 70% of kangaroo meat exports were shipped to Russia, but withdrawal of Russia from the market in 2009 reduced this share to zero in 2011–12, and also reduced production and prices. The major export destinations for kangaroo meat in 2014–15 were the European Union (81% of total exports), Papua New Guinea (10%) and the United States (2%).

Camelids

In 2013–14, Australia harvested approximately 12 million camels for meat production. In 2014–15, 122 tonnes of camelid meat was exported, 27% lower than the previous year. The value of camelid exports also declined in 2014–15, falling by 20% to $5.93 million. The major export destination for camelid meat in 2014–15 was Morocco, accounting for 96% of total exports.

Additionally, Australia exported 704 live camelids in 2014–15, valued at $1.1 million. The major destinations for live camelids for the three years to 2014–15 were Israel (69%), New Zealand (22%) and Qatar (6%).

Horses

In 2014–15, Australia exported 1597 tonnes of horse meat, 11% less than the previous year. The value of horse exports also declined in 2014–15, falling by 6% to $6.67 million. The major export destinations for horse meat in 2014–15 were Russia (70% of total exports) and Belgium (16%).

Buffalo

The gross value of production of the buffalo industry in 2011–12, the latest year for which data are available, was approximately $3.2 million, mainly from milk and meat production, and live exports from the Northern Territory. Live (non-breeding) buffalo exports increased to 3699 animals in 2014–15, up from 1684 in 2013–14, with a peak of 6564 in 2006–07. The main markets in the three years to 2014–15 were Vietnam (74% of total exports) and Brunei Darussalam (26%).

In 2011–12, 171 buffalo were slaughtered, compared with the peak of 1994 in 1999–2000. Exports of buffalo meat are close to zero.

Buffalo milk production was estimated at nearly 850 000 litres in 2011–12, with a gross value of approximately $2.3 million.

Dairy

The dairy industry (milk production) was the third largest rural industry in Australia by value of production in 2014–15. Victoria has 66% of the national dairy herd, followed by New South Wales (11%) and Tasmania (8%).

The Australian dairy cow herd declined by approximately one-quarter between 2000 and 2010. In 2010–11, it was 1.6 million animals. Since then, improved seasonal conditions, particularly in Victoria, have resulted in an increase in dairy cow numbers, which reached an estimated 1.74 million in 2014–15 (Table A7).

Australian milk production increased by 4% in 2014–15 to 9.7 billion litres, compared with 9.4 billion litres in 2013–14. A lower farmgate price for milk is estimated to have more than offset increased milk production, resulting in the gross value of milk production falling marginally to $4.7 billion in 2014–15.

Table A7 Australian dairy industry production

Dairy production	2012–13	2013–14	2014–15
Dairy cow numbers (millions)	1.69	1.65	1.74
Total milk production (million litres)	9317.0	9372.4	9731.7
Milk yield per cow (litres)	5518.5	5691.7	5592.9

Source: Australian Bureau of Agricultural and Resource Economics and Sciences (2016). *Agricultural commodities: March quarter 2016*, ABARES, Canberra, www.agriculture.gov.au/abares/publications/display?url=http://143.188.17.20/anrdl/DAFFService/display.php?fid=pb_agcomd9abcc20160301_cQe9T.xml.

In 2014–15, Australia exported dairy products (Table A8) worth $2.47 billion to about 100 countries.

Table A8 Australian dairy production and exports (kilotonnes)

	Total production			Exports		
Dairy product	2012–13	2013–14	2014–15	2012–13	2013–14	2014–15
Cheese	338.3	311.5	344.0	174.1	150.6	158.7
Butter and butter fat	118.2	116.1	118.6	53.7	49.3	43.6
Milk powders[a]	337.4	340.8	339.1	237.8	240.5	256.0

a Includes whole milk powder, skim milk powder and casein

Source: Australian Bureau of Agricultural and Resource Economics and Sciences (2016). *Agricultural commodities: March quarter 2016*, ABARES, Canberra, www.agriculture.gov.au/abares/publications/display?url=http://143.188.17.20/anrdl/DAFFService/display.php?fid=pb_agcomd9abcc20160301_cQe9T.xml.

Image credit: iStock

Fisheries and aquaculture

Australia has diverse wild-catch and aquaculture fisheries that produce both native and introduced species. In 2013–14, the latest year for which data are available, the gross value of fisheries production was approximately $2.5 billion. The volume and value of fisheries production for 2012–13 and 2013–14 are shown in Table A9.

Farmed aquaculture production in Australia includes many major species, such as tuna, salmon, barramundi, abalone and oysters. It is an important component of Australian fisheries production. Between 2003–04 and 2013–14, aquaculture's share of the total value of Australian fisheries production grew from 33% to 40%. The volume of aquaculture production in Australia declined by 6% in 2013–14 to approximately 74 900 tonnes. The value of aquaculture production declined by 6% to approximately $1.0 billion.

Selected figures for the volume of production and gross value of aquaculture harvests in 2013–14 are shown in Table A10.

Exports of Australian edible fisheries products, shown in Table A11, totalled 38 904 tonnes and were worth $1.1 billion in 2013–14.

Table A9 Australian fisheries production by species

	Volume of production (kilotonnes)		Value of production ($ million)	
Species	**2012–13**	**2013 –14**	**2012–13**	**2013–14**
Abalone	5.0	4.8	177.6	165.0
Oysters	12.4	11.4	93.5	90.3
Prawns	21.1	24.9	277.1	337.1
Rock lobster	10.3	10.4	439.1	585.9
Salmonids	43.0	41.8	517.7	543.0
Scallops	6.8	4.4	14.7	9.3
Tuna	10.6	10.7	176.0	146.7
Other fish	105.6	100.7	441.3	401.0
Other crustaceans, molluscs and species not included elsewhere[a]	17.0	12.9	239.1	181.9
Total[a,b]	**231.7**	**222.1**	**2376.3**	**2460.2**

a Volume excludes pearl oysters

b Figures may not add to totals because of rounding. Includes aquaculture production but excludes hatchery production.

Source: Australian Bureau of Agricultural and Resource Economics and Sciences (2015). *Australian fisheries and aquaculture statistics 2014*, ABARES, Canberra, www.agriculture.gov.au/abares/publications/display?url=http://143.188.17.20/anrdl/DAFFService/display.php?fid=pb_afastats13d9abmd20151218_11a.xml.

Table A10 Australian aquaculture production, 2013–14		
Aquaculture production	**Volume of production (kilotonnes)**	**Gross value of production ($ thousand)**
Fish		
Barramundi	3.4	33 857
Salmonids	41.8	542 956
Silver perch	0.3	4 106
Tuna	7.5	122 400
Other[a]	1.0	13 502
Total[b]	*54.2*	*716 821*
Crustaceans		
Marron	0.06	1 836
Prawns	3.8	63 522
Redclaw	0.04	682
Yabbies	0.04	615
Total[b]	*3.9*	*66 654*
Molluscs		
Abalone	0.9	26 802
Mussels	3.2	9 614
Oysters – edible	11.4	90 293
Oysters – pearl	na	60 719
Total[b]	*15.5*	*187 428*
Production not included elsewhere	1.4	23 448
Total[b,c] (all categories)	**74.9**	**994 352**

na = not available

a Includes eels, other native fish and aquarium fish

b Figures may not add to totals because of rounding.

c Total volume excludes pearl oysters

Source: Australian Bureau of Agricultural and Resource Economics and Sciences (2015). *Australian fisheries and aquaculture statistics 2014*, ABARES, Canberra, www.agriculture.gov.au/abares/publications/display?url=http://143.188.17.20/anrdl/DAFFService/display.php?fid=pb_afastats13d9abmd20151218_11a.xml.

Table A11 Exports of Australian fisheries products[a]						
	Volume (kilotonnes)			**Value ($ thousand)**		
Type of food	**2011–12**	**2012–13**	**2013–14**	**2011–12**	**2012–13**	**2013–14**
Edible	40.5	35.3	38.9	1 000 719	1 002 341	1 138 348
Non-edible	na	na	na	226 050	172 848	165 904

na = not available

a Excludes live tonnage but includes live value.

Source: Australian Bureau of Agricultural and Resource Economics and Sciences (2015). *Australian fisheries and aquaculture statistics 2014*, ABARES, Canberra, www.agriculture.gov.au/abares/publications/display?url=http://143.188.17.20/anrdl/DAFFService/display.php?fid=pb_afastats13d9abmd20151218_11a.xml.

Bees

In 2014–15, honey production was estimated at 17 954 tonnes. The gross value of the industry was estimated at $101 million, of which $88 million was honey production. The remainder was made up of beeswax, pollination services, package bees and queens. Before 2011, the export of package bees to the United States for the pollination industry was a small but growing sector of the industry. This export trade was valued at approximately $2.5 million in 2009–10. However, the United States banned imports of package bees from Australia in December 2010, because of the perceived risk of disease incursions into the United States following the entrance of the Asian honey bee into Australia.

The Australian honey bee industry comprises approximately 12 150 registered beekeepers, operating about 521 100 hives of European honey bees. Most honey bee operators are small, family-owned and family-operated businesses. Many of these, particularly businesses with fewer than 250 hives, derive most of their income from other sources. Larger operations (those with more than 500 hives) tend to specialise in honey production, and depend on their honey bee businesses as the sole source of income.

Most honey is produced by a relatively small number of businesses. According to industry estimates, around three-quarters of total honey production is produced by businesses operating more than 500 hives. Less than 15% of Australian honey production is from businesses with fewer than 250 hives.

Further information

Further information on each of the industries may be found at the relevant industry websites (see Appendix D).

Other Australian agricultural statistics and forecasts are available from the website of the Australian Bureau of Agricultural and Resource Economics and Sciences.[133]

133 www.agriculture.gov.au/abares

APPENDIX B
ANIMAL HEALTH CONTACTS IN AUSTRALIA

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APPENDIX C INVESTIGATIONS OF CERTAIN EMERGENCY ANIMAL DISEASES AND NATIONALLY NOTIFIABLE ANIMAL DISEASES

Australia maintains a National List of Notifiable Diseases of Terrestrial Animals.[134] Investigations during 2015 of suspect cases of certain emergency animal diseases and nationally notifiable animal diseases are recorded in the National Animal Health Information System (Section 2.3) and are reported in Table C1. This table excludes some diseases reported elsewhere in individual programs: anthrax (Section 2.4.5), avian influenza (Section 4.5.2), bovine brucellosis (Section 3.1.5), infection with equid herpesvirus 1 (abortigenic and neurological strains) (Section 2.4.8), infection with Newcastle disease virus (Section 2.4.12), and transmissible spongiform encephalopathies (Section 3.2.2). Wildlife health surveillance activities are reported in Section 3.1.7.

Table C1 Investigations of suspect cases of certain emergency animal diseases and nationally notifiable animal diseases, 2015

Disease	Species	Jurisdiction	Month	Response code[a]	Finding
Acariasis – tracheal mite (*Acarapis woodi*)	Bees	NSW	May	2	Negative
African horse sickness	Horse	SA	Mar	3	Negative
African swine fever	Pig	SA	Sep	3	Negative
American foulbrood (*Paenibacillus larvae*)	Bees	Qld	Jan	2	Negative (4 unrelated investigations)
	Bees	Qld	Jan	2	Positive (2 unrelated investigations)
	Bees	Qld	Feb	2	Negative (2 unrelated investigations)
	Bees	Qld	Feb	2	Positive (3 unrelated investigations)
	Bees	Qld	Mar	2	Negative (6 unrelated investigations)
	Bees	Qld	Mar	2	Positive (7 unrelated investigations)
	Bees	Qld	Apr	2	Negative (3 unrelated investigations)
	Bees	Qld	Apr	2	Positive (6 unrelated investigations)
	Bees	Qld	May	2	Negative (2 unrelated investigations)
	Bees	Qld	May	2	Positive (5 unrelated investigations)
	Bees	Qld	Jun	2	Positive (5 unrelated investigations)
	Bees	Qld	Jul	2	Negative (3 unrelated investigations)
	Bees	Qld	Jul	2	Positive (4 unrelated investigations)
	Bees	Qld	Aug	2	Negative (5 unrelated investigations)
	Bees	Qld	Aug	2	Positive (6 unrelated investigations)
	Bees	Qld	Sep	2	Negative (6 unrelated investigations)
	Bees	Qld	Sep	2	Positive (6 unrelated investigations)
	Bees	Qld	Oct	2	Negative (10 unrelated investigations)
	Bees	Qld	Oct	2	Positive (6 unrelated investigations)
	Bees	Qld	Nov	2	Negative (8 unrelated investigations)
	Bees	Qld	Nov	2	Positive (5 unrelated investigations)
	Bees	Qld	Dec	2	Negative (2 unrelated investigations)
	Bees	Qld	Dec	2	Positive (7 unrelated investigations)

134 www.agriculture.gov.au/pests-diseases-weeds/animal/notifiable#national-list-of-notifiable-diseases-of-terrestrial-animals-at-november-2015

Table C1 Investigations of suspect cases of certain emergency animal diseases and nationally notifiable animal diseases, 2015 *continued*					
Disease	**Species**	**Jurisdiction**	**Month**	**Response code[a]**	**Finding**
Anaplasmosis in tick-free areas	Cattle	NSW	Oct	2	Negative
	Cattle	NSW	Dec	2	Negative
	Cattle	Qld	Aug	2	Positive
	Cattle	Qld	Sep	2	Positive
	Cattle	WA	Oct	2	Negative (3 unrelated investigations)
Aujeszky's disease	Pig	SA	Sep	3	Negative
	Pig	WA	Apr	3	Negative
Australian bat lyssavirus	Cattle	Qld	Jan	2	Negative
	Cattle	Qld	Mar	2	Negative
	Dog	Qld	Mar	2	Negative
	Dog	WA	Sep	3	Negative
	Donkey	Qld	Aug	2	Negative
	Donkey	Qld	Sep	2	Negative
	Horse	NSW	Oct	2	Negative
	Horse	Qld	Feb	2	Negative
	Horse	Qld	Mar	2	Negative (4 unrelated investigations)
	Horse	Qld	Apr	2	Negative (2 unrelated investigations)
	Horse	Qld	May	2	Negative (3 unrelated investigations)
	Horse	Qld	Jun	2	Negative (5 unrelated investigations)
	Horse	Qld	Jul	2	Negative (3 unrelated investigations)
	Horse	Qld	Aug	2	Negative (7 unrelated investigations)
	Horse	Qld	Sep	2	Negative (4 unrelated investigations)
	Horse	Qld	Oct	2	Negative (6 unrelated investigations)
	Horse	Qld	Nov	2	Negative (2 unrelated investigations)
	Horse	Qld	Dec	2	Negative (2 unrelated investigations)
	Pig	WA	Apr	3	Negative
Babesiosis in tick-free areas	Cattle	NSW	Jan	2	Positive
	Cattle	NSW	Feb	2	Positive
	Cattle	NSW	Apr	2	Negative
	Cattle	NSW	Apr	2	Positive
	Cattle	NSW	May	2	Negative (3 unrelated investigations)
	Cattle	NSW	Jul	2	Negative (2 unrelated investigations)
	Cattle	NSW	Aug	2	Negative
	Cattle	NSW	Sep	2	Negative (3 unrelated investigations)
	Cattle	NSW	Oct	2	Negative (3 unrelated investigations)
	Cattle	NSW	Dec	2	Negative
	Cattle	Qld	Aug	2	Positive
	Cattle	Qld	Sep	2	Positive
	Cattle	WA	Dec	2	Negative
	Deer	NSW	Sep	2	Negative
	Sheep	NSW	Jun	2	Negative

Table C1 Investigations of suspect cases of certain emergency animal diseases and nationally notifiable animal diseases, 2015 *continued*					
Disease	**Species**	**Jurisdiction**	**Month**	**Response code[a]**	**Finding**
Bluetongue – clinical disease[b]	Cattle	NSW	Aug	2	Negative
	Cattle	NSW	Sep	2	Negative
	Cattle	NSW	Dec	2	Negative
	Cattle	WA	Oct	2	Negative (3 unrelated investigations)
	Sheep	NSW	Jan	2	Negative (2 unrelated investigations)
	Sheep	NSW	Feb	2	Negative
	Sheep	NSW	Mar	2	Negative
	Sheep	NSW	Apr	2	Negative
	Sheep	NSW	Jul	2	Negative
	Sheep	NSW	Aug	2	Negative
	Sheep	NSW	Sep	2	Negative
	Sheep	NSW	Oct	2	Negative
	Sheep	NSW	Nov	2	Negative (2 unrelated investigations)
	Sheep	SA	May	3	Negative
	Sheep	SA	Sep	3	Negative
	Sheep	WA	Mar	3	Negative
	Sheep	WA	Apr	3	Negative
	Sheep	WA	May	3	Negative
	Sheep	WA	Jul	3	Negative (3 unrelated investigations)
	Sheep	WA	Aug	3	Negative (6 unrelated investigations)
	Sheep	WA	Oct	2	Negative
	Sheep	WA	Nov	2	Negative
	Sheep	WA	Dec	2	Negative
Bovine virus diarrhoea type 2	Cattle	WA	Jul	3	Negative
Brucellosis (*Brucella abortus, B. suis, B. canis* and *B. melitensis*)[c]	Cattle	WA	Jul	2	Negative (2 unrelated investigations)
	Cattle	WA	Jul	3	Negative
	Cattle	WA	Aug	3	Negative (2 unrelated investigations)
	Cattle	WA	Sep	2	Negative (3 unrelated investigations)
	Dog	NSW	Jan	2	Negative (7 unrelated investigations)
	Dog	NSW	Feb	2	Negative (10 unrelated investigations)
	Dog	NSW	Mar	2	Negative (11 unrelated investigations)
	Dog	NSW	Apr	2	Negative (13 related investigations)
	Dog	NSW	Apr	2	Negative (6 unrelated investigations)
	Dog	NSW	Apr	2	Positive (2 unrelated investigations)
	Dog	NSW	Apr	2	Positive
	Dog	NSW	May	2	Negative (4 related investigations)
	Dog	NSW	May	2	Negative (8 unrelated investigations)
	Dog	NSW	May	2	Positive
	Dog	NSW	Jun	2	Negative (2 related investigations)
	Dog	NSW	Jun	2	Negative (9 unrelated investigations)

Table C1 Investigations of suspect cases of certain emergency animal diseases and nationally notifiable animal diseases, 2015 *continued*

Disease	Species	Jurisdiction	Month	Response code[a]	Finding
Brucellosis (*Brucella abortus*, *B. suis*, *B. canis* and *B. melitensis*)[c] *continued*	Dog	NSW	Jun	2	Positive (2 unrelated investigations)
	Dog	NSW	Jul	2	Negative (11 unrelated investigations)
	Dog	NSW	Jul	2	Positive
	Dog	NSW	Aug	2	Negative (12 unrelated investigations)
	Dog	NSW	Sep	2	Negative (9 unrelated investigations)
	Dog	NSW	Sep	2	Positive (2 unrelated investigations)
	Dog	NSW	Oct	2	Negative (17 unrelated investigations)
	Dog	NSW	Oct	2	Positive (2 unrelated investigations)
	Dog	NSW	Nov	2	Negative (8 unrelated investigations)
	Dog	NSW	Nov	2	Positive (4 unrelated investigations)
	Dog	NSW	Dec	2	Negative (16 unrelated investigations)
	Dog	NSW	Dec	2	Positive
	Dog	Qld	Jan	2	Negative
	Dog	Qld	Feb	2	Negative
	Dog	Qld	Mar	2	Negative
	Dog	Qld	May	2	Negative
	Dog	Qld	Aug	2	Positive
	Dog	Qld	Oct	3	Positive
	Dog	Qld	Dec	2	Negative
	Goat	Qld	Sep	2	Negative
	Horse	NSW	Aug	2	Negative
	Pig	NSW	Mar	2	Negative
	Pig	NSW	May	2	Negative
	Pig	NSW	Jul	2	Negative
	Pig	NSW	Oct	2	Negative (2 unrelated investigations)
	Pig	NSW	Dec	2	Negative
	Pig	Qld	Nov	2	Negative
	Sheep	Vic	Jul	2	Negative (18 unrelated investigations)
	Sheep	Vic	Aug	2	Negative (6 unrelated investigations)
	Sheep	Vic	Sep	2	Negative (4 unrelated investigations)
Classical swine fever	Pig	NT	Nov	2	Negative
	Pig	SA	Sep	3	Negative
	Pig	Vic	Jun	3	Negative
	Pig	WA	Jan	3	Negative
Contagious bovine pleuropneumonia	Cattle	WA	Dec	2	Negative
Contagious equine metritis	Horse	NSW	Sep	2	Negative
	Horse	WA	Dec	2	Negative (2 unrelated investigations)
Cysticercus bovis (*Taenia saginata*)	Cattle	Tas	May	2	Negative
East Coast fever (*Theileria parva*) and Mediterranean theilerosis (*T. annulata*)	Cattle	WA	Sep	2	Negative

Table C1 Investigations of suspect cases of certain emergency animal diseases and nationally notifiable animal diseases, 2015 *continued*					
Disease	**Species**	**Jurisdiction**	**Month**	**Response code[a]**	**Finding**
East Coast fever (*Theileria parva*) and Mediterranean theilerosis (*T. annulata*) *continued*	Cattle	WA	Oct	2	Negative
	Cattle	WA	Nov	2	Negative (2 unrelated investigations)
	Cattle	WA	Dec	2	Negative
Enzootic abortion of ewes	Sheep	WA	Apr	2	Negative
	Sheep	WA	Jun	2	Negative
	Sheep	WA	Jul	2	Negative
Enzootic bovine leucosis (eastern, western and Venezuelan)	Cattle	NSW	Jan	2	Negative
	Cattle	NSW	Feb	2	Negative
	Cattle	NSW	Mar	2	Negative
	Cattle	NSW	Jul	2	Negative (2 unrelated investigations)
	Cattle	NSW	Aug	2	Negative
	Cattle	NSW	Sep	2	Negative
	Cattle	Tas	Oct	2	Negative
	Cattle	Vic	Jun	1	Negative
Equine encephalomyelitis	Horse	WA	Jun	3	Negative
	Horse	WA	Aug	3	Negative (2 unrelated investigations)
	Horse	WA	Nov	3	Negative
	Horse	WA	Dec	2	Negative
Equine influenza	Horse	NSW	Sep	2	Negative
	Horse	NSW	Dec	2	Negative
	Horse	Qld	Jun	2	Negative
	Horse	Vic	Jan	2	Negative
	Horse	Vic	Feb	3	Negative (3 unrelated investigations)
	Horse	Vic	May	3	Negative
European foulbrood (*Melissococcus plutonius*)	Bees	Qld	Jan	2	Negative (5 unrelated investigations)
	Bees	Qld	Jan	2	Positive
	Bees	Qld	Feb	2	Negative (5 unrelated investigations)
	Bees	Qld	Mar	2	Negative (11 unrelated investigations)
	Bees	Qld	Mar	2	Positive (2 unrelated investigations)
	Bees	Qld	Apr	2	Negative (9 unrelated investigations)
	Bees	Qld	May	2	Negative (7 unrelated investigations)
	Bees	Qld	Jun	2	Negative (5 unrelated investigations)
	Bees	Qld	Jul	2	Negative (7 unrelated investigations)
	Bees	Qld	Aug	2	Negative (8 unrelated investigations)
	Bees	Qld	Aug	2	Positive (3 unrelated investigations)
	Bees	Qld	Sep	2	Negative (9 unrelated investigations)
	Bees	Qld	Sep	2	Positive (3 unrelated investigations)
	Bees	Qld	Oct	2	Negative (14 unrelated investigations)
	Bees	Qld	Oct	2	Positive (2 unrelated investigations)
	Bees	Qld	Nov	2	Negative (13 unrelated investigations)
	Bees	Qld	Dec	2	Negative (9 unrelated investigations)

Table C1 Investigations of suspect cases of certain emergency animal diseases and nationally notifiable animal diseases, 2015 *continued*					
Disease	**Species**	**Jurisdiction**	**Month**	**Response code[a]**	**Finding**
Foot-and-mouth disease	Cattle	NSW	Apr	3	Negative
	Cattle	NSW	Aug	3	Negative (2 unrelated investigations)
	Cattle	NSW	Oct	3	Negative
	Cattle	Qld	Apr	3	Negative
	Cattle	SA	Apr	3	Negative
	Cattle	SA	Jun	3	Negative
	Cattle	Vic	Jan	3	Negative (2 unrelated investigations)
	Cattle	Vic	Mar	3	Negative
	Cattle	Vic	May	3	Negative (2 unrelated investigations)
	Cattle	Vic	Aug	3	Negative
	Cattle	Vic	Sep	2	Negative
	Cattle	Vic	Sep	3	Negative
	Cattle	Vic	Dec	3	Negative
	Cattle	WA	Mar	3	Negative (2 unrelated investigations)
	Cattle	WA	Jul	3	Negative (2 unrelated investigations)
	Pig	NSW	Nov	3	Negative
	Pig	WA	Feb	3	Negative
	Pig	WA	Apr	3	Negative
	Sheep	NSW	Mar	3	Negative
	Sheep	NSW	May	3	Negative
	Sheep	NSW	Jun	3	Negative
	Sheep	NSW	Aug	3	Negative (2 unrelated investigations)
	Sheep	NSW	Sep	2	Negative
	Sheep	NSW	Sep	3	Negative
	Sheep	NSW	Nov	3	Negative (2 unrelated investigations)
	Sheep	SA	Sep	3	Negative
	Sheep	Vic	Mar	3	Negative
	Sheep	Vic	Apr	3	Negative
	Sheep	Vic	Jul	3	Negative
	Sheep	Vic	Sep	3	Negative (2 unrelated investigations)
	Sheep	Vic	Nov	3	Negative
	Sheep	WA	Mar	3	Negative
	Sheep	WA	Aug	3	Negative
	Sheep	WA	Oct	3	Negative
Glanders	Horse	SA	Mar	3	Negative
Hendra virus infection	Cat	SA	Oct	3	Negative
	Cat	Vic	Dec	3	Negative (2 unrelated investigations)
	Dog	NSW	Sep	2	Negative
	Dog	NSW	Oct	2	Negative
	Dog	NSW	Nov	2	Negative
	Dog	Qld	Jul	5	Negative
	Dog	Vic	Dec	3	Negative
	Dog	WA	Sep	3	Negative

Table C1 Investigations of suspect cases of certain emergency animal diseases and nationally notifiable animal diseases, 2015 *continued*					
Disease	**Species**	**Jurisdiction**	**Month**	**Response code[a]**	**Finding**
Hendra virus infection *continued*	Donkey	Qld	Apr	2	Negative
	Donkey	Qld	Aug	2	Negative
	Donkey	Qld	Sep	2	Negative (2 unrelated investigations)
	Donkey	Qld	Oct	2	Negative
	Horse	NSW	Jan	2	Negative (12 unrelated investigations)
	Horse	NSW	Feb	2	Negative (6 unrelated investigations)
	Horse	NSW	Mar	2	Negative (25 unrelated investigations)
	Horse	NSW	Apr	2	Negative (28 unrelated investigations)
	Horse	NSW	May	2	Negative (29 unrelated investigations)
	Horse	NSW	Jun	2	Negative (32 unrelated investigations)
	Horse	NSW	Jun	2	Positive
	Horse	NSW	Jul	2	Negative (36 unrelated investigations)
	Horse	NSW	Aug	2	Negative (39 unrelated investigations)
	Horse	NSW	Sep	2	Negative (44 unrelated investigations)
	Horse	NSW	Sep	3	Positive
	Horse	NSW	Oct	2	Negative (36 unrelated investigations)
	Horse	NSW	Nov	2	Negative (26 unrelated investigations)
	Horse	NSW	Dec	2	Negative (33 unrelated investigations)
	Horse	NT	Feb	2	Negative
	Horse	NT	Jun	2	Negative
	Horse	NT	Jul	2	Negative (3 unrelated investigations)
	Horse	NT	Oct	2	Negative
	Horse	Qld	Jan	2	Negative (47 unrelated investigations)
	Horse	Qld	Feb	2	Negative (46 unrelated investigations)
	Horse	Qld	Mar	2	Negative (55 unrelated investigations)
	Horse	Qld	Apr	2	Negative (49 unrelated investigations)
	Horse	Qld	May	2	Negative (48 unrelated investigations)
	Horse	Qld	Jun	2	Negative (70 unrelated investigations)
	Horse	Qld	Jul	2	Negative (91 unrelated investigations)
	Horse	Qld	Jul	5	Negative
	Horse	Qld	Jul	5	Positive
	Horse	Qld	Aug	2	Negative (85 unrelated investigations)
	Horse	Qld	Aug	5	Negative
	Horse	Qld	Sep	2	Negative (88 unrelated investigations)
	Horse	Qld	Oct	2	Negative (106 unrelated investigations)
	Horse	Qld	Nov	2	Negative (80 unrelated investigations)
	Horse	Qld	Dec	2	Negative (78 unrelated investigations)
	Horse	SA	Mar	3	Negative
	Horse	SA	Oct	3	Negative
	Horse	SA	Nov	3	Negative (3 unrelated investigations)
	Horse	Tas	Oct	3	Negative
	Horse	Vic	Jan	2	Negative (2 unrelated investigations)
	Horse	Vic	Jan	3	Negative (2 unrelated investigations)

Table C1 Investigations of suspect cases of certain emergency animal diseases and nationally notifiable animal diseases, 2015 *continued*					
Disease	**Species**	**Jurisdiction**	**Month**	**Response code[a]**	**Finding**
Hendra virus infection *continued*	Horse	Vic	Feb	2	Negative (3 unrelated investigations)
	Horse	Vic	Mar	2	Negative (2 unrelated investigations)
	Horse	Vic	Mar	3	Negative (2 unrelated investigations)
	Horse	Vic	Apr	2	Negative (3 unrelated investigations)
	Horse	Vic	May	2	Negative (4 unrelated investigations)
	Horse	Vic	Jun	2	Negative (2 unrelated investigations)
	Horse	Vic	Aug	2	Negative (3 unrelated investigations)
	Horse	Vic	Aug	3	Negative
	Horse	Vic	Sep	3	Negative (2 unrelated investigations)
	Horse	Vic	Oct	2	Negative
	Horse	Vic	Oct	3	Negative (4 unrelated investigations)
	Horse	Vic	Nov	2	Negative
	Horse	WA	Feb	3	Negative
	Horse	WA	Mar	3	Negative (2 unrelated investigations)
	Horse	WA	Apr	3	Negative (2 unrelated investigations
	Horse	WA	Apr	3	Negative
	Horse	WA	Jun	3	Negative
	Horse	WA	Jul	2	Negative
	Horse	WA	Aug	2	Negative
	Horse	WA	Aug	3	Negative
	Horse	WA	Sep	2	Negative (2 unrelated investigations)
	Horse	WA	Oct	2	Negative (2 unrelated investigations)
	Horse	WA	Nov	2	Negative
	Horse	WA	Dec	2	Negative
	Horse	WA	Dec	2	Negative (3 related investigations)
	Pig	WA	Apr	3	Negative
Infectious bursal disease – hypervirulent form and exotic antigenic variant forms	Chicken	Qld	Jan	3	Negative
Japanese encephalitis	Horse	WA	Feb	3	Negative
	Horse	WA	Dec	2	Negative (2 related investigations)
	Pig	WA	Apr	3	Negative
Leishmaniasis of any species	Dog	NSW	Oct	3	Negative
	Dog	NSW	Oct	3	Positive
	Dog	NSW	Nov	3	Negative
Maedi-visna	Barbary sheep	SA	Feb	2	Negative
Menangle virus infection	Pig	SA	Sep	3	Negative
Porcine reproductive and respiratory syndrome	Pig	SA	Sep	3	Negative
	Pig	WA	Jan	3	Negative
	Pig	WA	Aug	3	Negative
Post-weaning multi-systemic wasting syndrome	Pig	SA	Sep	3	Negative

Table C1 Investigations of suspect cases of certain emergency animal diseases and nationally notifiable animal diseases, 2015 *continued*					
Disease	**Species**	**Jurisdiction**	**Month**	**Response code[a]**	**Finding**
Rabies	Dog	Qld	Apr	3	Negative
	Dog	SA	Apr	3	Negative
	Dog	WA	Sep	3	Negative
	Horse	WA	Mar	3	Negative
	Horse	WA	Jun	3	Negative
Salmonellosis (*Salmonella* Abortusovis)	Sheep	WA	Apr	2	Negative
	Sheep	WA	Apr	3	Negative
	Sheep	WA	Jun	2	Negative
	Sheep	WA	Jul	2	Negative
	Sheep	WA	Aug	3	Negative
	Sheep	WA	Sep	2	Negative
Screw-worm fly – New World (*Cochliomyia hominivorax*)	Dog	WA	Sep	2	Negative
Screw-worm fly – Old World (*Chrysomya bezziana*)	Cattle	WA	Aug	2	Negative
	Horse	Qld	Nov	2	Negative
Sheep pox and goat pox	Sheep	WA	Mar	3	Negative
Surra (*Trypanosoma evansi*)	Pig	NT	Nov	2	Negative
Swine influenza	Pig	NSW	Apr	3	Positive[d]
	Pig	SA	Sep	3	Negative
	Pig	Vic	Jul	3	Negative
	Pig	WA	Apr	2	Negative
Swine vesicular disease	Pig	NSW	Nov	3	Negative
	Pig	WA	Feb	3	Negative
	Pig	WA	Apr	3	Negative
Transmissible gastroenteritis	Pig	WA	Jan	3	Negative
	Pig	WA	Apr	3	Negative
Tuberculosis (*Mycobacterium bovis*)	Cattle	NSW	Jan	2	Negative
	Cattle	NSW	Apr	2	Negative
	Cattle	NSW	Jul	2	Negative
	Cattle	Qld	Jan	2	Negative
	Cattle	Qld	Apr	2	Negative (6 granulomas examined)
	Cattle	Qld	Jul	2	Negative (5 granulomas examined)
	Cattle	Qld	Oct	2	Negative
	Cattle	Tas	Jul	2	Negative
	Cattle	Vic	Jan	2	Negative (2 granulomas examined)
	Cattle	Vic	Jul	2	Negative (3 granulomas examined)
	Cattle	Vic	Oct	2	Negative (2 granulomas examined)
	Pig	SA	Oct	2	Negative

Table C1 Investigations of suspect cases of certain emergency animal diseases and nationally notifiable animal diseases, 2015 *continued*					
Disease	**Species**	**Jurisdiction**	**Month**	**Response code[a]**	**Finding**
Varroosis (*Varroa destructor*)	Bees	Vic	Apr	2	Negative
	Bees	Vic	Aug	2	Negative
	Bees	Vic	Oct	2	Negative (2 unrelated investigations)
Vesicular stomatitis	Cattle	NSW	Apr	3	Negative
	Cattle	NSW	Aug	3	Negative (2 unrelated investigations)
	Cattle	NSW	Oct	3	Negative
	Cattle	Qld	Apr	3	Negative
	Cattle	SA	Apr	3	Negative
	Cattle	SA	Jun	3	Negative
	Cattle	Vic	May	3	Negative
	Cattle	Vic	Aug	3	Negative
	Cattle	Vic	Sep	3	Negative (2 unrelated investigations)
	Cattle	Vic	Dec	3	Negative
	Cattle	WA	Mar	3	Negative (2 unrelated investigations)
	Cattle	WA	Jul	3	Negative (2 unrelated investigations)
	Horse	NSW	Apr	2	Negative
	Horse	NSW	May	3	Negative
	Pig	NSW	Nov	3	Negative
	Pig	WA	Feb	3	Negative
	Pig	WA	Apr	3	Negative
	Sheep	NSW	Mar	3	Negative
	Sheep	NSW	May	3	Negative
	Sheep	NSW	Jun	3	Negative
	Sheep	NSW	Aug	3	Negative (2 unrelated investigations)
	Sheep	NSW	Sep	3	Negative (2 unrelated investigations)
	Sheep	NSW	Nov	3	Negative (2 unrelated investigations)
	Sheep	SA	Sep	3	Negative
	Sheep	Vic	Jun	3	Negative
	Sheep	Vic	Jul	3	Negative
	Sheep	Vic	Sep	3	Negative (2 unrelated investigations)
	Sheep	Vic	Nov	3	Negative
	Sheep	WA	Mar	3	Negative
West Nile virus infection – clinical	Bird	SA	Feb	3	Negative
	Bird	SA	May	3	Negative
	Chicken	SA	Mar	3	Negative (3 unrelated investigations)
	Horse	NSW	Nov	2	Negative
	Horse	Qld	Jul	3	Negative
	Horse	SA	Mar	2	Negative (2 unrelated investigations)
	Horse	Tas	Mar	2	Negative
	Horse	Vic	Apr	3	Negative
	Horse	Vic	Aug	3	Negative
	Horse	WA	Feb	3	Negative
	Horse	WA	Mar	3	Negative (2 unrelated investigations)
	Horse	WA	Jun	3	Negative

Table C1 Investigations of suspect cases of certain emergency animal diseases and nationally notifiable animal diseases, 2015 *continued*					
Disease	**Species**	**Jurisdiction**	**Month**	**Response code[a]**	**Finding**
West Nile virus infection – clinical *continued*	Horse	WA	Aug	3	Negative
	Horse	WA	Nov	3	Negative
	Horse	WA	Dec	2	Negative (3 related investigations)

NSW = New South Wales; NT = Northern Territory; Qld = Queensland; SA = South Australia; Tas = Tasmania; Vic = Victoria; WA = Western Australia

a Key to highest level of response:

1 Field investigation by government officer

2 Investigation by state or territory government veterinary laboratory

3 Specimens sent to the CSIRO Australian Animal Health Laboratory (or CSIRO Entomology)

4 Specimens sent to reference laboratories overseas

5 Regulatory action taken (quarantine or police)

6 Alert or standby

7 Eradication

b For additional negative monitoring data, see the National Arbovirus Monitoring Program: www.animalhealthaustralia.com.au/programs/disease-surveillance/national-arbovirus-monitoring-program.

c Bovine brucellosis (*B. abortus*) was eradicated from the Australian cattle herd in 1989 and is presently considered an exotic animal disease in Australia. Caprine and ovine brucellosis (caused by *B. melitensis*) has never been reported in Australian sheep or goats. Swine brucellosis (caused by *B. suis*) is confined to small areas of northern Australia, where it occurs in feral pigs, with cases detected occasionally in dogs used to hunt feral pigs.

d The outbreak was of human origin, caused by the H1N1 influenza A virus.

Source: National Animal Health Information System

Image credit: Renate Bossinger

APPENDIX D
KEY AUSTRALIAN ANIMAL HEALTH WEBSITES

Accreditation Program for Australian Veterinarians	www.animalhealthaustralia.com.au/training/veterinary-training/accreditation-program-for-australian-veterinarians-apav
Animal Health Australia	www.animalhealthaustralia.com.au
Animal Health Surveillance Quarterly	www.animalhealthaustralia.com.au/our-publications/animal-health-surveillance-quarterly
AQUAPLAN	www.agriculture.gov.au/animal/aquatic/aquaplan
AQUAVETPLAN	www.agriculture.gov.au/animal/aquatic/aquavetplan
AUS-MEAT Limited	www.ausmeat.com.au
Australasian Veterinary Boards Council	www.avbc.asn.au
Australian Alpaca Association	www.alpaca.asn.au
Australian Border Force	www.border.gov.au/australian-border-force-abf
Australian Centre for International Agricultural Research	www.aciar.gov.au
Australian Chicken Meat Federation	www.chicken.org.au
Australian Chief Veterinary Office	www.agriculture.gov.au/animal/health/acvo
Australian Dairy Farmers	www.australiandairyfarmers.com.au
Australian Egg Corporation Limited	www.aecl.org
Australian Food & Grocery Council	www.afgc.org.au
Australian Government Department of Agriculture and Water Resources	www.agriculture.gov.au
Australian Government Department of Foreign Affairs and Trade Overseas Aid Program (Australian Aid)	http://aid.dfat.gov.au
Australian Government Department of Health	www.health.gov.au
Australian Harness Racing	www.harness.org.au
Australian Honey Bee Industry Council	www.honeybee.org.au
Australian Horse Industry Council	www.horsecouncil.org.au
Australian Livestock Export Corporation (LiveCorp)	www.livecorp.com.au
Australian Lot Feeders' Association	www.feedlots.com.au
Australian National Quality Assurance Program	www.anqap.com
Australian Poultry Cooperative Research Centre	www.poultrycrc.com.au
Australian Q Fever Register	www.qfever.org
Australian Veterinary Association	www.ava.com.au
Australian Wool Innovation Limited	www.wool.com
Australia's animal health laboratory network	www.agriculture.gov.au/animal/health/system/lab-network
AUSVETPLAN	www.animalhealthaustralia.com.au/what-we-do/emergency-animal-disease/ausvetplan
Biosecurity in Australia	www.agriculture.gov.au/biosecurity/australia
Biosecurity risk analysis	www.agriculture.gov.au/biosecurity/risk-analysis
Cattle Council of Australia	www.cattlecouncil.com.au
Centre of Excellence for Biosecurity Risk Analysis	http://cebra.unimelb.edu.au
Cooperative Research Centre for High Integrity Australian Pork	www.porkcrc.com.au

Cooperative Research Centre for Sheep Industry Innovation	www.sheepcrc.org.au
CSIRO Australian Animal Health Laboratory	www.csiro.au/en/Research/Facilities/AAHL
Dairy Australia	www.dairyaustralia.com.au
Deer Industry Association of Australia	www.deerfarming.com.au
Department of Agriculture and Fisheries, Queensland	www.daf.qld.gov.au
Department of Agriculture and Food, Western Australia	www.agric.wa.gov.au
Department of Economic Development, Jobs, Transport and Resources, Victoria	http://economicdevelopment.vic.gov.au
Department of Fisheries, Western Australia	www.fish.wa.gov.au
Department of Primary Industries, New South Wales	www.dpi.nsw.gov.au
Department of Primary Industries and Regions, South Australia	www.pir.sa.gov.au
Department of Primary Industries, Parks, Water and Environment, Tasmania	www.dpipwe.tas.gov.au
Department of Primary Industry and Fisheries, Northern Territory	www.nt.gov.au/d/Primary_Industry
Faculty of Veterinary and Agricultural Sciences, University of Melbourne	http://fvas.unimelb.edu.au
Faculty of Veterinary Science, University of Sydney	http://sydney.edu.au/vetscience
Farm Biosecurity	www.farmbiosecurity.com.au
Fisheries Research and Development Corporation, Aquatic Animal Health	http://frdc.com.au/research/aquatic_animal_health/Pages/default.aspx
Food Standards Australia New Zealand	www.foodstandards.gov.au
Goat Industry Council of Australia	www.gica.com.au
Meat & Livestock Australia	www.mla.com.au
National Animal Health Information System	www.animalhealthaustralia.com.au/what-we-do/disease-surveillance/national-animal-health-information-system-nahis
National Animal Health Performance Standards	www.animalhealthaustralia.com.au/what-we-do/laboratory-services/national-animal-health-performance-standards
National Farmers' Federation	www.nff.org.au
National Notifiable Diseases Surveillance System	www.health.gov.au/internet/main/publishing.nsf/Content/cda-surveil-nndss-nndssintro.htm
National pests & disease outbreaks	www.outbreak.gov.au
National Transmissible Spongiform Encephalopathies Surveillance Program	www.animalhealthaustralia.com.au/what-we-do/disease-surveillance/tse-freedom-assurance-program/surveillance-of-tses
Racing Australia	http://racingaustralia.horse
Rural Industries Research and Development Corporation	www.rirdc.gov.au
SAFEMEAT	www.safemeat.com.au
School of Animal & Veterinary Sciences, Charles Sturt University	www.csu.edu.au/vet
School of Animal and Veterinary Sciences, University of Adelaide	www.adelaide.edu.au/vetsci
School of Veterinary and Biomedical Sciences, James Cook University	www.jcu.edu.au/college-of-public-health-medical-and-veterinary-sciences
School of Veterinary and Life Sciences, Murdoch University	www.murdoch.edu.au/School-of-Veterinary-and-Life-Sciences
School of Veterinary Science, University of Queensland	www.veterinary-science.uq.edu.au
Sheepmeat Council of Australia	www.sheepmeatcouncil.com.au
Wildlife Health Australia	www.wildlifehealthaustralia.com.au

ACRONYMS AND ABBREVIATIONS

ABLV	Australian bat lyssavirus
ACIAR	Australian Centre for International Agricultural Research
AECL	Australian Egg Corporation Limited
AHA	Animal Health Australia
AHC	Animal Health Committee
AUSVETPLAN	Australian Veterinary Emergency Plan
BEF	bovine ephemeral fever
BSE	bovine spongiform encephalopathy
BTV	bluetongue virus
CAE	caprine arthritis–encephalitis
CCEAD	Consultative Committee on Emergency Animal Diseases
Codex	Codex Alimentarius Commission
CRC	cooperative research centre
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CSIRO-AAHL	CSIRO Australian Animal Health Laboratory
DAF	Department of Agriculture and Fisheries
DAFWA	Department of Agriculture and Food Western Australia
DFAT	Department of Foreign Affairs and Trade
EAD	emergency animal disease
EADRA	Emergency Animal Disease Response Agreement
EID	emerging infectious disease
EuFMD	European Commission for the Control of Foot-and-Mouth Disease
FAO	Food and Agriculture Organization of the United Nations
FMD	foot-and-mouth disease
FSANZ	Food Standards Australia New Zealand
HACCP	hazard analysis and critical control points
IGAB	Intergovernmental Agreement on Biosecurity
LEADDR	Laboratories for Emergency Animal Disease Diagnosis and Response
MAF	Ministry of Agriculture and Fisheries
MLA	Meat & Livestock Australia
MRL	maximum residue limit
NACA	Network of Aquaculture Centres in Asia–Pacific
NAHIS	National Animal Health Information System
NAIWB	National Avian Influenza Wild Bird
NAMP	National Arbovirus Monitoring Program
NAQS	Northern Australia Quarantine Strategy
NBC	National Biosecurity Committee
NBPSP	National Bee Pest Surveillance Program
NLIS	National Livestock Identification System
NMG	National Management Group
NSDIP	National Significant Disease Investigation Program
NSW DPI	New South Wales Department of Primary Industries
NTSESP	National Transmissible Spongiform Encephalopathies Surveillance Program
NVD	National Vendor Declaration

OCVO	Office of the Chief Veterinary Officer
OIE	World Organisation for Animal Health
OsHV-1	ostreid herpesvirus 1 microvariant
PNG	Papua New Guinea
QA	quality assurance
R&D	research and development
RD&E	research, development and extension
RSPCA	Royal Society for the Prevention of Cruelty to Animals
SCAAH	Sub-Committee on Aquatic Animal Health
SWFSPP	Screw-worm Fly Surveillance and Preparedness Program
TSE	transmissible spongiform encephalopathy
TSEFAP	Transmissible Spongiform Encephalopathy Freedom Assurance Program
WHA	Wildlife Health Australia
WHO	World Health Organization

Image credit: DL Stapleton

GLOSSARY

acaricide	Pesticides used to control acarids such as mites and ticks.
antimicrobial	Antibacterial agents (including ionophores) but not including antiprotozoals, antifungals, antiseptics, disinfectants, antineoplastic agents, antivirals, immunologicals, direct-fed microbials or enzyme substances.
biosecurity	The exclusion, eradication or effective management of risks posed by pests and diseases to human and animal health, horticultural industries, ecological systems and the economy.
camelids	Members of the biological family Camelidae, including camels, alpacas, llamas and dromedaries.
Culicoides	A genus containing at least 123 species of biting midge – very small insects, visible to the naked eye, with a wing length of about 0.9 mm. Particular *Culicoides* species carry and spread bluetongue and Akabane viruses by taking blood meals from hosts such as cattle and sheep. The distribution and population of *Culicoides* are affected by factors such as climate (rainfall, wind), light and proximity of livestock.
emergency animal disease	A disease that, when it occurs, requires an emergency response, because it would have a national impact if it was not controlled.
emerging (disease)	A new infectious disease resulting from a change in an existing pathogenic agent, a known disease occurring in a new area or population, or a previously unrecognised pathogen or disease.
endemic (disease)	A disease that is known to occur over a long period of time within a population or a geographic range.
enteric	Intestinal; to do with the intestines (gut).
epidemic	An unexpected and substantial increase in the incidence of a disease.
epidemiological	Relating to the study of disease and its causes in a population.
epidemiologist	A scientist who studies the transmission and control of epidemic diseases.
epidemiology	Science of the distribution of disease in populations, with investigations into the source and causes of disease.
exotic (disease or pest)	A disease that does not normally occur in a particular area or country (as opposed to an endemic disease).
granulomas	Lesions with a yellowish appearance that have a caseous (cheesy), caseo-calcerous (cheesy and chalky) or calcified (bony) consistency. Occasionally, they may contain pus. The caseous centre is usually dry, firm and covered with a capsule of varying thickness that is made from the surrounding tissue. Granulomas can vary in size from small (and therefore easily missed) to very large, involving the greater part of the organ.
morbidity	Illness or disease.
nucleotide substitution	A form of mutation of the nucleotide sequence of deoxyribonucleic acid (DNA), where one base is replaced by another.
pathogen	A biological agent that causes disease or illness in its host.
pathogenic	Capable of causing disease.
precursor	A substance, or virus, from which another substance can form.
ratite	A large, flightless bird, such as an emu or an ostrich.
sentinel	A previously uninfected animal or hive of animals, kept at a specific location to detect the presence of disease-causing organisms, such as viruses or parasites. Samples (e.g. blood, bees) are collected from the sentinels at intervals to check whether infection or infestation has occurred.
serology	Immunological reactions and properties of serum, often used to diagnose disease.
synthetic pyrethroid	Synthetic chemical insecticide that acts in a similar manner to naturally derived pyrethrins.

transboundary animal diseases	Epidemic animal diseases that are highly infectious, with potential for very rapid spread, irrespective of national borders, and able to seriously impact the economy or human health (or both).
vector	A living organism (e.g. an insect) that transmits an infectious agent from one host to another.
virology	The study of viruses and viral diseases.
virulent	A term referring to the relative ability of an infectious agent to cause disease.
zoonosis (zoonotic disease)	A disease that can be transmitted from animals to people or, more specifically, a disease that normally exists in animals but that can infect humans. Plural: zoonoses.

Image credit: DAF Qld

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