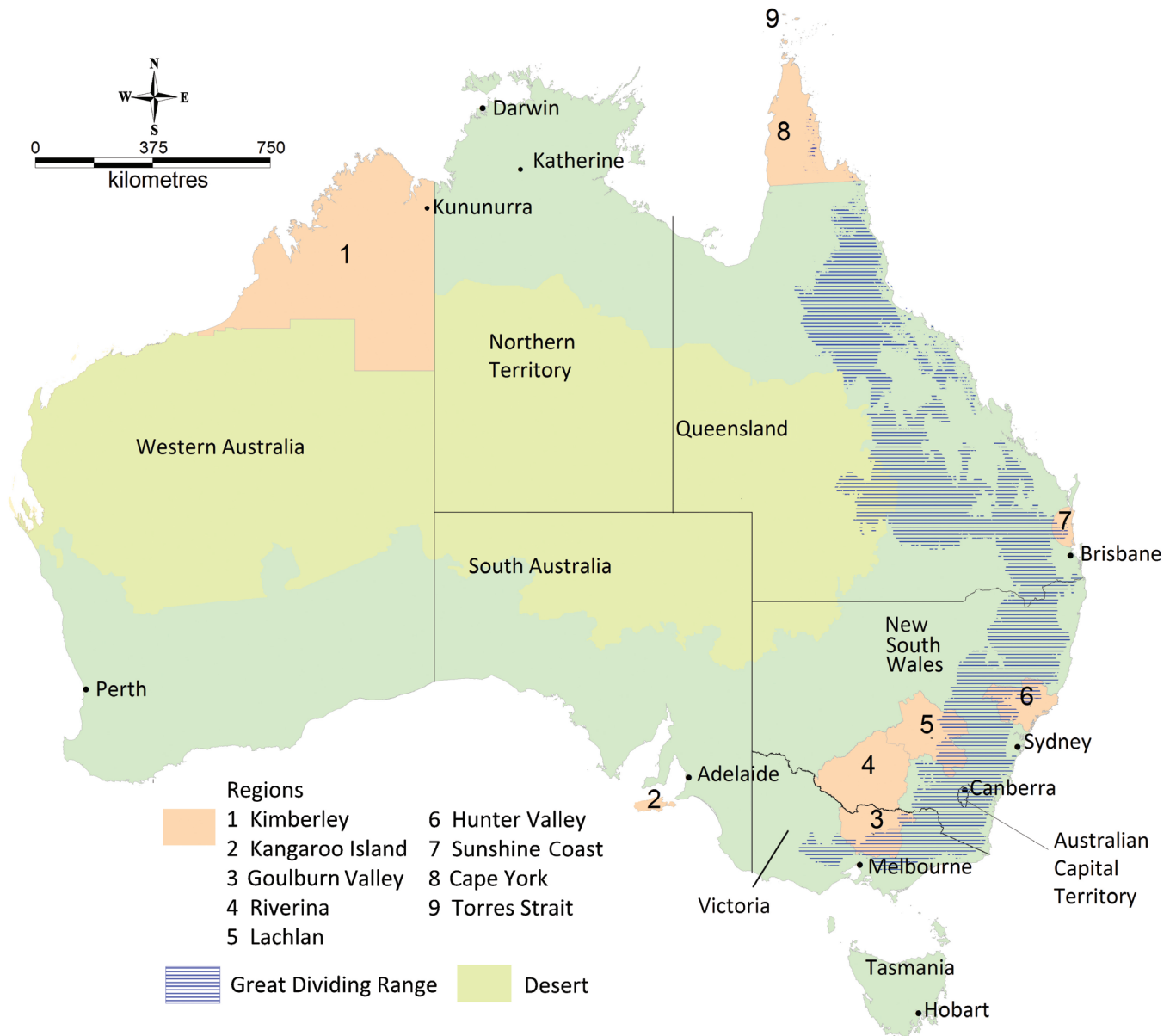




ANIMAL HEALTH IN **AUSTRALIA** 2014







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2014



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Feedback

Comments and suggestions regarding the *Animal Health in Australia 2014* report are welcomed. Please forward all correspondence to the Manager, Corporate Communications, Animal Health Australia, via email at aha@animalhealthaustralia.com.au.

Foreword



This 18th 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 ongoing programs, nationally significant terrestrial and aquatic animal diseases, and new initiatives during 2014.

Throughout the year, we have continued our work to address the threat of antimicrobial resistance (AMR). The prevalence of multidrug-resistant microbes in Australian animals appears to be low, and there is little direct evidence of the emergence in Australia of the most serious drug-resistant organisms, or their spread from animals to humans. However, the potential remains for emergence of drug-resistant microbes and their transmission from animals to humans in Australia. To combat this threat, Australia is developing a National Antimicrobial Resistance Strategy. The strategy will guide Australia's efforts across the human and animal health, food and agriculture sectors to prevent and contain AMR, ensure that work is comprehensive and coordinated, and ensure that progress is reviewed and reported on. To inform the strategy, the Australian Government Department of Agriculture commissioned a report on surveillance and reporting of AMR and antibiotic use in animals in Australia. On 1 December 2014, the Department of Agriculture hosted its second AMR Roundtable, bringing together representatives from government, animal industries, research and others, to discuss the report.

This year saw the release of *AQUAPLAN 2014–2019*, which outlines the priorities of Australia's governments and aquatic animal industries to strengthen arrangements for managing aquatic animal health. The plan builds on the success of Australia's previous two five-year national strategic plans for aquatic animal health. It provides the strategic planning and strong collaboration that are needed to ensure healthy and sustainable production across all fisheries and aquaculture sectors. It also provides suitable conditions for smaller and emerging industries to develop. *AQUAPLAN 2014–2019* has five main objectives and outlines the agreed activities, outcomes, responsibilities and resourcing implications for each. It is an excellent example of effective collaboration between Australia's governments and the diverse aquaculture, fisheries and ornamental fish industries to improve our aquatic animal health system.

Australia's work on preparedness for an outbreak of foot-and-mouth disease (FMD) continued throughout 2014. A key component of this work has been Exercise Odyssey – a program to develop the capability to implement a national livestock standstill should an outbreak of FMD occur in Australia. To date, Exercise Odyssey has comprised a series of more than 40 discussion exercises and field-based

activities throughout 2014, and more are planned for early 2015. It has brought together participants from national, state and territory government biosecurity agencies, other government agencies, livestock and affiliated industries, and other organisations. Activities have considered various aspects of a national livestock standstill, including the roles of government and industry, disease response plans and arrangements, managing livestock in transit, rapid provision of accurate public information, triggers for declaring a standstill and the financial costs of implementation of a standstill. Together, these activities have contributed to Australia's preparedness to combat an incursion of FMD. The lessons learned are also expected to increase our preparedness for other emergency animal diseases.

Signing by Australia of the memorandum of understanding with New Zealand on the Trans-Tasman Foot and Mouth Disease Action Plan in early 2014 will also improve Australia's preparedness. Building on the strong collaboration between Australia and New Zealand, the action plan includes activities that target improvements at global, border and domestic levels, and span the breadth of the emergency management continuum (risk reduction, readiness, response and recovery).

Australia's emergency animal disease response capabilities were further augmented through another international collaboration: renewal of the memorandum of understanding on the International Animal Health Emergency Reserve with New Zealand, Canada, the United States of America, the United Kingdom and Ireland. The agreement provides a mechanism for sharing of competent and skilled personnel to assist with the response to an emergency animal disease event in an affected signatory country.

In Australia, 2014 also saw the commencement of construction of our new post-entry quarantine facility at Mickleham (Victoria), the regaining of Australia's freedom from highly pathogenic avian influenza following an incident in New South Wales in late 2013, and the release of a quarantine policy for the importation of freshwater ornamental finfish from approved countries.

As the highlights above show, 2014 has been both a busy and an interesting year. This report reflects the significant activities and developments in animal health in Australia over this period, showcasing our ability to successfully manage emerging challenges and proactively improve our animal health system.

I commend this report to you.



Dr Mark Schipp
Australian Chief Veterinary Officer

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Jarred Schulz





Overview

Australia's animal health system comprises the organisations, government agencies, commercial companies, universities and individuals that are involved in animal health and the livestock production chain. Together, these components 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 2014. Highlights for the year are summarised below.

Organisation of the animal health system

Chapter 1 describes the roles of government and nongovernment participants in the national animal health system, and the consultative mechanisms that link them. Animal Health Australia coordinates national animal health programs in Australia. Wildlife Health Australia (formerly the Australian Wildlife Health Network) complements livestock health activities by coordinating the monitoring of the health of wild native and feral animals.

Reform of Australia's biosecurity system continued during 2014. The National Biosecurity Committee, which operates under the Intergovernmental Agreement on Biosecurity, developed policy frameworks to improve early detection and diagnosis of pests and diseases in Australia. Other reforms included development of mechanisms to improve the sharing of surveillance information between jurisdictions; further development of the national framework for biosecurity research, development and extension; and a national stocktake of investment in biosecurity. Biosecurity legislation was introduced into the Australian Parliament on 27 November 2014. When passed, the legislation will replace the *Quarantine Act 1908* as the primary legislative means for the Australian Government to manage biosecurity risks.

The Australian Government Department of Agriculture, state and territory governments, Animal Health Australia and the livestock industries collaborated to develop an Avian Influenza Risk Mitigation Strategy for high-risk farms, in response to several costly avian influenza outbreaks during the past few years. The strategy addresses on-farm biosecurity extension and audit, active surveillance, response arrangements and retailer engagement.

Terrestrial animal health

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.

Australia uses the data collated in the National Animal Health Information System (NAHIS) to provide regular reports on diseases of interest to the World Organisation for Animal Health (OIE). The information in NAHIS is also essential for supporting trade in animal commodities.

Since they were first detected in Queensland in 2007, Asian honey bees have gradually spread in the state. Australia has moved from eradication to management of this pest. Research and development projects that started under the Asian Honey Bee Transition to Management program (which ended in June 2013) are continuing. The aim is to reduce the incidence and impact of bee pests and diseases, and build capacity to apply research findings through extension and education.

The following significant notifications were made in 2014:

- One anthrax incident occurred in New South Wales. The affected property was in the known anthrax endemic area, and the incident was managed according to the anthrax policy of the state's Department of Primary Industries.
- During 2014, abortion caused by equine herpesvirus 1 was diagnosed in one mare in South Australia, five mares on two horse properties in Victoria and one mare that aborted a full-term foal on a property in Queensland.

Terrestrial animal disease surveillance and monitoring

Chapter 3 describes disease surveillance and monitoring activities under government and nongovernment programs that operate at the national level. These programs are managed by Animal Health Australia, Wildlife Health Australia, and the Australian, state and territory governments.

In 2014, each sectoral committee reporting to the National Biosecurity Committee, including Animal Health Committee, began developing a National Surveillance and Diagnostic Strategy to underpin the Surveillance and Diagnostic Framework, under the Intergovernmental Agreement on Biosecurity. The animal health strategy, which will be completed in 2015, will detail the surveillance and diagnostic objectives to support Australia's livestock industries.

In a parallel process, a steering committee established at the National Animal Health General Surveillance Forum in

November 2013 has begun drafting an Enhanced General Surveillance business plan to present to industry and government. As part of this process, governments and industry have reviewed elements of Australia's general surveillance system.

More than 984 events involving disease investigations in wildlife were added to the national database of Wildlife Health Australia in 2014. Approximately 42% of these events were bats submitted for exclusion testing for Australian bat lyssavirus (ABLV), and another 41% related to wild bird mortalities. A total of 335 bats were tested for ABLV in 2014; of these, 29 tested positive. This is a higher proportion than in previous years. The reasons for this change are unknown – it could reflect either an increase in ABLV prevalence in the wild bat population or a change in factors affecting which bats have been submitted for testing.

In 2014, 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.

Three mass mortality events involving eastern grey kangaroos (*Macropus giganteus*) were investigated in 2014: two in New South Wales and one in Queensland. Infection with parasites was the likely cause of two of these events; the other was diagnosed as poisoning from ingestion of toxic plants.

During 2013 and 2014, an external consultant reviewed the risks of entry of screw-worm fly into Australia and Australia's surveillance requirements. Findings from the review are currently being considered by the Screw-worm Fly Freedom Assurance Program National Advisory Committee in the development of a new business plan.

Improvements were made during 2014 to the National Bee Pest Surveillance Program, which is an early warning system to detect new incursions of pest bees and exotic bee pests. The improvements included increasing the number of high-risk ports covered by surveillance activities and the level of surveillance at some existing ports, deploying remote surveillance hives (catch boxes with cameras) in ports as part of a national trial of this new surveillance method, developing floral maps and conducting floral sweep netting in ports every two months for detection of pest bees, increasing the involvement of hobby beekeepers in surveillance, and increasing the number of sentinel hives.

The Northern Australia Quarantine Strategy is an integrated program of active and passive disease surveillance in northern Australia. In 2014, the program expanded its community animal health reporting project in Aboriginal and Torres Strait Islander communities to include island communities in Torres Strait. This project is

an effective way of maintaining a baseline understanding of animal health in these remote areas. Surveillance for Japanese encephalitis included use of a novel method that allows molecular testing of excreted saliva from mosquitoes (the primary vectors of the virus); no evidence of Japanese encephalitis virus transmission on mainland Australia was found.

Managing animal health emergencies

Chapter 4 describes Australia's arrangements for preparing for, and responding to, emergency animal diseases (EADs), including planning, training and communication. The chapter also describes EAD responses during 2014.

The Department of Agriculture, states and territories, livestock industry groups and Animal Health Australia have continued work to strengthen Australia's preparedness for an outbreak of foot-and-mouth disease (FMD). In 2014, this included Exercise Odysseus – a series of discussion exercises and field-based activities based on simulation of the early days of an FMD outbreak, when a national livestock standstill would be implemented. In addition to assessing response arrangements, Exercise Odysseus provided an opportunity to raise awareness of the significance of FMD to Australia, and the importance of biosecurity practices and surveillance activities for early detection of EADs.

In March 2014, the Department of Agriculture and the New Zealand Ministry for Primary Industries signed a memorandum of understanding to collaborate on FMD preparedness. Australia's states and territories have also been improving their FMD preparedness through specific programs and activities.

In 2014, the Department of Agriculture extended its agreement with the European Commission for the Control of Foot-and-Mouth Disease for the provision of training in Nepal for Australian veterinarians and stock handlers in detection and control of FMD. On their return to Australia, participants undertake extension activities to increase awareness about FMD among private veterinarians, livestock workers and producers. Australia continues to collaborate with other countries on epidemiology and disease modelling. In 2014, this included a multicountry FMD vaccination modelling study that evaluated different vaccination strategies that might be used during an FMD outbreak.

On 21 February 2014, following resolution of an outbreak of highly pathogenic avian influenza (HPAI) on two poultry farms near Young in New South Wales, Australia declared resumption of its status as a country free from HPAI, in accordance with OIE requirements. Animal Health Committee has established a working group to provide

advice on measures to reduce the occurrence of avian influenza outbreaks in Australian poultry. Discussions with industry are now in progress to identify and implement the most practical ways to minimise the risk of avian influenza infection in the poultry industries.

Updated Australian Veterinary Emergency Plan (AUSVETPLAN) manuals were published in 2014 for African swine fever (disease strategy) and the zoo industry (enterprise manual). Revisions were made to a number of other AUSVETPLAN manuals. As well, 2014 saw finalisation of a guidance document on declared areas and premises classifications in an EAD response, two new resource documents (on destruction of birds and on trapping procedures for *Culicoides* insect vectors) and the *Biosecurity incident public information manual*, which was developed by the Biosecurity Incident National Communications Network.

Australia's *National biosecurity manual for egg production* was published in 2014. This manual, a cooperative initiative of Animal Health Australia and Australia's egg production industry, documents and raises awareness of best practice in biosecurity in the egg industry.

EAD responses in 2014 involved incidents of Hendra virus infection in horses in Queensland and New South Wales, anthrax in sheep on a single property in New South Wales, atypical scrapie in aged sheep in Victoria and Western Australia (this is a different disease from classical scrapie), pigeon paramyxovirus in racing pigeons in Victoria, theileriosis (a tick-borne disease) in cattle in South Australia, infection with *Leishmania* in an imported dog in Victoria and 'triple D' (diarrhoea, drooling and death) syndrome in cattle in New South Wales.

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.

AQUAPLAN 2014–2019, Australia's third national strategic plan for aquatic animal health, was published in 2014. It 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 2014, a four-year project was begun to develop 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 deeds that Australia has in place for terrestrial animal and plant diseases.

In 2014, the new Australian Aquatic Veterinary Emergency Plan (AQUAVETPLAN) disease strategy manual for abalone viral ganglioneuritis was published online. Revisions of four manuals commenced in 2014 for the diseases viral encephalopathy and retinopathy, whirling disease, withering syndrome of abalone and crayfish plague.

During 2014, ostreid herpesvirus 1 (OsHV-1) microvariant was detected in the Georges River and the Hawkesbury River estuaries, New South Wales. OsHV-1 causes Pacific oyster mortality syndrome in farmed oysters. New South Wales manages the disease through movement controls on farmed oysters, oyster farming infrastructure and equipment from affected areas. In September 2014, the New South Wales Government released the Pacific Oyster Mortality Syndrome Incursion Response Policy, which sets out response actions and responsibilities that will apply in the event of further outbreaks of the disease.

The Regional Proficiency Testing Program for Aquatic Animal Disease Laboratories in Asia, funded by the Department of Agriculture, was completed in late 2014. The program resulted in significant improvements in the accuracy of testing to diagnose important aquatic animal diseases in participating laboratories.

Imports and exports

Chapter 6 describes the Department of Agriculture's 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.

Building has commenced on a new post-entry quarantine station at Mickleham in Victoria, which will consolidate all current quarantine operations for high-risk plants and animals at one site. Planning for the transition from the current quarantine stations to the new facility is well under way.

The Department of Agriculture has completed an import risk assessment of biosecurity risks linked to iridoviruses and related viruses in imports of gourami, cichlid and poeciliid ornamental fish. Two reviews of policy were also conducted: one of irradiation as a treatment for imports, and the other of the importation of hatching eggs with respect to avian paramyxovirus.

World Trade Organization member countries have reached agreement on a number of reforms that will facilitate trade. This Trade Facilitation Agreement should

result in significant gains in trade through simplification of customs procedures.

Free trade agreements have been signed between Australia and the Republic of Korea, Japan and China. By gradually eliminating tariffs, these agreements will open up new opportunities for Australian agriculture.

The Department of Agriculture 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.

Consumer protection

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.

The National Residue Survey in the Department of Agriculture monitors residues and contaminants in food. Food Standards Australia New Zealand assesses the level of contaminants in the Australian diet to ensure that the Australian regulatory system results in a safe food supply for Australians.

Australia is an active participant in the Codex Alimentarius system, providing expertise for a number of Codex committees, and chairing the Codex Committee on Food Import and Export Inspection and Certification Systems.

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 markets.

Development and implementation of Australia's National Antimicrobial Resistance (AMR) Strategy¹ is being overseen by the Australian Antimicrobial Resistance Prevention and Containment Steering Group. The Australian Strategic and Technical Advisory Group on AMR, which consists of members of both veterinary and medical disciplines, and agriculture and food representatives, provides ongoing technical, scientific and clinical advice and expertise to inform the development of the national AMR Strategy.

1 www.agriculture.gov.au/animal-plant-health/animal/amr

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 2014, all jurisdictions made a number of amendments to legislation and administrative arrangements for animal welfare, with the aim of improving animal welfare outcomes.

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. *Australian animal welfare standards and guidelines: land transport of livestock* are now being implemented by state and territory governments. The development of cattle and sheep standards and guidelines is well advanced, and the documents are now ready for consideration by governments. Consultation is in progress on various aspects of the draft national standards and guidelines for exhibited animals. In 2014, public submissions were invited on a proposal to introduce nationally consistent rules for the care and management of livestock during their transition through saleyards and depots in Australia. Discussions began on a review of the *Model code of practice for the welfare of animals: domestic poultry*, which will form the basis of the development of Australian animal welfare standards and guidelines for poultry.

The states and territories, which are best placed to drive reform in this area, are now responsible for the future growth of the Australian Animal Welfare Strategy.

A number of projects took place under the National Primary Industries Animal Welfare Research, Development and Extension Strategy during 2014. The strategy encourages co-investment and collaboration on a national basis to improve the efficient use of research, development and extension resources in animal welfare. The final report on a project to monitor public attitudes to animal welfare was completed and will be used to develop a regular process to monitor public attitudes to animal welfare.

The Minister for Agriculture has announced reforms to the Exporter Supply Chain Assurance System for live animal exports. The reforms reflect the government's commitment to reduce red tape and increase performance efficiency of the system.

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, published a scientific and technical review in 2014 on the future of animal welfare. The Collaborating Centre is cooperating with partners in Southeast Asia to build animal welfare science capacity in the region through a training program.

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 2014, joint animal health surveys were conducted in several regions of these countries. Various other activities took place to develop skills in animal disease surveillance and response, and raise public awareness. The Department of Agriculture continued its pest and disease surveys of Norfolk Island.
- Overseas aid – Australia's aid program, which focuses on the Indo-Pacific region, is guided by a new policy statement, *Australian aid: promoting prosperity, reducing poverty, enhancing stability*, released in June 2014, which aligns the goal of poverty reduction with the pursuit of economic growth in the region. Australia supports partner governments in building surveillance systems and improving their ability to respond to emerging disease threats.
- Research – Australian research activities in the region are primarily resourced through the Australian Centre for International Agricultural Research (ACIAR) and the Australian Government Department of Foreign Affairs and Trade. 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, Papua New Guinea and southern Africa.

Research and development

Chapter 10 provides a snapshot of Australian research in livestock health during 2014. Research relating to livestock health is conducted by the Commonwealth Scientific and Industrial Research Organisation (CSIRO), cooperative research centres, universities (including veterinary science faculties), and industry-based research and development corporations.

The National Animal Biosecurity Research, Development and Extension Strategy, which was published in 2013, promotes collaboration among research organisations in biosecurity research, development and extension.



Animal Health Australia



Chapter 1

Organisation of the animal health system

Effective national surveillance and control of animal diseases in Australia requires cooperative partnerships among the government agencies, organisations, commercial companies and individuals who are involved in animal industries.

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

The Australian Government advises on and coordinates animal health policy at a national level. It is responsible for international animal health matters, including quarantine, export certification and trade, as well as disease reporting to the World Organisation for Animal Health (OIE). Under the Australian constitution, the 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 via an active 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 the livestock industries. This allows consultation between government and industry to determine national animal health priorities. The livestock industries participate in policy development, support targeted animal health activities and contribute to emergency responses. Australia's livestock industries are described in Appendix 1.

Australia's animal health system includes all organisations, government agencies, commercial companies, universities and individuals that are involved in animal health and the livestock production chain. Links are maintained with partner human health agencies, particularly with regard to zoonoses and food safety. The Australian Government Department of Agriculture is actively represented

Table 1.1 Veterinarians and other animal health personnel in Australia, 2014

Registered veterinarians		Auxiliary personnel	
Government	614	Stock inspectors, meat inspectors, etc.	1 166
Laboratories, universities, etc.	837		
Private practitioners	8 975		
Other veterinarians	646		
Total	11 072	Total	1 166

on the Communicable Diseases Network Australia, a key public health group. Links are also maintained with partner environmental agencies, particularly with regard to wildlife health. The Australian Government Department of the Environment is represented on AHC. Wildlife Health Australia (WHA; formerly the Australian Wildlife Health Network) complements livestock health activities by coordinating the monitoring of the health of wild native and feral animals.

Table 1.1 shows the numbers and categories of veterinarians and other animal health personnel in Australia. Animal Health Australia (AHA) is a not-for-profit public company established by the Australian Government, state and territory governments, and major national livestock industry organisations. AHA coordinates and manages more than 60 national projects relating to animal biosecurity, health and welfare on behalf of its members: the Australian Government, state and territory governments, and the peak national councils of Australia's livestock industries and service providers (see Table 1.2 on page 5). These projects improve animal and human health, biosecurity, livestock welfare, productivity, market access, and food safety and quality.

1.1 Governance

1.1.1 Australian Government committees

Consultative committees ensure that all components of the animal² 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 provide their advice and support to 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.

Figure 1.1 shows the relationship between animal health and welfare management committees and organisations in Australia.

National Biosecurity Committee

The National Biosecurity Committee (NBC) provides strategic leadership across jurisdictions and sectors in the development and implementation of national approaches and policies for emerging and ongoing biosecurity issues, including in animal health. The NBC operates under the authority of the Intergovernmental Agreement on Biosecurity (IGAB).³ AHC reports to the NBC.

A key focus during 2014 was development of policy frameworks and work on eight IGAB schedules, covering all essential elements of national onshore biosecurity.

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.

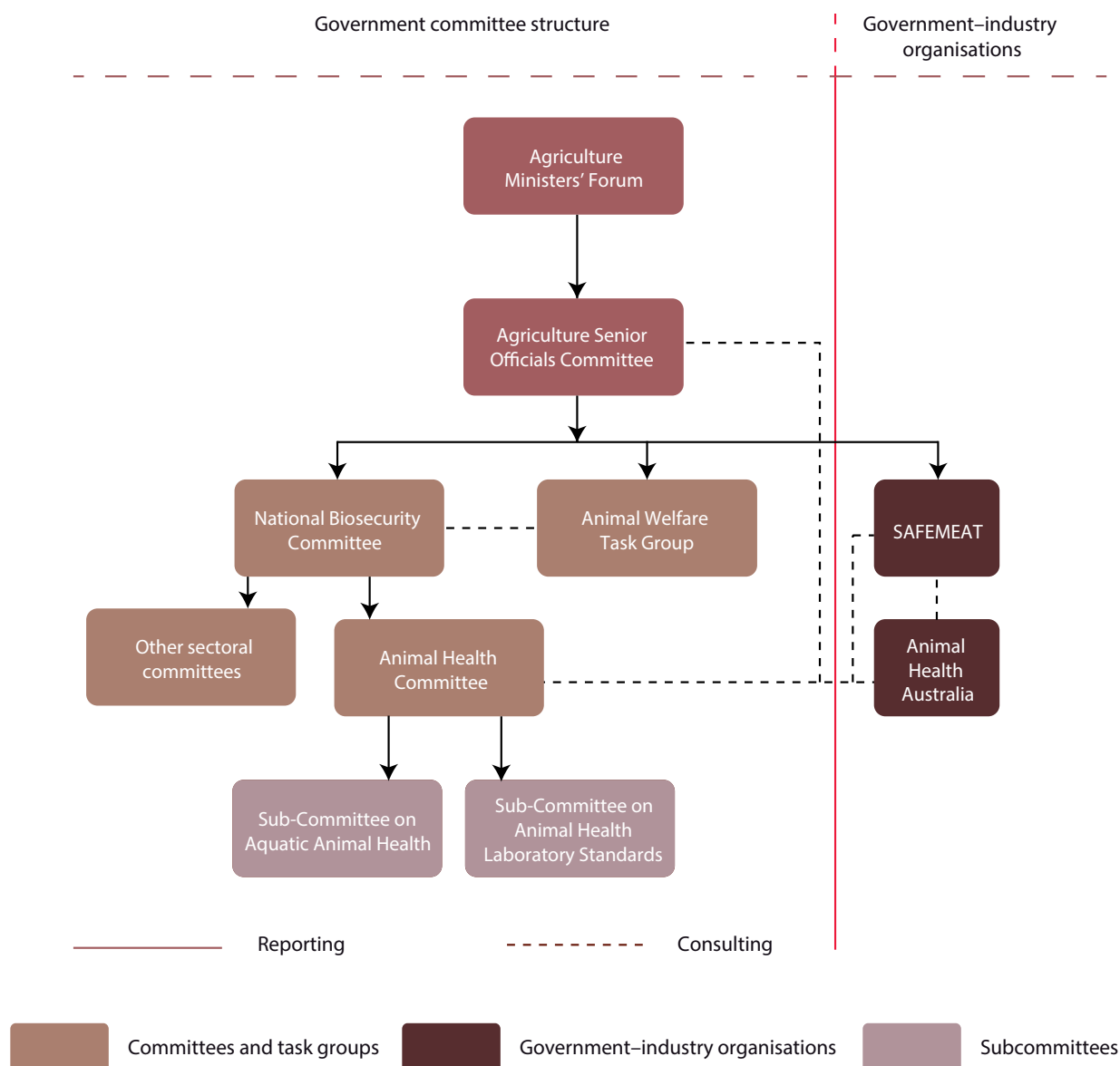
Animal Health Committee

AHC⁴ provides the Australian Government with scientific, strategic and nationally coordinated policy advice on animal health matters through the NBC and AHC's higher reporting processes. AHC leads the development and implementation of government policy, programs, operational strategies and standards in national animal health, domestic quarantine and veterinary public health.

² Both terrestrial and aquatic animals

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

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



Note: As part of the Australian Government Smaller Government Reform Agenda, it was announced that, to streamline services and reduce the cost of government administration, the operations of the Sub-Committee on Animal Health Laboratory Standards will cease during 2015.

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

AHC members comprise the Australian and state and territory chief veterinary officers, and representatives from the Australian Government Department of Agriculture, the Australian Government Department of the Environment, and the Australian Animal Health Laboratory of the Commonwealth Scientific and Industrial Research Organisation (CSIRO-AAHL; Table 1.2). 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) and was advised during 2014 on laboratory issues by its Sub-Committee on Animal Health Laboratory Standards (SCAHL). 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 broad and regular dissemination of the newsletter *Vetcommuniqué*, industry membership of AHA, and direct 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 nongovernment agencies – including specialists from academia, industry and the private sector – may also be invited to participate.

Sub-Committee on Animal Health Laboratory Standards

Throughout 2014, SCAHLS operated as the national network for animal and veterinary public health laboratories in Australia that are managed by governments, universities and the private sector. The New Zealand Government was also a member. SCAHLS maintained professional and technical standards for animal health laboratory services within member laboratories, and developed and evaluated new tests. This included overseeing the Australian National Quality Assurance Program (ANQAP)⁵ and producing the Australian and New Zealand Standard Diagnostic Procedures.⁶ In addition to providing technical and policy support to AHC, the subcommittee monitored and facilitated preparedness for exotic and other emergency animal diseases (EADs) through the Laboratories for Emergency Animal Disease Diagnosis and Response network (see Chapter 4).

In December 2014, as part of its Smaller Government Reform Agenda, which aims to streamline services and reduce the cost of government administration, the Australian Government announced that the operations of SCAHLS will cease. AHC will develop alternative arrangements to ensure that national laboratory standards are maintained and that experts who provide laboratory-related advice on Australia's national animal health system come together as needed.

1.1.2 Government–industry committees and organisations

Consultative Committee on Emergency Animal Diseases

The Consultative Committee on Emergency Animal Diseases (CCEAD)⁷ is convened when an EAD outbreak occurs. 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

AHA⁸ is the coordinating body for national animal health programs in Australia. With a national focus on animal health, welfare and biosecurity issues, the company facilitates sustainable partnerships between members. It provides leadership in securing outcomes that support Australia's position as a world leader in animal health and animal health services.

AHA's 32 members comprise the Australian Government, the state and territory governments, livestock industry organisations and service providers; a number of other organisations are associate members. The current membership is shown in Table 1.2, and contact details for these organisations are provided in Appendix 2.

AHA has a strong track record in delivering significant outcomes for its members and is recognised as an important contributor to improving animal health in Australia. The company's roles are to:

- improve Australia's animal health policy and practice by building capacity for EAD preparedness
- ensure that Australia's livestock health systems support productivity, competitive advantages and preferred market access
- ensure that animal health programs help to protect human health, the environment and recreational activities
- manage nationally agreed animal health programs.

AHA uses a comprehensive consultative approach, based on consensus, to identify priorities and resolve issues. The company has established a number of formal and informal consultative mechanisms. For example, the Industry Forum provides a unique opportunity for AHA industry members to discuss industry-related concerns. An industry consensus can then be brought to the Members' Forum for broader consideration by all members of the company. By working across a complex network of stakeholders, AHA delivers results that benefit the national animal health system as a whole.

5 www.anqap.com

6 www.scahls.org.au/procedures

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

8 www.animalhealthaustralia.com.au

Table 1.2 Members of Animal Health Australia

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



SAFEMEAT

SAFEMEAT⁹ is a partnership between the peak meat industry bodies,¹⁰ 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
- recommendations of the SAFEMEAT Initiatives Review.

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 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.

During 2014, the SAFEMEAT Initiatives Review commenced its implementation phase. 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 that 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 communication program to drive uptake and improvement of SAFEMEAT-endorsed industry programs
- a sustainable funding model to ensure that the system remains effective.

Through the various NLIS committees, in 2014 SAFEMEAT:

- continued to work with the Australian and state and territory governments on the inclusion and verification of the NLIS in abattoir-approved programs (these programs define the scope and operating criteria for each establishment, and are approved and audited by regulatory authorities)
- initiated action with the Australian Livestock Exporters’ Council to address NLIS compliance issues in the sector
- assisted with monitoring by the states and territories to overcome documentation problems with the mob-based NLIS for sheep and goats
- worked 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
- developed strategies to ensure national consistency in interpreting and applying NLIS rules by the states and territories
- progressed the development of the NLIS (Pork) business rules.

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.

1.2 National biosecurity reforms

Australia has a strong biosecurity system that protects human, animal and plant health, and our unique

⁹ www.safemeat.com.au

¹⁰ 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 and Property Agents Association, Australian Livestock Markets Association, Goat Industry Council of Australia and Animal Health Australia

environment, and supports Australia's reputation as a safe and reliable trading nation. This reputation has significant economic, environmental and community benefits for all Australians. Areas of Australia's biosecurity system are undergoing reforms to ensure that the system remains relevant and effective. This will lead to a more modern system that is 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, the environment and international trade. To do this effectively, jurisdictions, 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 of pests and diseases, and accurate, timely diagnosis.
- A National Biosecurity Information Governance Agreement and national minimum data standards for surveillance and emergency response have been 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.
- The National Plant Biosecurity Strategy and the National Animal Biosecurity Research, Development and Extension Strategy are the key components of the national framework for biosecurity research, development and extension. A National Environment and Community Biosecurity Research, Development and Extension Strategy is also being developed. Together, these strategies provide a national, coordinated and strategic approach to biosecurity research, development and extension.

In 2014, to maximise the efficiency of its sectoral committees, the NBC merged the Australian Weeds Committee and the Vertebrate Pests Committee to form a new Invasive Plants and Animals Committee. The NBC also condensed the IGAB working groups into a single taskforce to oversee continued implementation of IGAB initiatives. The NBC's Stakeholder Engagement Consultative Group was disbanded; the committee will refresh and improve the way it engages with stakeholders using existing mechanisms.

Investment into biosecurity across Australia was examined to provide an understanding of how funds are directed towards prevention of, and preparation for, incursions of exotic or emergency pests and diseases;

eradication or containment of exotic pests and diseases through national programs; and long-term management of pests and diseases established in Australia. This understanding will improve the efficiency and effectiveness of national biosecurity spending and the biosecurity system.

The Biosecurity Bill 2014 and its supporting Bills (the biosecurity legislation) were introduced into the Australian Parliament on 27 November 2014. When passed, the biosecurity legislation will replace the *Quarantine Act 1908* as the primary legislative means for the Australian Government to manage biosecurity risks. The Biosecurity Bill 2014 provides a modern regulatory framework to manage the risk of pests and diseases entering Australian territory and causing harm to animal, plant or human health, the environment or the economy. Remaining free of pests and diseases will help Australia maximise its agricultural productivity and continue to pursue new export opportunities.

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 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 delivers the Australian Government's activities in animal health and welfare.

The Australian Government is Australia's largest single employer of veterinarians, providing an important reserve for the state and territory governments in the event of a major EAD outbreak.

The Department of Agriculture's quarantine and biosecurity functions within the Biosecurity Animal Division work in conjunction with other areas of the department 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.

Livestock export is a key area for policy and regulatory reform for the Department of Agriculture. New regulatory processes have been developed and implemented, and are being reformed, based on practical experience of the new system. Policy development in this area is continuing. A priority for the Department of Agriculture is

to give effect to the government's election commitment to reduce red tape and increase performance efficiency in the Exporter Supply Chain Assurance System (ESCAS)¹¹ and export certification.

In 2014, the following divisions and branches in the Department of Agriculture were responsible for animal 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
 - Live Animal Exports Reform Taskforce.

As well, the Export Standards Branch and the Meat Exports Branch of the Exports Division address sanitary issues relating to exported animal products.

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. The OCVO provides essential links for Australia internationally via the OIE, and domestically via national animal health committees.

As Australia's international reference point on animal health, the OCVO coordinates Australia's commitments to the OIE, animal health intelligence gathering, and communication with other international agencies involved in animal health.

The OCVO also provides executive, technical and administrative support to AHC and the CCEAD. It provides strategic direction and national coordination for Australia's animal health policies and activities, including for EAD responses.

In 2015, the OCVO will play a key role in coordinating Australia's engagement with the OIE Performance of Veterinary Services evaluation process.

Biosecurity Animal Division

Animal Biosecurity Branch

The Animal Biosecurity Branch develops biosecurity policy. It also provides technical and scientific advice on the safe importation of animals and animal products (including aquatic animals and their products), and 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 activities on national animal health policies and programs, for both terrestrial and aquatic animals. 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 and veterinary public health issues.

Animal and Biological Import Assessments Branch

The Animal and Biological Import Assessments Branch manages the importation of live animals, animal reproductive material and 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, soil and water samples, and skins and hides.

The branch works across the entire biosecurity continuum – pre-border, border and post-entry quarantine – with a focus on minimising the risk of entry into Australia of exotic animal pests and diseases. It achieves this by auditing overseas and domestic facilities, providing clearance support, assessing and granting import permits, providing advice to clients and regulatory officers, and managing the government-operated post-entry animal quarantine stations.

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, and is responsible for ongoing regulation of ESCAS.

¹¹ www.daff.gov.au/biosecurity/export/live-animals/livestock/information-exporters-industry/escas

Live Animal Exports Reform Taskforce

The Live Animal Exports Reform Taskforce develops regulatory reform proposals in line with the government's election commitment to reduce red tape and increase performance efficiency in ESCAS and export certification. This involves developing policy and reforming business processes, assisting with the development of legislative amendments, and liaising with licensed exporters and peak industry bodies. The reforms will deliver livestock export regulation that is clearer, faster and less costly to administer, while maintaining animal health and welfare.

The taskforce engages with a wide range of internal and external stakeholders. Drawing on stakeholder views, the taskforce developed the government report on the effectiveness of ESCAS in delivering animal welfare outcomes and facilitating trade (see Section 8.6).

1.3.2 Other national animal health services and programs

Wildlife Health Australia

WHA, previously the Australian Wildlife Health Network (AWHN), 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 support from state and territory governments and stakeholders.

For more than 10 years, the AWHN was vital to preparedness for, and response to, animal disease issues in wildlife and feral animals. After 10 years of operation, the AWHN was reviewed to consider Australia's future needs for wildlife health management. The review resulted in the establishment in November 2013 of a new organisation, Wildlife Health Australia Inc., as a separate legal entity, to continue the work of the AWHN.

WHA commenced operation on 1 July 2014 and now has more than 400 members nationally. Members include individuals and institutional representatives from national, state and territory departments of environment, agriculture and human health; universities; zoos; diagnostic pathology services; private practitioners; and wildlife carers. The Chair of the WHA Management Committee is the Australian Chief Veterinary Officer.

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.

Activities of WHA 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.

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

Animal health laboratories

The Australian Government, state and territory governments, CSIRO, veterinary schools and the private laboratory sector maintain a network of world-class animal health laboratories in Australia.¹² This network provides diagnostic and research services for endemic and exotic animal diseases, including transboundary animal diseases and zoonoses (diseases that are transmissible between animals and humans). National policies and standards for laboratory services relevant to EADs were coordinated primarily through SCAHLS in 2014.¹³ SCAHLS, generally through the Department of Agriculture, also advised stakeholders on issues relevant to international animal health laboratory standards and policies. National laboratory responses to EAD incidents and outbreaks were primarily supported by the Laboratories for Emergency Animal Disease Diagnosis and Response network (see Chapter 4). In 2014, both SCAHLS and the network

¹² www.agriculture.gov.au/animal-plant-health/animal/system/lab-network

¹³ www.scahls.org.au

contributed to the revision of the Australian Veterinary Emergency Plan (AUSVETPLAN) *Laboratory preparedness manual*,¹⁴ a key operational and resources manual for laboratory diagnosticians.

In 2015, with the cessation of SCAHLS as a standing national body, AHC will develop new arrangements for national coordination of policies and standards for animal health laboratory services in Australia.

CSIRO-AAHL¹⁵ 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. CSIRO-AAHL develops and improves diagnostic technologies, provides laboratory services for exotic and other major EADs, and provides independent scientific advice. It also plays a key role in transferring testing capabilities for major EADs to 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 or 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 also 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*),¹⁶ 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, SCAHLS has facilitated the development and evaluation of new tests for EADs, and the production of a comprehensive series of Australia and New Zealand Standard Diagnostic Procedures for specific EADs. The procedures reflect the relevant international standards prescribed by the OIE.¹⁷

ANQAP¹⁸ 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.

For professional development, SCAHLS has supported the activities of the Australian Association of Veterinary Laboratory Diagnosticians and other networks for laboratory specialty areas.

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 governing the surveillance, control, investigation and reporting of diseases, and chemical residues and contaminants, as well as legislation relating to animal welfare. The jurisdictions deliver their services through government-appointed or government-accredited animal health personnel – district veterinarians, regional veterinary officers and local biosecurity officers – who are responsible for administering the relevant state and territory legislation;

14 www.animalhealthaustralia.com.au/programs/emergency-animal-disease-preparedness/ausvetplan/management-manuals

15 www.csiro.au/Organisation-Structure/National-Facilities/AAHL.aspx

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

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

18 www.anqap.com

they also 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
- 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 Diseases¹⁹ lists exotic, emergency and endemic diseases of national significance. Notifiable diseases for each state and territory include those on the national list together with additional 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.

¹⁹ www.daff.gov.au/animal-plant-health/pests-diseases-weeds/animal/notifiable

For the past 50 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, contagious bovine pleuropneumonia, contagious equine metritis, bovine brucellosis, bovine tuberculosis, virulent Newcastle disease, equine influenza and highly pathogenic avian influenza.

Chemical residues and contaminants

Chemical residue programs aim to keep animal products free from agricultural and veterinary chemicals and other contaminants. The National Residue Survey monitors animal products from all states and territories to ensure that they are safe. The program monitors for:

- pesticides from soil, pasture or stockfeed
- heavy metals
- veterinary drugs, such as anthelmintics, antibiotics and acaricides.

For more information on Australia's measures to maintain a residue- and contamination-free food chain, see Section 7.2.2.

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, because early detection of disease facilitates more rapid control and eradication. This work requires close links with abattoirs, 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 50 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 industry–government 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, chlamyphilosis, avian influenza and Hendra virus infection.

In 2014, collaboration between the Department of Agriculture, state and territory governments, AHA and the livestock industries, including through AHC, led to outcomes on the following national animal health priorities:

- A process was initiated to fully review the overall management of bovine Johne's disease in Australia, in partnership with industry. The current regulatory approach has a number of ongoing problems, including technical limitations.
- During 2014, AHC agreed to request both OIE Performance of Veterinary Services (PVS) training and an external OIE PVS evaluation. The OIE PVS evaluation process is a successful, well-established OIE initiative to evaluate the quality of national veterinary services, based on internationally agreed OIE standards for veterinary services.
- An Avian Influenza Risk Mitigation Strategy for high-risk farms was developed, in response to several costly avian influenza outbreaks during the past few years. An industry–government task group is discussing implementation of the strategy, following its completion by AHC. The strategy includes options for on-farm biosecurity extension and audit, active surveillance, response arrangements and retailer engagement.
- An AHC document on national animal health research priorities has been developed, to better align animal health research with policy needs. This document will be fed into implementation of the Animal Biosecurity Research, Development and Extension Strategy, led by AHA.

- A new proposal – One Biosecurity – has been discussed, to replace numerous, complex endemic disease control programs with a simple producer-focused farm biosecurity program. More substantive consultation will take place at the AHA industry forum in March 2015.
- Several animal disease incidents were managed during 2014, as detailed in Chapter 4 and Appendix 3. The effective management of these outbreaks illustrates the strength of a collaborative national approach to EAD responses in maintaining Australia's favourable animal health status.

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 and production advice, and by investigating and treating disease. They also play an integral role in programs for detecting and responding to 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 Veterinarians²⁰ is designed to integrate private veterinary practitioners into the national animal health system, thus supporting the international standing of Australia's animal health capability. The program accredits nongovernment veterinarians who can use their skills and knowledge effectively to contribute to government and industry animal disease control programs, and export inspection and certification.

Other national programs that involve private veterinarians in the national animal health system are the Australian Veterinary Practitioner Surveillance Network and 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,

²⁰ www.animalhealthaustralia.com.au/training-centre/accreditation-program-for-australian-veterinarians-apav



James Cook University and the University of Adelaide. All are currently producing graduates. All Australian veterinary courses include strong undergraduate programs in the health of horses, companion animals, farmed livestock and wildlife, as well as in 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, this audit has been conducted by the Australasian Veterinary Boards Council (AVBC).²¹ Most site visits include a representative from the Royal College of Veterinary Surgeons on the team. In recent years, teams from the United States accreditation system have joined AVBC visits to American Veterinary Medical Association–accredited schools at Massey, Melbourne, Murdoch, Queensland and Sydney universities. All seven Australian veterinary schools are accredited with the Royal College of Veterinary Surgeons and the South African Veterinary Council.

In addition to visits, accredited schools must submit annual reports, which are assessed against the

12 standards for veterinary accreditation. The newly established veterinary schools have also welcomed AVBC teams to provide formative feedback during development of their courses.

As well as conducting accreditation, the AVBC advises on the standards for veterinary registration in Australia and New Zealand, and on the registration of veterinary specialists. It also conducts skills assessment for veterinarians who wish to migrate to Australia, and 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 within the Australian vocational education and training sector provide training for veterinary nurses, animal technologists, farm managers and others involved in the care of 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.

²¹ www.avbc.asn.au

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 will provide an alternative 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 Inc. (LBN) is an independent industry initiative funded by the Cattle Council of Australia, the Sheepmeat Council of Australia and WoolProducers Australia. It is a three-year pilot project that promotes greater awareness of biosecurity, animal health and animal welfare issues. In addition, it is designed to improve on-farm management practices and preparedness for exotic and endemic disease outbreaks. This includes developing good animal welfare practices to buffer livestock from infectious diseases; these practices encompass veterinary, husbandry and management actions, and making decisions that ensure healthy and well cared-for animals. An increased level of overall awareness of biosecurity is critical to farmers protecting their on-farm assets.

Livestock producers are provided with effective tools and useful information to manage disease (endemic and exotic) and pest events on their farms. The LBN is developing mechanisms for public consultation on animal health, welfare and biosecurity issues.

The LBN is working in collaboration with state and national agencies to address industry concerns about jurisdictions' responses to existing or emerging biosecurity threats to livestock production.

Strategic goals of the LBN are to:

- build a network of public and private partnerships to help deliver information about biosecurity risks to animal health and welfare
- support jurisdictions to improve industry capability in the event of an EAD outbreak
- work with partners and stakeholders to identify and, where necessary, update extension material for on-farm animal health, welfare and biosecurity, for dissemination within the cattle and sheep industries.

Regional biosecurity officers with veterinary qualifications and/or substantial farming industry experience are working with collaborating organisations to increase

on-farm biosecurity awareness, engagement and readiness. They are located in all states and territories, and are coordinated and managed by a national manager based in Canberra. The LBN regional officers are actively building networks within existing organisations involved in biosecurity, such as departments responsible for agriculture, farm organisations, farmer groups, agribusiness and stock agents. The LBN officers are also helping coordinate specific biosecurity programs in answer to problems and issues raised by farmers in their region. Examples include wild dog control, lice control, and preparing stock for road transport to markets and abattoirs.

A review of the project is scheduled for 2015 to determine whether industry will continue with the pilot initiative. The review will consider the level of direct contact with farmers through public and private agencies.

The LBN Board reflects the project's industry leadership: the chair is a former managing director of Meat & Livestock Australia, and the directors are from the beef cattle industry in Queensland and New South Wales, the sheepmeat industry in Victoria and the wool industry in Victoria.

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 carry out compliance monitoring checks throughout the livestock supply chain to ensure that those consigning, receiving and slaughtering stock are complying with NLIS requirements.

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 (National Vendor Declaration – 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.

In 2011, the Primary Industries Ministerial Council commissioned a review to identify ways in which the current mob-based system could be improved to ensure compliance with the National Livestock Traceability Performance Standards (NLTPS). This included consideration of electronic identification. In October 2013, the Minister for Agriculture announced the release of a Council of Australian Governments Consultation Regulatory Impact Statement on proposals for improving NLIS (Sheep and Goats) to ensure NLTPS compliance. 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

The pig industry is continuing to develop NLIS (Pork). Currently, it is a mob-based system based on tattoos and brands to identify the property of birth, along with movement documents.

SAFEMEAT has developed draft business rules for NLIS (Pork), which 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 of animal movements throughout the supply chain. Some further testing is to be done

before NLIS (Pork) is presented to agriculture ministers for final approval. This will be followed by enactment of legislation by the states and territories to enable mandatory reporting of movements.

1.4.4 NLIS for alpacas and llamas

The NLIS (Alpaca and Llama) tracing system is under development. The industry is advocating the use of identification tags that incorporate both radiofrequency identification and visual readability. 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. Examples of 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 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.

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)²² principles and comprise five elements:

- property risk assessment – ensures that livestock are not exposed to areas on a property that are contaminated with organochlorines 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
- 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.

The program reached the milestone of 10 years on 1 March 2014. During 2014, requirements relating to the use and identification of livestock treated with hormonal growth promotants were prescribed within the Rules and Standards to support regulatory requirements.

As at 31 October 2014, 207 990 property identification codes were accredited in the LPA program. For the year ending 30 June 2014, approximately 7100 on-farm audits were completed, including the core random audit program and the targeted audit program conducted on behalf of the National Residue Survey. To 31 October 2014, more than 42 000 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 over time. 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 major domestic retailers and the export market. Accordingly, lot feeders have a large incentive to be accredited under the NFAS, and a large deterrent if they breach the scheme's standards and lose accreditation. 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 a discount to the state government environmental licence fee – a licence required for all feedlots – for NFAS-accredited feedlots 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 the NFAS mean that the program is now recognised within legislation in various states, thereby further encouraging industry uptake.

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 and awareness of issues such as animal health and welfare. The conference also recognises industry excellence on issues such as animal welfare, thereby encouraging further improvement within the sector.

ALFA also uses the expertise of feedlot veterinarians to deliver workshops across Australia each year that provide practical information on the day-to-day management of animal health and welfare on feedlots. Other promotional materials, including DVDs and fact sheets containing

²² 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.

industry case studies, have been used to deliver information on animal health, welfare, biosecurity and other matters. Formal animal welfare training has been developed and will be rolled out via ALFA workshops throughout Australia in 2015.

Many lot feeders do not have the time, resources or networks to continually keep abreast of developments in legislation, best-management practices and the NFAS. Accordingly, ALFA has appointed a Technical Services Officer to provide on-the-ground assistance to lot feeders.

ALFA regularly meets with the RSPCA and retailers to explain its activities on issues such as animal welfare and to learn about potential trends in animal welfare and food standards that the industry may need to implement. It has recently reviewed its animal welfare requirements, assessing:

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

As a result of the review, ALFA has developed numerous amendments to the NFAS standards. These have been promulgated through the industry via ALFA animal health and welfare workshops. A number of research projects have been initiated to address identified knowledge gaps.

ALFA is also undertaking a strategic review of the NFAS, which will be completed in 2015. The review aims to ensure that the NFAS will meet the current and future needs of industry and other stakeholders.

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 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 against the food safety program 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 and 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

The Australian Pork Industry Quality Assurance Program (APIQ✓®) is owned and administered by Australian Pork Limited on behalf of the Australian pork industry. At 30 November 2014, APIQ✓® covered 91% of the Australian breeding herd and 557 pig farm enterprises.

APIQ✓® is an independently audited on-farm QA system. It is based on managing farm risks by following good agricultural practices, using HACCP principles. To gain APIQ✓® certification, producers must meet standards in five key areas:

- management
- food safety
- animal welfare
- biosecurity
- traceability.

All pig production systems, including free-range, outdoor-bred and indoor systems, are covered by APIQ✓®.

APIQ✓®-certified producers have the option of stating that the production site does not use gestation (sow) stalls, supporting the phase-out of sow stalls across Australia. Customer-specific modules are also available under APIQ✓® to provide assurance to specific buyers or markets that the pork they source meets their own production standards. The system provides producers with specific tools to assist them with record keeping, which is a requirement of the APIQ✓® standards.

All APIQ✓®-certified producers must have an annual on-site compliance audit conducted by a certified independent auditor and meet all the certification requirements. Auditors must be APIQ✓® registered and accredited by Exemplar Global (formerly RABQSA – the Registrar Accreditation Board and the Quality Society of Australasia). They must also have a minimum accreditation as a National Food Safety Auditor, Level 2, with APIQ✓® Scope (an examination to test knowledge of the pig industry), and have attended the APIQ✓® auditor training program. 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 are audited annually by an independent certifying body to ensure that their policies, processes and administration are robust, reliable and of a high standard.

The APIQ Panel, comprising independent experts, has been established to consider major or critical incidents

involving producers and auditors, and determine courses of action, in accordance with APIQ✓® certification policies.

APIQ✓® also 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 under Australian standard *Hygienic production and transportation of meat and meat products for human consumption* (AS 4696:2007).

1.5.5 Egg Corp Assured, the national egg quality assurance program

On behalf of the egg industry, the Australian Egg Corporation Limited (AECL) developed Egg Corp Assured (ECA), the national egg QA program. The program 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, and to corporate social responsibility. ECA is a unique QA program that provides standards for a range of egg industry best-practice criteria – for pullet rearing, egg production, egg grading and egg packing – relating to:

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

Launched in November 2004, the program 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 program by industry has led to ECA accrediting 160 farms in 2014. The program covers more than 11.3 million laying hens, which represents 78% of the national flock.

As a result of a recent external review of the program, the administration and operations of ECA have been outsourced for 2014–15 to Freshcare's Scheme Support Services. During this period, ECA's processes and systems will be reviewed and improved to ensure that they meet stakeholder, consumer and industry demands.

The AECL entrusts audit management of ECA to global certification bodies whose auditing staff have Exemplar Global (formerly RABQSA) accreditation in food safety, as a minimum; auditors must also attend the ECA auditor training program held each year by the AECL. Two senior



AECL auditors review every audit, and a program of spot (unannounced) audits is implemented. A verification audit program, to verify audit evidence, was implemented in 2013 and continued in 2014. A verification audit checks a selection of audit points from the scheme, rather than being a full ECA audit.

A series of QA training workshops are usually held annually in most states and territories for egg producers, ECA-accredited farms and ECA-accredited auditors. The purpose of the workshops is to educate and inform attendees on how to incorporate any new components of the national QA program, from both a practical farm point of view and an auditor's perspective. The program is continually being improved to maintain its relevance to a changing marketplace and to improve its integrity.

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 a manual that specifies the minimum biosecurity requirements on meat chicken farms. The manual includes an auditable checklist.

All jurisdictions have agreed that implementation of the *National farm biosecurity manual for chicken growers* satisfies the requirements for poultry farming specified in the Primary Production and Processing Standard for Poultry Meat, issued by Food Standards Australia New Zealand. The 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. Regular audits of the food safety management system are undertaken by the relevant jurisdictional authority and/or the processor to whom the farmer is contracted, to ascertain that appropriate measures are in place to ensure food safety and animal health.

²³ www.farmbiosecurity.com.au/livestock/chickens/meat-chicken-production-biosecurity

An auditable industry animal welfare standard for all aspects of the chicken meat industry – including hatcheries, breeder farms and grow-out farms – provides a detailed and solid framework for operators within the industry.²⁴ Processors are encouraged to integrate these industry 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.

Implementation of welfare standards and biosecurity measures relies heavily on the integrated nature of much of the chicken meat industry. Processors have contractual arrangements with growers, and are themselves bound by the requirements of customers, especially the quick-service restaurants and supermarket chains. The Chicken Meat Program of the Rural Industries Research and Development Corporation is developing training tools, including DVDs, to help implement these measures.

In addition, all major customers, such as the supermarkets and quick-service restaurant chains, require processors and farmers to meet their own stringent standards relating to areas such as food safety, animal welfare, animal health and environmental impact. Since the beginning of 2014, one major supermarket has required its suppliers to comply with the RSPCA Approved Farming Scheme standard, which is independently audited. Chickens farmed with access to an outside range area are mostly farmed under the Free Range Egg and Poultry Australia standard, which is also externally and independently audited.

1.5.7 Australian duck industry quality assurance program

In May 2010, the Australian Duck Meat Association (ADMA) and AHA jointly produced the *Farm biosecurity manual for the duck meat industry*.²⁵ This manual, which supersedes individual duck producers' operation manuals, contains an auditable checklist. The manual was produced to complement the requirements of the Primary Production and Processing Standard for Poultry Meat.

Previously, the duck industry's on-farm biosecurity and QA measures were taken from the *National farm biosecurity manual – poultry production*. The new biosecurity manual is more suited to duck production and allows for better QA of duck meat and byproducts.

In 2009, the duck industry adopted the *National water biosecurity manual – poultry production*²⁶ to ensure that

water sanitation systems used on commercial duck farms meet national biosecurity standards.

Model code of practice for the welfare of animals – domestic poultry (4th edition)²⁷ outlines the welfare standards for the Australian poultry industry. The duck industry follows this code, and processors are encouraged to integrate these requirements into their in-house QA systems.

The ADMA has trained personnel to operate as industry liaison officers, and as members of the CCEAD and the National Management Group, in the case of an EAD incident.

1.5.8 Q-Alpaca

Q-Alpaca, designed and managed by the Australian Alpaca Association Ltd, 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.

Q-Alpaca has a number of intentions:

- The program encourages development and adoption of relatively straightforward strategies to diagnose, monitor and manage known diseases.
- It reduces the risk of an EAD affecting a herd in the event of such a disease outbreak.
- It reduces the risk of introducing certain preventable infections and infestations, or transferring them to another alpaca herd.
- The health of participating alpaca herds is closely monitored. All deaths within the herd must be investigated by an approved veterinarian – this requirement relates to all dead alpacas 12 months of age and over, and all dead alpacas under 12 months of age that show signs of wasting and diarrhoea. Necropsy is a requirement of the program to exclude the presence of Johne's disease, and to note cases of severe worm infestation, liver disease, gastric ulceration, liver fluke infestation and coccidiosis. Q-Alpaca participants may choose to investigate other diseases and causes of death through the necropsy and follow-up tests.
- 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.

24 www.chicken.org.au/page.php?id=241

25 www.farmbiosecurity.com.au/wp-content/uploads/2012/11/Farm-Biosecurity-Manual-for-the-Duck-Meat-Industry.pdf

26 www.farmbiosecurity.com.au/wp-content/uploads/2012/11/National-Water-Biosecurity-Manual-Poultry-Production.pdf

27 www.publish.csiro.au/Books/download.cfm?ID=3451

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

1.5.9 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 Pty Ltd Board and administered by AUS QUAL Pty Ltd – 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 (formerly RABQSA) third-party auditor. Certification is provided by AUS-QUAL. Beekeepers selling direct to the public undergo an annual audit. Those selling bulk honey to packers undergo an audit 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 and disease status)
- extraction (process, facilities and equipment)
- biosecurity
- hygiene (personal, machinery maintenance, sanitation, vermin control)
- purchases (inventory lists, stocktake activities)

- equipment calibration
- internal and external audit results
- staff training register
- occupational health and safety issues.

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

1.5.10 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.²⁸ This document was developed in consultation with the chief veterinary officers of each state and territory, and has been endorsed by the 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.

Australian Renderers Association rendering quality standards and accreditation

The Australian standard *Hygienic rendering of animal products* (AS 5008) provides the framework for producing safe rendered products in Australia. First published in 2001 and revised in 2007, the standard is based partly on the Australian Renderers Association (ARA) Inc. *Code of practice for hygienic rendering of animal products*.²⁹ 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.

²⁸ www.sfmca.com.au/info_centre/documents/185

²⁹ www.ausrenderers.com.au/index.php/downloads/file/33-ara-code-of-practice-2011

Each state and territory requires rendering plants to abide by the standard. Compliance is verified by audits. These must be conducted by, or on behalf of, state and territory food authorities, or by independent auditors, who recommend accreditation of rendering plants according to an accreditation scheme managed by the ARA. The independent auditors report audit results to the ARA and the Department of Agriculture. 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)³⁰ 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 pet food. 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

Australian seafood is caught, farmed, processed and sold by a wide range of industry operations, each of which considers 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 tailored to their own operations.

In 2003, the Australian standard for the production of seafood that is safe and suitable for human consumption was revised. The standard reflects the seafood industry's commitment to providing seafood that is produced in accordance with internationally recognised standards, and meets the requirements of domestic and international customers and food safety authorities.

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),³¹ 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 as a whole 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(s) 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.

The SIRP does not override or take precedence over other strategies. However, it has a potential role in managing the third of these strategies.

30 www.ava.com.au/petfast

31 www.fishnames.com.au



iStock photo: superjoseph



Animal Health Australia



Chapter 2

Terrestrial animal health

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 quarantine 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. For some endemic diseases (e.g. Johne's disease), government and industry have agreed that a nationally coordinated program is necessary to reduce the risk of disease spread between regions and individual properties.

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 Nationally notifiable animal diseases

The National List of Notifiable Animal Diseases³² of terrestrial animals facilitates disease reporting and control. 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 regularly reviewed by Animal Health Committee; it was last reviewed in early 2013. 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.

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 2014.

Table 2.1 Australia's status for OIE-listed diseases of terrestrial animals, 2014

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
<i>Brucella abortus</i> (infection with)	Free	Australia declared freedom in 1989
<i>Brucella melitensis</i> (infection with)	Free	
<i>Brucella suis</i> (infection with)	Serological evidence	Maintained in feral pigs in northern Australia. Rare occurrence in domestic pigs
Crimean Congo haemorrhagic fever	Free	Never occurred
<i>Echinococcus granulosus</i> (infection with)	Present	
<i>Echinococcus multilocularis</i> (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
New World screw-worm fly (<i>Cochliomyia hominivorax</i>)	Free	Never occurred
Old World screw-worm fly (<i>Chrysomya bezziana</i>)	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

32 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, 2014 *continued*

Disease	Status	Date of last occurrence and notes
Multiple-species diseases		
Rinderpest virus (infection with)	Free	1923. With the global eradication of rinderpest in 2011, all countries are free
Surra (<i>Trypanosoma evansi</i>)	Free	Never occurred
<i>Trichinella</i> spp. (infection with)	Not reported	<i>T. spiralis</i> is not present. <i>T. pseudospiralis</i> is present in wildlife
Tularaemia	Free	Never occurred
Vesicular stomatitis	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 2014
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. 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 from EBL on 31 December 2012
Haemorrhagic septicaemia	Free	Never occurred. Strains of <i>Pasteurella multocida</i> 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
Lumpy skin disease	Free	Never occurred
<i>Mycoplasma mycoides</i> subsp. <i>mycoides</i> 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	<i>Theileria parva</i> and <i>T. annulata</i> are not present
Trichomonosis	Present	
Trypanosomosis (tsetse borne)	Free	Never occurred

Table 2.1 Australia's status for OIE-listed diseases of terrestrial animals, 2014 *continued*

Disease	Status	Date of last occurrence and notes
Sheep and goat diseases		
Caprine arthritis–encephalitis	Present	Voluntary accreditation schemes exist
<i>Chlamydophila abortus</i> (enzootic abortion of ewes, ovine chlamydiosis) (infection with)	Not reported	Never occurred
Contagious agalactia	Not reported	<i>Mycoplasma agalactiae</i> 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 (<i>Brucella ovis</i>)	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 (<i>Salmonella</i> 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
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
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

Table 2.1 Australia's status for OIE-listed diseases of terrestrial animals, 2014 *continued*

Disease	Status	Date of last occurrence and notes
Swine diseases		
African swine fever	Free	Never occurred
Classical swine fever virus (infection with)	Free	1962
Nipah virus encephalitis	Free	Never occurred
Porcine cysticercosis	Free	Never occurred
Porcine reproductive and respiratory syndrome	Free	Never occurred
Swine vesicular disease	Free	Never occurred
Transmissible gastroenteritis	Free	Never occurred
Avian diseases		
Avian chlamydiosis	Present	
Avian infectious bronchitis	Present	
Avian infectious laryngotracheitis	Present	
Avian mycoplasmosis (<i>Mycoplasma gallisepticum</i>)	Present	
Avian mycoplasmosis (<i>M. synoviae</i>)	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
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. <i>Salmonella</i> 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

Table 2.1 Australia's status for OIE-listed diseases of terrestrial animals, 2014 *continued*

Disease	Status	Date of last occurrence and notes
Bee diseases		
<i>Acarapis woodi</i> (infestation of honey bees with)	Free	Never occurred
<i>Paenibacillus larvae</i> (American foulbrood) (infection of honey bees with)	Present	
<i>Melissococcus plutonius</i> (European foulbrood) (infection of honey bees with)	Present	Not known to occur in Western Australia
<i>Aethina tumida</i> (small hive beetle) (infestation with)	Present	Restricted distribution
<i>Tropilaelaps</i> spp. (infestation of honey bees with)	Free	Never occurred
<i>Varroa</i> spp. (varroosis) (infestation of honey bees with)	Free	<i>Varroa destructor</i> has never been reported in Australia
Other diseases		
Camel pox	Free	Never occurred
Leishmaniasis	Australian variant present	Rare. Australian <i>Leishmania</i> was not reported in 2014 from macropods. A case of <i>L. infantum</i> occurred in an imported dog

OIE = World Organisation for Animal Health

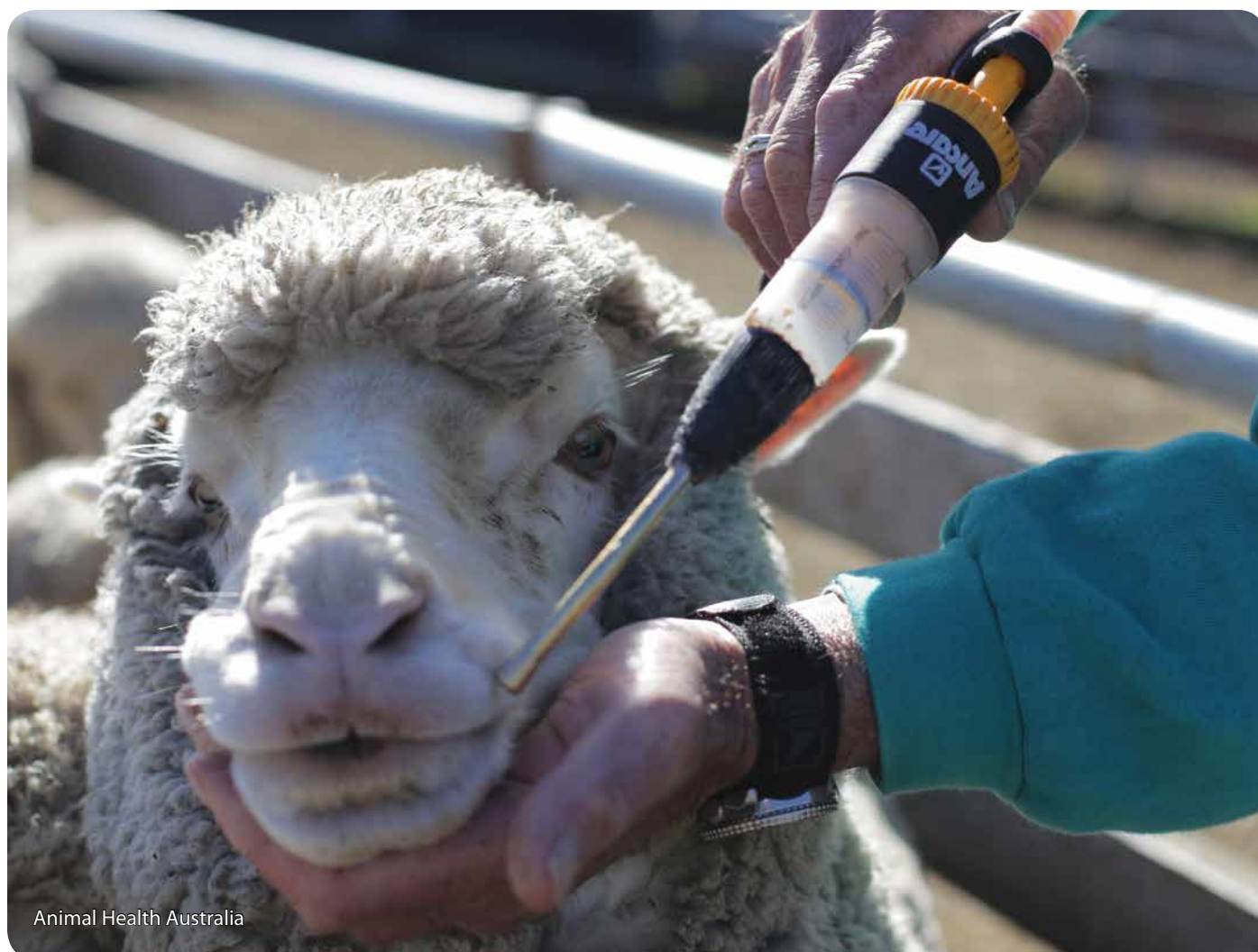


Table 2.2 Australia's status for other diseases of terrestrial animals that are reported to the OIE each year, 2014

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 <i>Salmonella</i> infections	Present	
Listeriosis	Present	
Melioidosis	Present	Restricted distribution
Nosemosis of bees	Present	
Salmonellosis (<i>Salmonella</i> Abortusequi)	Free	Never reported
Sheep mange	Free	1896
Strangles	Present	
Swine erysipelas	Present	
Toxoplasmosis	Present	
Ulcerative lymphangitis	Free	Never reported
Vibronic 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 National Animal Health Information System (NAHIS) collates data from a wide range of government and nongovernment 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.

Figure 2.1 summarises the sources of data in NAHIS, including surveillance and monitoring programs, control programs, diagnostic laboratories and veterinary investigations.

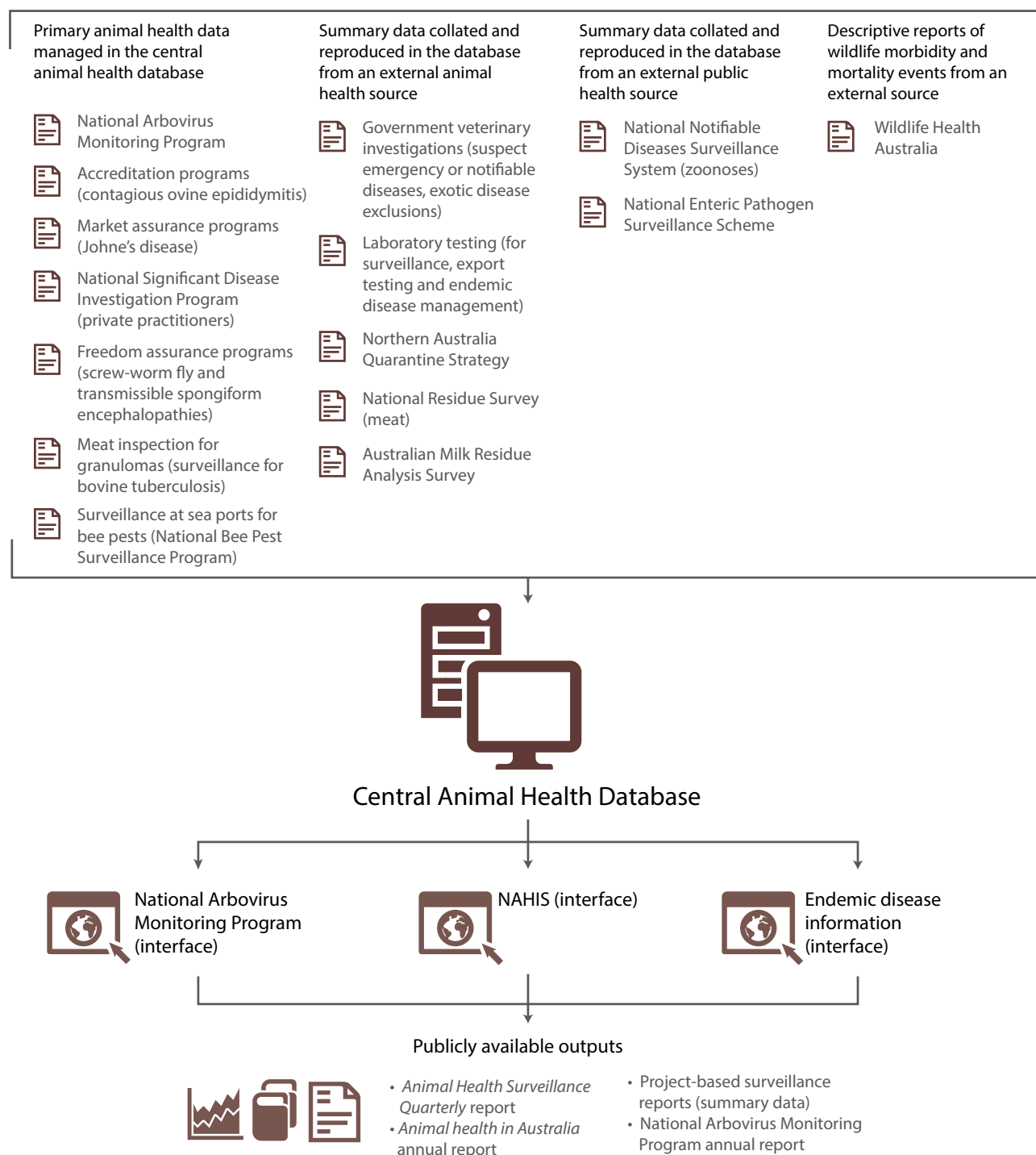


Figure 2.1 National Animal Health Information System data sources, interfaces and reports

All computer 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 and disease information sheets; the National Arbovirus Monitoring Program Information System (NAMP/Info) 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.³³

2.4 Endemic diseases of national significance

This section describes the status of, and programs for, endemic animal diseases of national significance in 2014. 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.

The Australian Honey Bee Industry Council, state and territory governments, the Australian Government Department of Agriculture, and Plant Health Australia have begun preliminary discussions on establishing a National Bee Biosecurity Program to target all established pests and diseases of honey bees, with a major focus on American foulbrood.

³³ www.animalhealthaustralia.com.au/programs/disease-surveillance/national-animal-health-information-system

New South Wales

In New South Wales, from December 2013 to November 2014, 61 beekeepers had an outbreak of AFB, with 325 hives officially recorded as being infected.

In areas with a high incidence of AFB, the Biosecurity Compliance Unit of the New South Wales Department of Primary Industries (NSW DPI) 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 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/or diseased hives, and helping with the removal of some of these hives for destruction.

The take-home message to industry is 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, Fisheries and Forestry (DAFF) conduct monthly information sessions for beekeepers in various locations, which cover sterilisation, control and management techniques. During 2014, 111 submissions, most of them consisting of multiple samples, were made to Queensland DAFF's Biosecurity Science Laboratory for diagnosis of American and European foulbrood. Of these, 67 contained one or more samples that were diagnosed as positive for AFB by microscopic examination.

South Australia

AFB is present to varying degrees throughout South Australia, except for Kangaroo Island, which remains free from the disease. Detection of AFB is achieved predominantly through a combination of apiarist reporting, packer testing and active disease surveillance. During 2014, 14 of 198 submissions (7%) tested positive for AFB in honey or bee smear samples, and seven beekeepers had some of their 3000 hives affected with AFB.

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 provides a diagnostic service that allows beekeepers to monitor the AFB status of their apiaries and allows the department to monitor infected apiaries. These measures support a quality assurance program, B-Qual, which has been adopted by the industry (see Section 1.5.9). The percentage of infected apiaries in 2014 remains 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 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 2014.

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, a division of Queensland DAFF, 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 to 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 South Johnstone and west towards Mutchilba. Natural movement is expected to lead to further slow spread of the bee. A number of research and development projects started under the AHB T2M program and continued through 2013–14. Projects are under way to capitalise on opportunities to further 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 Rural Industries Research and Development Corporation, the Commonwealth Scientific and Industrial Research Organisation (CSIRO), and Horticulture Australia Limited 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.

New South Wales

SHB is widespread in New South Wales beehives. Researchers at the Elizabeth Macarthur Agricultural Institute have invented the APITHOR trap, which provides good control and is safe.

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 Department of Primary Industry and Fisheries conduct targeted surveillance. No detections were reported in 2014.

Queensland

SHB is identified as 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 DAFF 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.

South Australia

There was no evidence of SHB in South Australia in 2014.

To assist with keeping the state SHB-free, hives, package bees, used hive equipment, beeswax, pollen, propolis, used appliances, queen cells, queens and escorts, and any other bee products are prohibited entry into South Australia unless accompanied by both written permission from the South Australian Chief Inspector of Stock and a completed health certificate declaring freedom from all stages of SHB. Before countersigning any health certificate, state departments are encouraged to request evidence that beekeepers have undertaken significant inspections to confirm the absence of SHB.

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 Environment and Primary Industries.

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 to be carried out; 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 (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

One anthrax incident occurred during 2014. Ten sheep, including both ewes and lambs, died on a property in the Cobar district of the Western Local Lands Services region in late September. A total of 1220 sheep were at risk, 500 of which had been mustered for lamb mulesing. Samples from a lamb and a ewe tested by the district veterinarian using immunochromatographic tests (ICTs) were positive and negative, respectively. Anthrax was confirmed by polychrome methylene blue staining at the State Veterinary Diagnostic Laboratory at Menangle. Fifty-three cattle on agistment on a separate part of the property were not considered to be at risk. No sheep had been moved on or off the property during the previous 10 months.

Six people who were potentially exposed during husbandry activities with the lambs received advice from their doctors and NSW Health.

The property, located in the known anthrax endemic area, was managed according to the NSW DPI anthrax policy. The property was placed in quarantine, contaminated areas were disinfected and all carcasses were burned to ash. All at-risk sheep were vaccinated. The quarantine was released after 42 days.

During 2014, anthrax was excluded in 95 investigations of livestock mortality: 65 cattle; 26 sheep, including one Barbary sheep; 3 horses and 1 kangaroo. Alternative diagnoses for cattle included bloat, clostridial infections, hepatitis/hepatopathy, plant poisonings (*Cestrum parqui*, *Pteridium esculentum*, *Nerium oleander* and nitrate/nitrite poisoning from an unknown plant), lead toxicity, urea toxicity, selenium deficiency, peritonitis, hardware disease, gunshot, hypocalcaemia and hypomagnesaemia. Alternative diagnoses for sheep included mycotoxicity (*Aspergillus clavatus*), *Pasteurella multocida* pneumonia, peritonitis, redgut, urolithiasis, lactic acidosis, dehydration and hepatopathy. No alternative diagnoses were determined for the horses or kangaroo.

Victoria

No reports of anthrax were made in Victoria during 2014. A total of 69 anthrax exclusion investigations were undertaken – 64 on cattle, 2 on sheep, 2 on horses and 1 on a goat. The last recorded case of anthrax in Victoria was in September 2009.

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 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 in Australia. 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 2014, the program had 52 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 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

CAE is a notifiable disease in Victoria. Five clinical events were reported during 2014.

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 *R. microplus* or cases of tick fever were reported in South Australia, Tasmania or Victoria during 2014.

New South Wales

Cattle tick generally occurs only in the far north-eastern corner of New South Wales. 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.

During the year, 93 new cattle tick infestations were recorded, an increase on the previous two years. Increased straying during a prolonged dry season and poor on-property biosecurity were identified as reasons for the rise.

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.

Tick fever was confirmed twice in New South Wales in 2014, both involving single cases: one due to *B. bovis* in a cow introduced from Queensland two days previously

and the second due to *B. bigemina* in a beef herd with cattle tick present. Tick fever occurs in New South Wales infrequently, averaging about one outbreak every two 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 2014 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 for 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 2014 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 DAFF 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, 56 approved providers are available to provide services at 27 clearing dips and 2 livestock inspection centres (spray stations). Approved providers are trained and monitored by Queensland DAFF biosecurity officers.

Queensland DAFF 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 DAFF provides laboratory services for the analysis of dip fluids, and for testing and identification of acaricide-resistant strains of cattle ticks.

At the end of June 2014, when the Queensland cattle tick season ended, 122 infested properties in the free zone and 174 infested properties in the control zone were under movement restrictions. An additional 1449 properties in the free and control zones had a cattle tick status of either at risk (high) or at risk (low).

During 2014, 46 incidents of babesiosis – with an average mortality rate of 8.6% (range 0–71%) of at-risk animals – and 5 incidents of anaplasmosis – with an average mortality rate of 11.4% of at-risk animals – were confirmed through the Queensland DAFF veterinary laboratory.

Live vaccines produced by Queensland DAFF's Tick Fever Centre are used to control babesiosis and anaplasmosis. During 2014, the centre sold 611 960 doses of trivalent vaccine (94% chilled and 6% 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 Equine herpesvirus 1

Equine 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 by detection of intranuclear inclusion bodies during examination of tissue samples under a microscope. However, definitive diagnosis of EHV-1 infection – in cases of either abortion or neurological disease – requires detection of the virus 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.

During 2014, abortion from EHV-1 was definitively diagnosed in one mare in South Australia, five mares on two horse properties in Victoria and one mare that aborted a full-term foal on a property in the Lockyer Valley, Queensland.

2.4.9 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.

2.4.10 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 affects cattle, goats, alpaca and deer. In 2012, a novel 'bison' B strain was detected in cattle in Queensland. Investigations are in progress to better understand the nature and extent of this new strain.

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 (see Figure 2.1) and are available on the AHA website.³⁴

Regulatory programs for Johne's disease operate in the north of Australia, Western Australia and South Australia. In other parts of southern Australia, the emphasis is on control of the disease by producers, especially in the south-eastern dairy and sheep industries, where Johne's disease is endemic.

In 2014, 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 2014.

Beef cattle

BJD has rarely been detected in the northern and western beef industry. However, three clinical cases were detected in a Queensland beef herd in late 2012, following detection of a single case in another, smaller herd during 2011. Tracing from the 2012 detection has resulted in a small number of additional detections in traced animals, and one infected herd, which appears to have been infected from another source. 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 447 producers, about 344 of whom have had the infected or suspect statuses of their herds resolved. A key element of the scheme is the nonfinancial 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 of 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 2013–14 financial year, approximately 9418 consignments, comprising 1 938 629 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.

34 www.animalhealthaustralia.com.au/programs/johnes-disease/market-assurance-programs-maps

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 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.

2.4.11 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 ND 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 2013–16³⁵ 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 level of risk 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 2014 from the previous year.

Northern Territory

There are no commercial poultry flocks in the Northern Territory.

Queensland

In Queensland, all commercial operators of farms with 500 or more birds are required by law to vaccinate their poultry against ND. Vaccination is in accordance with the *National Newcastle Disease Management Plan 2013–16* for a medium-risk state, as agreed by the national steering committee.

The 2013–16 management plan has reduced compulsory vaccination requirements for broilers, 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 nonvaccination of broilers, combined with surveillance activity. One major broiler company has chosen this option and ceased ND vaccination from October 2014; the other two major broiler companies in Queensland are continuing to vaccinate their broiler flocks.

During 2014, no virulent ND or precursor ND viruses were detected in Queensland. All detections of ND virus have been categorised as lentogenic or vaccine-like strains.

35 www.animalhealthaustralia.com.au/wp-content/uploads/2011/04/National-Newcastle-Disease-Management-Plan-2013-2016.pdf

South Australia

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

No ND viruses were detected in poultry in South Australia during 2014.

Tasmania

In Tasmania, meat chickens are exempt from the requirement to vaccinate flocks with more than 1000 birds, provided that they comply with passive surveillance requirements under the *National Newcastle Disease Management Plan 2013–16*. 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 2014, 11 permits were issued for the purchase and use of approximately 31 million doses of ND vaccine on 61 properties.

Western Australia

In Western Australia, owners of 1000 or more chickens are required to vaccinate long-lived birds, keep vaccination records and undertake any testing required. ND vaccination of meat chickens kept for less than 24 weeks is not required, and permits to purchase ND vaccine are no longer required. Targeted auditing of producer compliance is undertaken. It is compulsory to report and collect samples from any flock meeting the ND case definition. The nationally agreed biosecurity standards are strongly promoted to industry, and routine surveys of biosecurity practices are conducted.



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2.4.12 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 2014 are shown in Table 2.3.

Table 2.3 Ovine brucellosis accredited-free flocks, at 31 December 2014

State	Accredited-free
New South Wales	827
Queensland	79
South Australia	522
Tasmania	80
Victoria	496
Western Australia	195
Australia	2199

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 the adoption of 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 2014, the scheme covered 827 flocks, predominantly stud flocks.

Northern Territory

The Northern Territory has no sheep industry.

Queensland

Queensland has a voluntary ovine brucellosis accreditation scheme for stud flocks. In December 2014, 79 flocks were accredited. Although a number of new flocks were accredited throughout 2014, severe drought conditions and dispersal of some flocks are likely to have contributed to a number of flocks also exiting the scheme.

South Australia

A voluntary ovine brucellosis accreditation scheme operates in South Australia. Currently, 413 producers and 522 flocks are accredited. South Australia has a low incidence of ovine brucellosis, which continued in 2014.

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 80 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 2014, infection was detected in eight flocks.

A voluntary ovine brucellosis accreditation scheme, which is administered by the Victorian Department of Environment and Primary Industries, 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 2014, 496 flocks were accredited in Victoria as free from ovine brucellosis.

Western Australia

A voluntary ovine brucellosis accreditation scheme is available to ram breeders in Western Australia. As of December 2014, the scheme had 195 accredited flocks.

2.4.13 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 for the past 20 years, and the state was declared a protected area for footrot in 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 2014. 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. A trial is being undertaken to assess the ability of strain-specific footrot vaccines to eradicate footrot from large sheep flocks in Tasmania.

Footrot is not regarded as a significant problem in Queensland, and no clinical cases were reported in 2014.

There are no commercial sheep flocks in the Northern Territory.

2.4.14 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

B. suis infection has been detected in feral pigs in northern New South Wales, but it has not been reported in domestic pigs. *B. suis* has been detected in dogs that have been pig hunting in northern New South Wales, particularly around the Moree area. Infection has also been detected in dogs that have been fed raw pigmeat from feral pigs. Transmission of *B. suis* infection from the mother to the puppies around the time of birth is suspected in two young dogs with no known contact with feral pigs.

Queensland

In Queensland, *B. suis* is confined to some populations of feral pigs. A *B. suis* Accredited Herd Scheme is administered by Queensland DAFF 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 2014, no cases of *B. suis* infection were reported in South Australia.

2.4.15 West Nile virus

In the summer and autumn of 2011, an unprecedented number of cases of neurological disease in horses occurred across south-eastern Australia. A variant West Nile virus (WNV) strain, WNV_{NSW2011}, was identified as the causative agent for many cases. This virulent virus emerged in Australia. WNV_{NSW2011} is related to Kunjin virus, the indigenous WNV strain in Australia, but is substantially more neuroinvasive.

The clinical signs seen in horses infected with WNV_{NSW2011} were consistent with those described for West Nile fever (WNF). The OIE provides the following criteria to define the occurrence of WNF:

1. WNV has been isolated from an animal that shows signs consistent with WNF; or
2. viral antigen or viral ribonucleic acid specific to WNV has been identified in samples from one or more animals that show clinical signs consistent with WNF, or that is epidemiologically linked to a confirmed or suspected outbreak of WNF; or
3. antibodies to WNV have been identified in an unvaccinated animal that shows clinical signs consistent with WNF, or that is epidemiologically linked to a confirmed or suspected outbreak of WNF.

The experience of 2011, supported by recent research, leads to the conclusion that WNF as defined in the OIE *Terrestrial animal health code* is present in Australia. Australia can therefore no longer claim country freedom from WNF. To date, there have been no reports of WNF in Australia in species other than horses. The occurrence of the disease in any species, including wild species, is notifiable to the OIE.

Clinical WNF is on Australia's National List of Notifiable Animal Diseases. This means that there is a legal requirement for anyone who diagnoses WNF to immediately notify their relevant state or territory animal health authority.

No cases of WNV (Kunjin) were detected in 2014.



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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 supported by stock inspectors and biosecurity 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 2012 and 2013, Australian governments developed a draft Surveillance and Diagnostic Framework as part of the Intergovernmental Agreement on Biosecurity (IGAB). In 2014, each sectoral committee reporting to the National Biosecurity Committee, including Animal Health Committee (AHC), was asked to develop a National Surveillance and Diagnostic Strategy to underpin the framework, and detail the surveillance and diagnostic objectives to support Australia's livestock industries. The strategy will be completed early in 2015, and a national business plan and jurisdictional plans will subsequently be developed.

In a parallel process, industry and government representatives met at the National Animal Health General Surveillance Forum in November 2013. The forum established a steering committee that drafted terms of reference for improving Australia's general animal health surveillance system. During 2014, the steering committee used these terms of reference to begin drafting an Enhanced General Surveillance (EGS) business plan to present to industry and government.

AHC recognised that it would be optimal for the National Surveillance and Diagnostic Strategy to be completed first so that the EGS business plan could address relevant objectives in the strategy. This would also create synergies because the EGS business plan will form a component of the IGAB business plan. Drafting of the EGS business plan will progress once the final strategy is available.

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 disease status of stock in their districts – 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) in Geelong.

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. Examples of targeted surveillance in 2014 include defining the prevalence of ovine brucellosis on a regional basis in New South Wales, examining the distribution of *Theileria orientalis* (which causes disease in cattle) around Australia and its presence in potential vectors, examining *Brucella suis* in pig-hunting dogs in western New South Wales, and examining the causes of lamb mortality in Victoria.

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 for evaluating, clinically investigating and reporting outbreaks of significant disease in animals. Private veterinary practitioners provide information about their on-farm investigations, which is collected through the Australian Veterinary Practitioner Surveillance Network (AVPSN). 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).

Australian Veterinary Practitioner Surveillance Network

The AVPSN is a web-based program that collects information about on-farm investigations by nongovernment veterinarians. Veterinarians are recruited strategically across Australia's animal production regions to ensure geographic coverage, and coverage of the range of livestock industries and animal production systems in Australia.

The AVPSN supports Australia's disease-free reputation by providing quantitative information on the amount of farm-level general surveillance, and raises awareness of EADs among participating practitioners.

The AVPSN, along with the other elements of Australia's general surveillance system, is being reviewed holistically by governments and industry as part of the development of a National Surveillance Strategy and a National Surveillance Business Plan. This process aims to collate and prioritise numerous disparate surveillance activities to maximise the consistency and efficiency of EAD surveillance at the national level, for both early detection and proof of freedom (see Section 3.1.1).

National Significant Disease Investigation Program

The NSDIP was initiated to support veterinarians to conduct 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 funded from livestock industry and government subscriptions, the NSDIP³⁶ began in June 2009. 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 nongovernment 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 case 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

³⁶ www.animalhealthaustralia.com.au/programs/disease-surveillance/national-significant-disease-investigation-program

a legal responsibility to notify their relevant animal health authority for further action through this pathway.³⁷

In addition, some jurisdictions independently fund a similar, complementary program (see next section).

During 2013–14, private veterinary practitioners reported 185 significant disease investigations under the NSDIP.

Summary data of investigations by species and financial year are shown in Figure 3.1, and by syndrome and species in Figure 3.2.

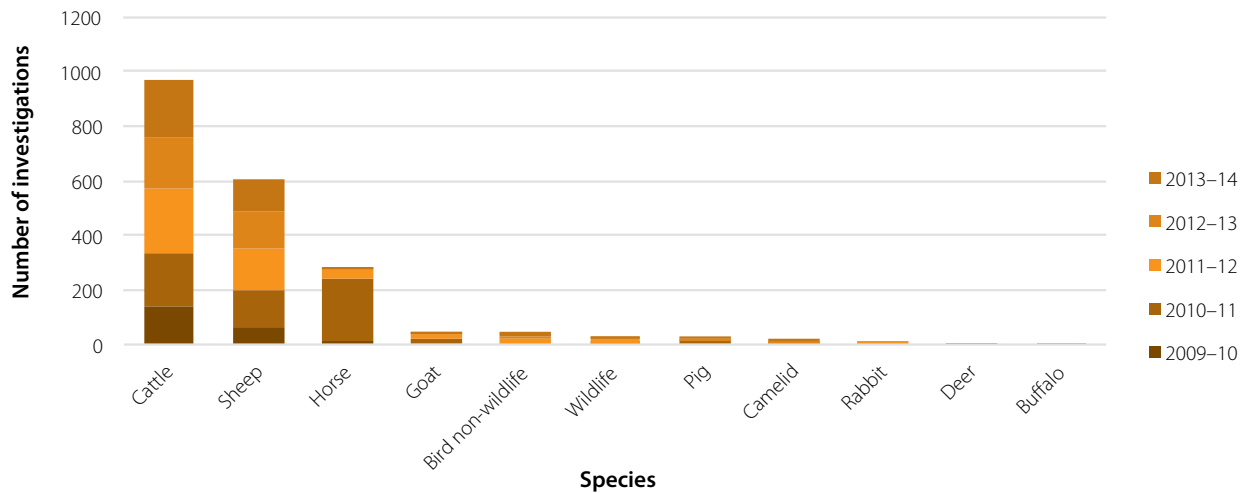


Figure 3.1 Number of investigations reported, by species, under the National Significant Disease Investigation Program, July 2009 to June 2014

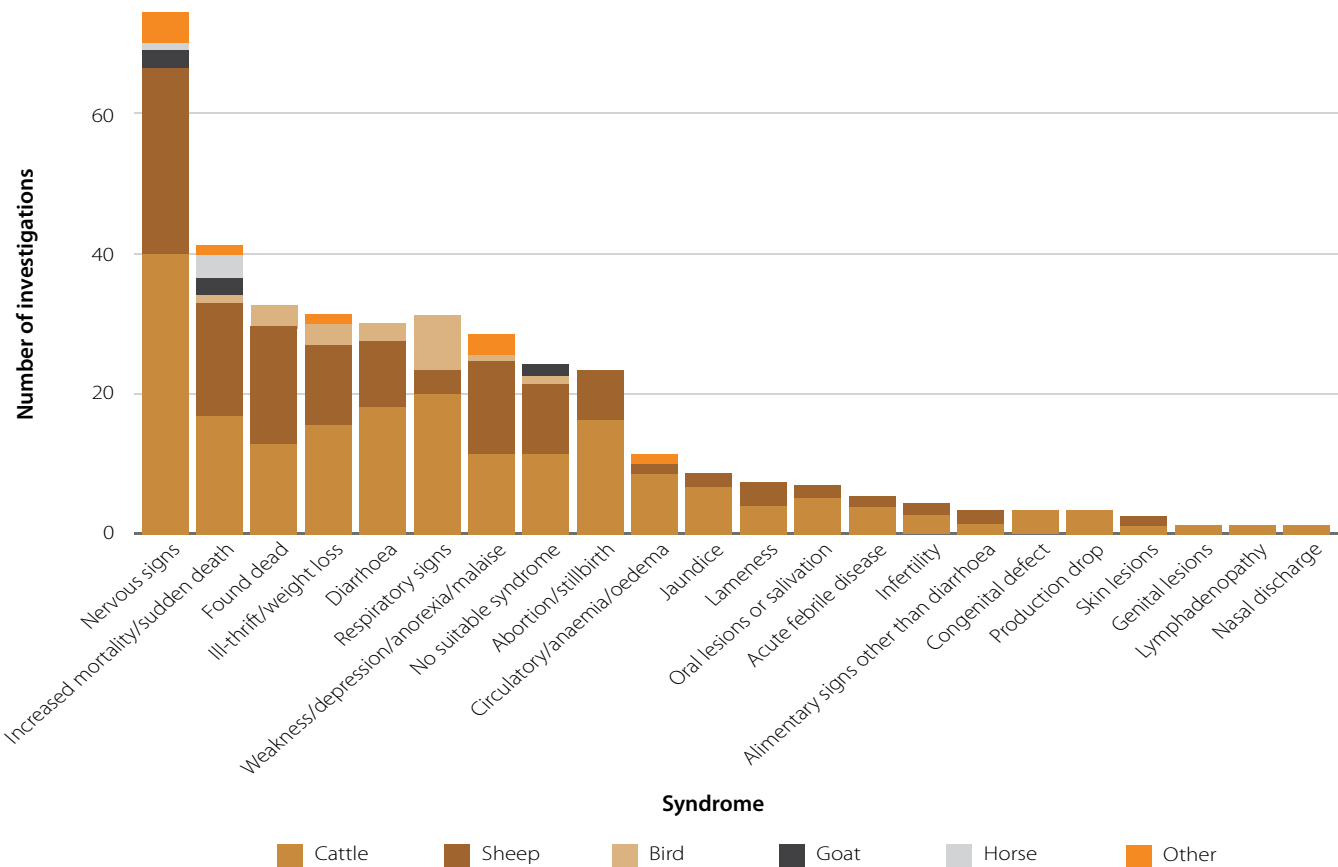


Figure 3.2 Number of investigations reported, by syndrome and species, under the National Significant Disease Investigation Program, July 2013 to June 2014

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



Brigette Heyer

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 displaying 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 are regularly visited or contacted by veterinary or biosecurity officers from the Queensland Department of Agriculture, Fisheries and Forestry (DAFF) 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.

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Image Rachael Gordon

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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 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 disease incident investigations 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 2014, practitioner liaison included workshops on brain removal, continued promotion of overseas training opportunities for private practitioners on foot-and-mouth disease, and the *Animal Health and Welfare* newsletter. The newsletter, which is issued three times per year, provides practitioners with brief reports of surveillance information from disease investigations and data from Tasmania's Animal Health Laboratory, and promotes relevant surveillance programs. A dedicated web page 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 Victorian Department of Environment and Primary Industries 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 2014, private veterinary practitioners investigated and reported approximately 290 disease events as part of the Victorian Significant Disease Investigation Program.

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

In 2014, the department offered two intensive courses in livestock disease investigation theory and field techniques. Fifteen private veterinary practitioners and three departmental staff completed the two-day training course. The department also delivered a series of one-day courses in field-based gross pathology techniques, with approximately 100 private veterinary practitioners and departmental staff attending. The department intends to continue offering this training on a regular basis in subsequent years.

Western Australia

Western Australia's animal health surveillance capability is underpinned by the network that has been established between private and Department of Agriculture and Food Western Australia (DAFWA) veterinarians and livestock owners. Private veterinarians form an integral part of the animal health surveillance network through regular contact with producers and provide vital disease investigation services to the livestock industries.

Western Australia promotes surveillance and reporting of significant livestock disease events by private practitioners through a range of activities. These activities include personal networking by departmental veterinary officers, regional training workshops in disease investigation, and the production of a monthly surveillance newsletter and a quarterly *Livestock Biosecurity* newsletter.

During 2014, DAFWA and the NSDIP sponsored approximately 73 investigations of significant disease

in livestock by private veterinarians. This included subsidising the cost of the veterinary practitioner investigation, paying travel costs, waiving all laboratory costs associated with the case, and providing assistance with collecting and dispatching appropriate samples. Practitioners, DAFWA field veterinary officers and pathologists liaise closely under the program.

The DAFWA Animal Health Laboratories also waive the charges of laboratory diagnostic work on cases of suspect notifiable diseases or cases that are considered to be of public benefit. During 2014, submissions from private veterinarians resulted in the investigation of approximately 1125 cases of livestock disease. Of these cases, approximately 250 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 cases of bovine TB were reported in 2000 in cattle and in 2001 in buffalo. A traceforward and traceback slaughter program was completed in both instances.

In 2010, bovine TB surveillance data were evaluated quantitatively using a scenario-tree methodology.³⁸ 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 version of the *Bovine tuberculosis case response manual – managing an incident of bovine tuberculosis*.³⁹ 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.⁴⁰

The *Australian standard for the hygienic production and transportation of meat and meat products for human consumption*⁴¹ requires that all carcasses and their parts

are inspected by a meat safety inspector. Because bovine TB is considered an exotic animal disease in Australia, suspicious granulomas identified during inspection of cattle carcasses 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 investigation of 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.



38 Martin P, Cameron A and 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.

39 www.animalhealthaustralia.com.au/programs/disease-surveillance/australian-bovine-tuberculosis-surveillance-project

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

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

Table 3.1 Serological tests for *Brucella abortus* in Australia, abortion serology, 2007–14

Number of tests ^a								
Species	2007	2008	2009	2010	2011	2012	2013	2014
Cattle	293	626	289	1313	939	1205	733	743
Dog	0	0	0	0	0	2	0	0
Pig	0	0	0	0	0	1	0	0
Total	293	626	289	1313	939	1208	733	743

a All test results were negative for *Brucella abortus*.

Table 3.2 Serological tests for *Brucella abortus* in Australia, other serology, 2007–14

Number of tests ^a								
Species	2007	2008	2009	2010	2011	2012	2013	2014
Alpaca	0	0	8	0	0	0	0	0
Cattle	13 209	9 860	5 672	11 398	4 936	4 880	8 960	7 259
Deer	519	0	53	0	0	0	0	0
Dog	0	0	0	0	0	0	0	0
Goat	2 190	0	905	0	9	64	0	0
Horse	9	0	0	2	1	0	0	0
Pig	0	0	18	0	0	11	0	0
Sheep	273	45	5	0	3	2	0	0
Total	16 200	9 905	6 661	11 400	4 949	4 957	8 960	7 259

a All test results were negative for *Brucella abortus*.

3.1.6 National Sheep Health Monitoring Project

The National Sheep Health Monitoring Project (NSHMP), which commenced in 2007, monitors lines⁴² of adult sheep in abattoirs for a number of important animal health conditions.

In the 2013–14 financial year, 3 082 347 sheep, excluding lambs, 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 carcass-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 industries' 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.

Monitoring of livestock in abattoirs also enables public health risk management for diseases such as hydatid disease. As well, 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

42 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.

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 noncompliance, lifting productivity and reducing costs.

The animal health conditions identified through monitoring occur throughout Australia, but vary in prevalence between regions. Information analysed to date shows that the proportion of affected lines for some conditions is high, but that the average number of sheep affected within a line is very low.

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 – previously the Australian Wildlife Health Network; see Section 1.3.2) 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 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 aquaria in Australia. A new surveillance program involving sentinel clinics that have a high wildlife case load began in 2014.

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 650 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.

In 2014, 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 with wildlife as part of their ecology 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 nongovernment agencies.

More than 984 wildlife disease investigation events were added to the national database in 2014.

Approximately 42% of these events were bats submitted for exclusion testing for Australian bat lyssavirus (ABLV); wild bird mortalities accounted for a further 41% 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, with a particular focus on 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 the important ecological functions performed by bats, such as pollination and insect control, leading to ecological and economic losses.⁴³ 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 results⁴⁴ as part of NAHIS. A total of 335 bats were tested for ABLV in 2014. Of these, 29 tested positive: 10 black flying foxes (*Pteropus alecto*), 14 little red flying foxes (*P. scapulatus*), 4 grey-headed flying foxes (*P. poliocephalus*) and an unidentified flying fox (*Pteropus* sp.). The proportion of tested bats infected with ABLV is higher than for previous years. The reason for this is not fully known. Although a real increase in ABLV prevalence in the wild bat population is possible, another likely explanation is a change in the factors affecting which bats were submitted for testing (e.g. location, or presence of neurological signs).

Queensland DAFF, through the Queensland Centre for Emerging Infectious Diseases,⁴⁵ targets Hendra virus and other emerging diseases in Queensland. Current projects relevant to surveillance in bats include Hendra virus infection and transmission dynamics in flying foxes, flying fox dispersal and Hendra virus risk, and the identification of lyssavirus variants in Australian microbats.

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 in wild bird mortality events includes exclusion of avian influenza, avian paramyxovirus and West Nile virus, where appropriate. In 2014, no wild bird mortality events were attributed to avian influenza or West Nile virus.

Findings in bird mortality events included aspergillosis, avian mycobacteriosis, avian chlamydophilosis, avian paramyxovirus, avian pox, botulism, coccidiosis, cryptosporidiosis, *Macrorhabdus ornithogaster* infection, salmonellosis, spironucleosis, poisoning, psittacine beak and feather disease, trichomoniasis and trauma.

Other wildlife disease investigations

Three mass mortality events involving eastern grey kangaroos (*Macropus giganteus*) were investigated in 2014: two in New South Wales and one in Queensland. In one event in New South Wales, more than 350 kangaroos were found dead or moribund between December 2013 and April 2014. Preliminary investigations detected a *Babesia*-like parasite in blood films, brain squash preparations and kidney impression smears. Intoxication by steroidal saponins from ingestion of toxic plants was diagnosed in the second event in New South Wales, in which more than 85 kangaroos were found dead or presented with blindness between April and May 2014.

In the mortality event in Queensland, more than 30 kangaroos were found dead or moribund in September 2014. Hepatopathy associated with fascioliasis, in addition to heavy burdens of both internal and external parasites, was diagnosed.

Lobomycosis-like disease was diagnosed in an Australian snubfin dolphin, following biopsy of a lesion from one of several affected breaching snubfin dolphins in September 2014. Panfungal polymerase chain reaction testing detected DNA most closely resembling *Paracoccidioides brasiliensis*, a taxon related to *Lacazia loboi*.

White-nose syndrome was excluded by laboratory tests, combined with local surveillance, in a northern free-tailed bat (*Mormopterus lumsdenae*) that presented with skin lesions in Queensland. White-nose syndrome, which is caused by the fungus *Pseudogymnoascus destructans*, has had a significant impact on bats in North America but has not been identified in Australia.



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

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

45 More information on the Queensland Centre for Emerging Infectious Diseases, and its research projects and partners is available at www.daff.qld.gov.au/research/research-areas/centre-for-emerging-infectious-diseases.

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 arboviral 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. This report covers the 2013–14 financial year.

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, strategic serological surveys of cattle herds and trapping of insect vectors.

Blood samples from groups of young cattle that have not previously been exposed to arboviral 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* survival. This increases the likelihood of detection.

The number and locations of herds 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 assess the seasonal intensity of infection with each arbovirus. The locations of monitoring sites in 2013–14 are shown in Figure 3.3.

Beatrice Hill in 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 (NAQS) of the

Australian Government Department of Agriculture in remote coastal regions of northern Australia, including Torres Strait.

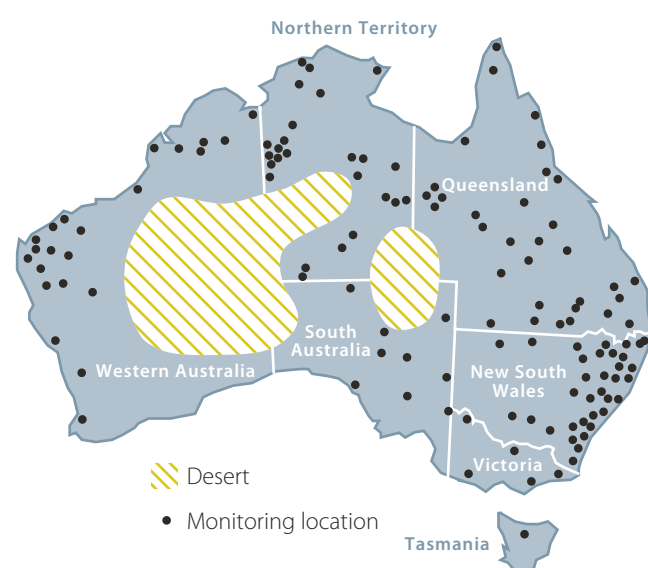


Figure 3.3 Locations of NAMP monitoring sites in Australia, 2013–14

Monitoring data for 2013–14

This report describes the limits of vector and virus distribution, and the areas free from bluetongue, Akabane and BEF viruses in the 2013–14 arbovirus transmission season.

Vector distribution

The distribution of bluetongue, Akabane and BEF viruses across the Australian continent is determined by the distribution of their insect vectors. Complex interactions with geography, climate and vectors prevent the viruses from becoming established in the southern and inland areas of Australia. Consequently, these areas are continuously free from these arboviruses. In the north, and in some of the eastern and western coastal areas, the distribution of arboviruses fluctuates from year to year, depending on the distribution of their insect vectors. The principal climatic factors influencing vector distribution are rainfall and temperature.

BTV is biologically transmitted by a limited number of species of *Culicoides* midges. The important vector species in Australia feed on cattle, and research indicates that they all originally arrived in Australia on air currents from neighbouring countries. The biting midge *C. brevitarsis* is the main vector of BTV and Akabane virus in Australia. A close relationship 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, include *C. actoni*, *C. dumdumi*, *C. fulvus* and *C. wadai*. The main vector of BEF virus is believed to be the mosquito *Culex annulirostris*. This mosquito is less susceptible to climatic extremes than *C. brevitarsis* and often has a wider distribution.

Vector trapping

Vectors in Western Australia were only collected in the Kimberley region. Specimens of *C. brevitarsis* were collected from the central and northern Kimberley throughout the year. Specimens of *C. wadai*, *C. fulvus* and *C. actoni* were occasionally collected, and the distribution of these species was limited to sites north of the Leopold Ranges in the Kimberley.

In the Northern Territory during the first quarter of the sampling year (July–September), specimens of the vectors *C. brevitarsis* and *C. actoni* were collected in low numbers – *C. brevitarsis* at Berrimah, Beatrice Hill, Douglas Daly and Katherine; and *C. actoni* at Beatrice Hill and Berrimah. In the October–December quarter, *C. brevitarsis* specimens were collected at all northern sentinel sites, and *C. actoni* was found only at Beatrice Hill. No collections of *C. fulvus* and *C. wadai* were made during these two periods. During the January–March quarter, *C. actoni* and *C. wadai* were found in low numbers at Beatrice Hill and Douglas Daly, and a single specimen of *C. actoni* was trapped at Victoria River. *C. fulvus* was collected in low numbers at Beatrice Hill.

In Queensland, the distribution of *C. brevitarsis* was extensive across all regions during 2013–14. Collections of *C. brevitarsis* occurred at both coastal sites (Seisia, Cooktown, Normanton, Innisfail, Townsville and Maryborough) and inland sites (Clermont, Dalby, Roma, Moonie, Chinchilla, Allora and Alpha). *C. wadai* was also detected during 2013–14, but only at Innisfail, Townsville and Maryborough. *C. actoni* and *C. oxystoma* – the less common species – were collected at Cooktown in the April–June quarter. *C. fulvus* and *C. dumdumi* were not detected at any site in Queensland during the sampling year. Ongoing drought conditions affected submissions at several sites in central and western Queensland.

In New South Wales, the 2013–14 season commenced in December with *C. brevitarsis* being detected in the far North, and on the North Coast and North West Slopes (Moree), and a single specimen trapped at the southernmost coastal site of Bodalla. By January, *C. brevitarsis* had spread; high numbers were detected south to Taree on the Mid North Coast, and low numbers were detected south to Berry. Vectors were present at these sites until April 2014. *C. brevitarsis* was detected in the Sydney and Hunter Valley regions from January to April, on the Great Dividing Range at the Northern

Tablelands in February and at Armidale in April. Inland, the vector distribution spread to Boomi, Moree, Lightning Ridge, Coonamble and further south to Boggabri (North West Slopes), where *C. brevitarsis* was detected from March to May. *C. brevitarsis* was also detected at Mudgee in April. *C. wadai* was not detected during 2013–14.

No competent vector species were detected in South Australia, Tasmania or Victoria in 2013–14.

Viral distribution and climate

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 transmission⁴⁷ has been detected for the past two years.

Seroconversions occurred in the central and northern areas of the Kimberley in Western Australia. Between July and December 2013, two detections in the surveillance zone resulted in the expansion of the BTV zone in the central and southern Kimberley. Daily maximum and minimum temperatures were above average in July–September 2013. In April–June 2014, a further zone extension occurred in the central and eastern Kimberley down to the Great Sandy Desert. In the north, the wet season began with heavy rainfall in November. Inland Western Australia received significant rainfall in summer, which continued until May for the Kimberley and large areas of the Pilbara. Serotypes BTV-1, BTV-20 and BTV-21 were detected in the Kimberley.

In the Northern Territory, seroconversions were widespread in northern areas. Monitoring showed that serotype BTV-1 was recorded at all sentinel sites during 2013–14, including Victoria River, where seroconversions occurred only during October–December 2013, and again in April 2014. In October–December 2013, rainfall was average over the north and west of the territory, but below average in the south. However, temperatures were above average for the whole of the territory. From October 2013 to June 2014, BTV-1 and BTV-20 were isolated from Beatrice Hill, while BTV-1 was isolated at Berrimah, Douglas Daly and Katherine.

Queensland experienced very dry conditions from September 2013 to June 2014, which led to several temperature and rainfall records being broken during the sampling year. The dry conditions resulted in destocking

of animals from properties and/or the sale of properties, which interfered with sample collection in all regions. Sampling showed that seroconversions occurred in the northern and central regions from July to September 2013, which coincided with areas of above-average rainfall north of Townsville, and above-average maximum temperatures and near-normal minimums. Virus activity in the north continued from October 2013 to June 2014 at Cooktown, Seisia, Weipa and Dajarra. In January, a rain depression associated with ex-tropical cyclone Dylan brought locally heavy falls to the interior, but, in May, large areas of inland Queensland had less than one-third of average rainfall. The southern region recorded activity at Chinchilla from January to March, and no seroconversions were detected at sites in the central region in the April–June quarter. BTV-1 occurred in all regions during the year.

BTV seroconversions in New South Wales were first recorded during January 2014 on the North Coast. Seroconversions then progressed down the coastal region to Paterson in February, Scone (Hunter Valley) in March, the Sydney Basin in April, and Nowra and Milton on the South Coast in June and July, respectively. Activity was also detected on the far North Coast from March. Between April and July, seroconversions were detected on the eastern ranges (near Armidale and Yarrowitch), the Northern Tablelands (Inverell and Glen Innes) and North West Slopes (Moree and Wyallda). BTV-1 was detected at all sites, except on the far North Coast at Lismore and Casino, where BTV-21 was detected (BTV-1 was also detected at Casino). The limited frost activity on the eastern ranges and coastal plain towards the end of June 2013 preceded the extensive BTV transmission that started in early 2014. Rainfall over the 12-month period from July 2013 was 'below average' to 'lowest on record' across the region where BTV activity was detected. At the end of the 2014 transmission season, frost activity was first recorded in early May 2014 on the Northern Tablelands but was then infrequent until mid-June. Generally, mild temperatures (minimum temperature up to 2–4 °C above average) were recorded along the entire coastal plain until the last week of June 2014.

In South Australia, minimum temperatures were generally around average during 2013–14, and rainfall ranged from average to above average from January to June. Tasmania was generally warm, and summer was relatively dry in most parts of the state. Throughout spring and early summer, Victoria experienced very much below-average rainfall across the north and north-west of the state, with contrasting above-average rainfall in southern areas. Victorian temperatures were above average during most of the sampling year, except in winter. However, no BTV activity was detected in South Australia, Tasmania or Victoria (Figure 3.4).

46 www.animalhealthaustralia.com.au/programs/disease-surveillance/national-arbovirus-monitoring-program

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

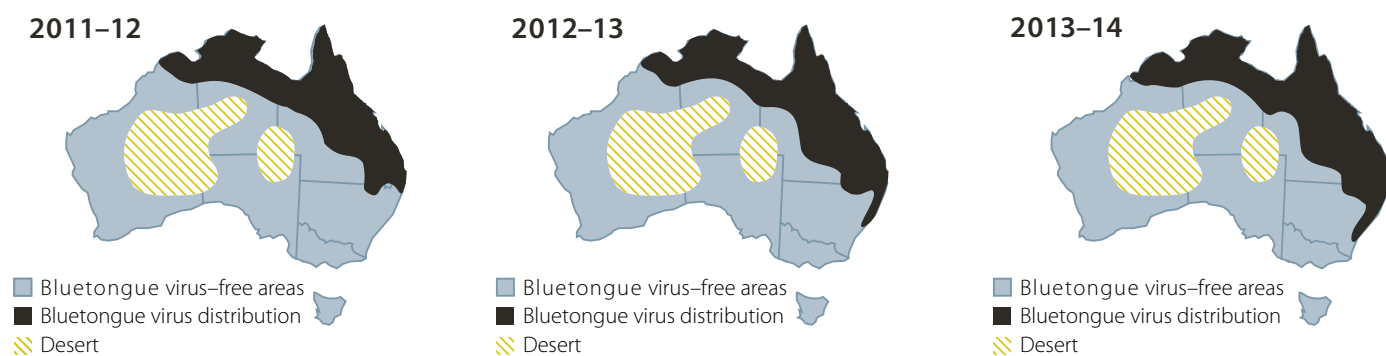


Figure 3.4 Distribution of bluetongue virus in Australia, 2011–12 to 2013–14

Akabane virus distribution

Evidence of Akabane seroconversions commenced in the July–September 2013 quarter in northern Western Australia, the Northern Territory and Queensland. Since Akabane virus is endemic in the Northern Territory, testing was not conducted. For Queensland, detections occurred as far south as Chinchilla, Allora and Quilpie (southern region).

In New South Wales, Akabane virus activity was detected on the far North Coast from December 2013, extending along the coastal plain south to Bodalla (South Coast) by April 2014. Seroconversions were also detected on the Northern Tablelands, on the North West Slopes and in the Hunter Valley. The incidence of seroconversions was low at all sites. Cases of Akabane virus-affected calves have not been reported. South Australia, Victoria and Tasmania continued to show no evidence of Akabane virus transmission (Figure 3.5).

Bovine ephemeral fever virus distribution

Monitoring data showed that BEF seroconversions in Western Australia sporadically occurred in the Kimberley, with one report in the Pilbara. In the Northern Territory, BEF seroconversions were widespread during the monitoring year (Beatrice Hill, Berrimah, Douglas Daly, Victoria River, Katherine and Garrithyia) and were often associated with clinical disease. Seroconversions were also widespread throughout the year in the northern, central and southern regions of Queensland.

In New South Wales, BEF virus transmission was limited to the far North Coast in the Casino and Grafton regions during April and May 2014, and near Warialda on the North West Slopes during April 2014. Cases of BEF were confirmed by real-time PCR or seroconversions. The cases of BEF recorded are most likely due to suitable conditions for mosquito breeding after the rainfall recorded across New South Wales during March 2014.

No virus activity was detected in South Australia, Victoria or Tasmania during the year (Figure 3.6).

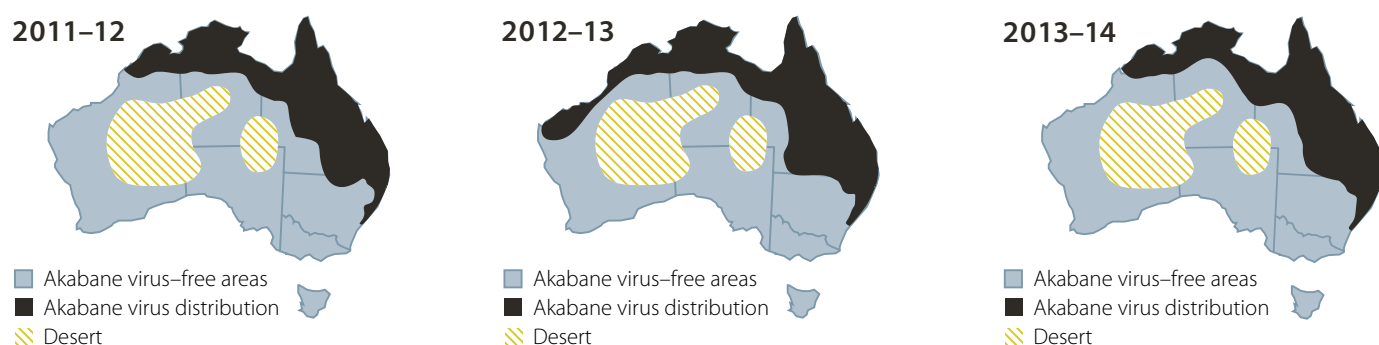


Figure 3.5 Distribution of Akabane virus in Australia, 2011–12 to 2013–14

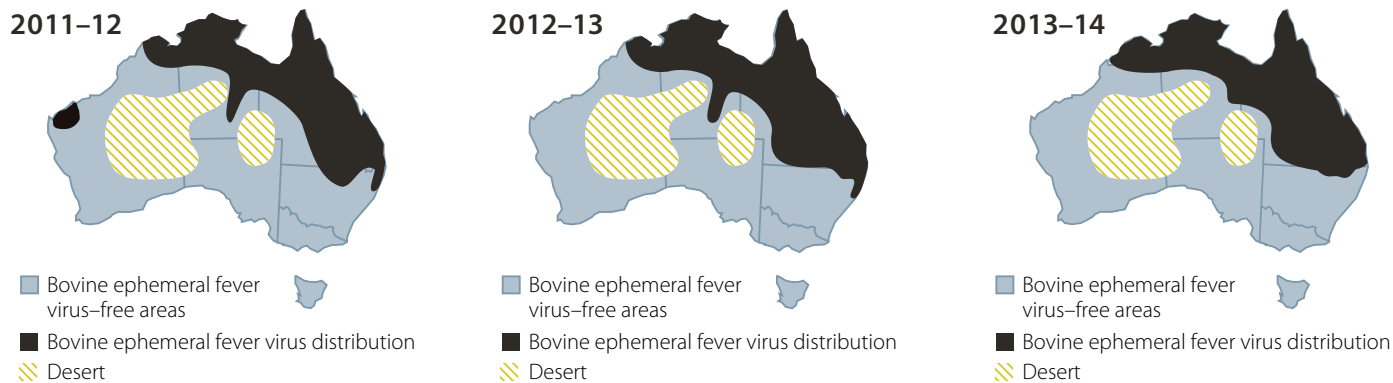


Figure 3.6 Distribution of bovine ephemeral fever virus in Australia, 2011-12 to 2013-14



3.2.2 Transmissible Spongiform Encephalopathies Freedom Assurance Program

In 2014, 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' sheep and from 'clinically consistent',⁴⁸ 'fallen'⁴⁹ and 'casualty slaughter'⁵⁰ cattle. Details of the sampling program for sheep and cattle are provided in the NTSESP *National guidelines for field operations*.⁵¹

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.

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.

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



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 *Terrestrial animal health code*, Chapter 11.4, on surveillance for BSE.

49 Fallen cattle are defined by 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 by the OIE 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

During 2014, three sheep were detected with atypical scrapie as part of the NTSESP: an eight-year-old ewe diagnosed in Victoria and two ewes in Western Australia, aged two and four years. More information on these detections is provided in Section 4.5.3.

Table 3.3 shows the results from the NTSESP for the 2013–14 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 the feeding of ruminant meat and bone meal 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 2013–14 financial year, 511 operations were inspected, from renderers to end users. This revealed 37 instances of noncompliance, one of which required prosecution. During the same period, 11 671 audits were completed through industry quality assurance programs. One required referral to the relevant state agency.

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 and tested as part of the NTSESP, then incinerated or buried. The Cattle Council of Australia funds the removal of these cattle from the Australian herd.

Program communications

During 2013–14, 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 producers to report animals with TSE-consistent clinical signs and use NTSESP testing for diagnosis
- a series of pamphlets for stockfeed manufacturers and users, promoting awareness of their responsibilities under the ruminant feed-ban legislation
- web pages about the components of the TSEFAP on the AHA website.

Table 3.3 Summary of results from the National Transmissible Spongiform Encephalopathies Surveillance Program, 2013–14

State or territory	Cattle			Sheep	
	Number examined	Points ^a	Number positive	Number examined	Number positive
New South Wales	169	55 094.1	0	208	0
Northern Territory ^b	36	14 240.8	0	0	0
Queensland	208	56 829.7	0	34	0
South Australia	24	10 665.0	0	69	0
Tasmania	28	5 376.7	0	13	0
Victoria	233	73 077.3	0	266	0
Western Australia	57	20 211.7	0	230	0
Total	755	235 495.3	0	820	0

a Points are awarded according to the criteria in the OIE *Terrestrial animal health code*.

b There are no commercial sheep farms in the Northern Territory.

⁵² www.animalhealthaustralia.com.au/programs/disease-surveillance/national-animal-health-information-system

3.2.3 Screw-worm Fly Freedom Assurance Program

Old World screw-worm fly (SWF; *Chrysomya bezziana*) is a serious threat facing Australia’s livestock industries. Old World SWF is an obligate parasite of warm-blooded animals in the tropics. It is endemic throughout much of Africa, parts of the Middle East, the Indian subcontinent and Southeast Asia, including countries to Australia’s north. In 1973, Australian authorities, recognising the threat posed by SWF, began a long-term research and development effort, initially in Papua New Guinea and then in Malaysia. The aim was to investigate the biology and ecology of SWF, develop large-scale mass rearing technology for SWF, and then adapt this technology for use in the sterile insect technique to eliminate any incursion of SWF into Australia.

Findings from this research were considered in 2001, and in 2002 responsibility for coordinating Australia’s future SWF preparedness was transferred to AHA. AHA

currently manages an ongoing Screw-worm Fly Freedom Assurance Program (SWFFAP), in consultation with industry and government stakeholders.

Screw-worm fly surveillance

SWF surveillance uses a multifaceted approach, including adult fly trapping in Torres Strait and at seaports, sample collection from myiasis cases in livestock and wildlife, and animal surveys. This approach increases the capacity for early detection of SWF incursions, which increases the probability of a successful eradication program.

Nationally collated SWF 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 surveillance data (excluding vessel inspection data) are reported in NAHIS. Figure 3.7 provides a summary of the data from adult fly trapping. The locations of SWF traps in 2014 are shown in Figure 3.8.

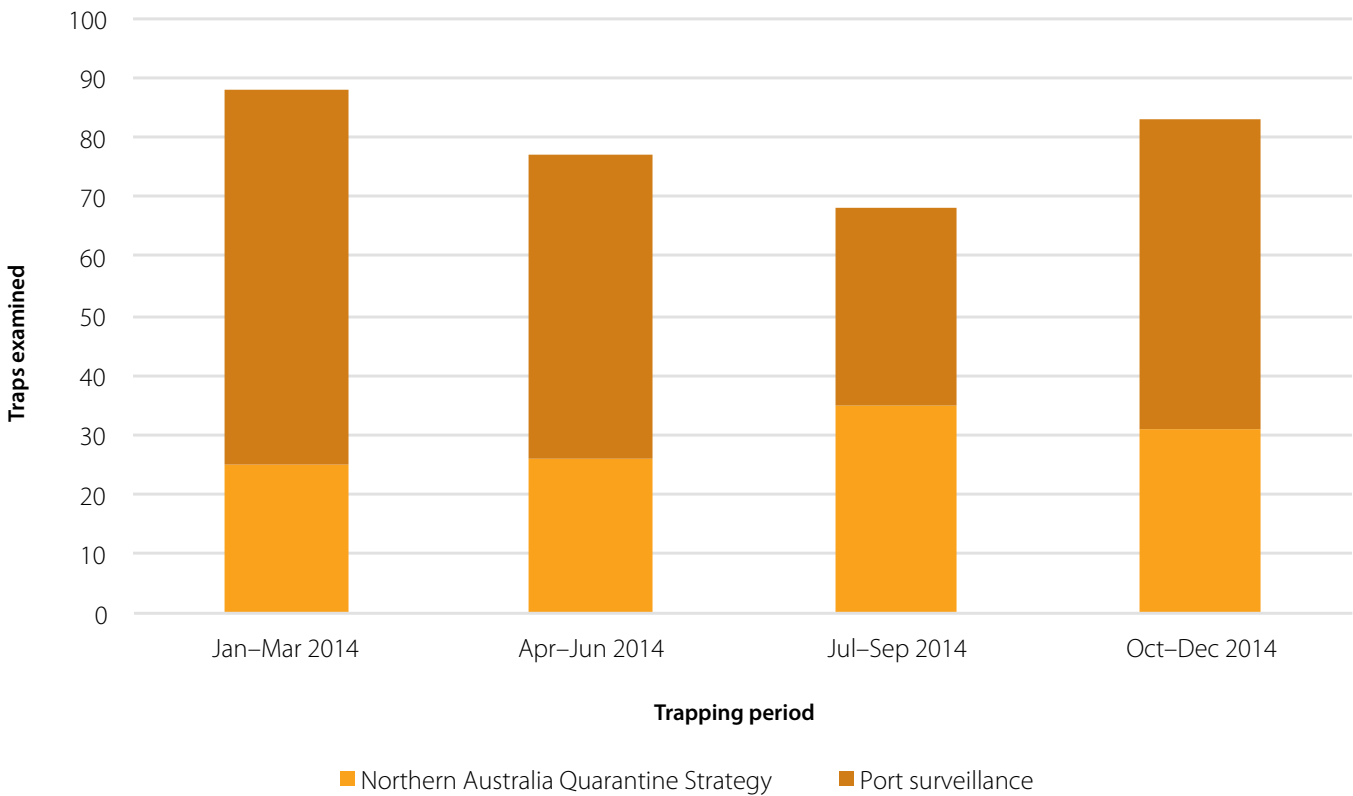


Figure 3.7 Summary of adult screw-worm fly trapping in 2014



Figure 3.8 Locations of screw-worm fly traps in 2014

Communications

A communications program focuses on producers in northern Australia, live export yards and abattoirs. In 2014, SWF was included in awareness/call-to-action material developed for, and distributed to, livestock producers and smallholders, as part of a renewed *Spotted Anything Unusual?* national campaign. In addition, NAQS provides awareness material through its engagement with local communities and visitors to the Torres Strait region.

Review

During 2013 and 2014, an external consultancy reviewed the risks of entry of SWF into Australia and surveillance requirements. A review report was subsequently received and accepted by the SWFFAP National Advisory Committee. Findings from the review are currently being considered by the committee in the development of a new business plan.

3.2.4 National Avian Influenza Wild Bird Surveillance Program

Activities under the National Avian Influenza Wild Bird (NAIWB) Surveillance Program are conducted 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 investigation of 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 2014, targeted wild bird surveillance took place in New South Wales, the Northern Territory, Queensland, South Australia, Tasmania, Victoria, Western Australia and Norfolk Island. A total of 8140 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 H1–H11 were detected in 2014.

The NAIWB Surveillance Program continues to help inform policy for prevention and management of avian influenza outbreaks in Australian poultry flocks. 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 strains of highly pathogenic avian influenza H5 or H7 in the event of an outbreak of these subtypes in chickens. The program also ensures that laboratory capacity for high-throughput molecular testing is available in Australia. 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 (the One Health approach).

3.2.5 National Bee Pest Surveillance Program

The National Bee Pest Surveillance Program (NBPSP)⁵³ 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.

On 1 July 2013, the NBPSP became a cost-shared initiative for two years between the honey bee industry, industries that rely on pollination (represented by Horticulture Innovation Australia⁵⁴) and the Department of Agriculture. Plant Health Australia (PHA) has managed the program

⁵³ www.planthealthaustralia.com.au/national-programs/national-bee-pest-surveillance-program

⁵⁴ Previously Horticulture Australia Limited

since 2012. PHA, the honey bee industry, pollination-reliant plant industries, research and development agencies, and governments are currently working towards implementing a long-term funding agreement for the NBPSP from 2015–16.

Significant improvements were made to the NBPSP in 2014, including:

- publishing a 140-page operations manual.⁵⁵ The manual was developed by PHA to summarise surveillance methods, diagnostic information, detection and reporting of pests, and how to respond in the event of detection
- adopting the recommendations from the CSIRO port risk assessment report⁵⁶ and including additional high-risk ports as part of the NBPSP, as well as increasing the level of surveillance at some existing high-risk ports
- deploying 20 remote surveillance hives (empty hives with cameras, which can be monitored remotely by computer) in ports as part of a national trial of this new surveillance method
- developing floral maps and initiating floral sweep netting in high-risk ports that are considered a likely entry point for exotic pest bees, such as Asian honey bee (*Apis cerana*), red dwarf honey bee (*A. florea*) and giant honey bee (*A. dorsata*). Floral maps document the floral resources in the port area, and sweep netting of the flora every two months determines the presence or absence of these pest bee species
- increasing the involvement of hobby beekeepers in coordinated surveillance for exotic pests, such as varroa mites. This involves beekeepers using simple detection methods such as sugar shaking and alcohol washing on hives in areas surrounding high-risk ports
- increasing the number of sentinel hives; by the end of 2014, more than 146 sentinel hives had been established and were being monitored every eight weeks with a sticky mat and a miticide strip – this is an increase from 128 sentinel hives in 2013.

During 2014, more than 50 catch boxes (empty hives) were deployed at many southern ports as an additional surveillance measure. These catch boxes are used to detect bee swarms in the port area and test the bees for exotic pests, such as varroa mites. If the trial of remote surveillance hives is successful, PHA will work with stakeholders to gradually replace these catch boxes.

Formalised surveillance for small hive beetle (SHB; *Aethina tumida*) across Australia continued (see section 2.4.4). 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.

PHA is negotiating with all stakeholders to continue to implement changes to the NBPSP. These changes, some of which include the incorporation of additional surveillance techniques, and more surveillance at high-risk ports, are being promoted to assist in the early detection of pest bees and exotic bee pests. These changes reflect an ongoing transition to a more broadly based surveillance program for bee pests and pest bees. The revised NBPSP will increase the efficiency of detection of both internal and exotic mites, and of exotic bees that occur in Asia (Asian honey bee, red dwarf honey bee and giant honey bee).

As well as providing early detection of bee pests and pest bees, the NBPSP supplies data to support health certification for exports of queen bees and packaged bees.



Bugwood

⁵⁵ www.planthealthaustralia.com.au/wp-content/uploads/2014/12/NBPSP-Operations-Manual.pdf

⁵⁶ The report identified Australian ports at high risk for the entry of exotic bees and/or bee pests, based on interception data, shipping movements, shipping origin and duration, and port berthing locations, as well as whether conditions at the ports were favourable for bees to establish.

Tables 3.4 and 3.5 show sample data from sentinel hives located at Australian ports in 2014 and other surveillance activities.

Table 3.4 Samples examined for pests of bees, by state or territory, 2014

State or territory	Specimens examined
New South Wales	150
Northern Territory	125
Queensland	124
South Australia	73
Tasmania	108
Victoria	140
Western Australia	148
Total	868

Table 3.5 Samples examined for pests of bees, by agent, 2014

Agent	Specimens examined
Pest bees (<i>A. cerana</i> , <i>A. florea</i> , <i>A. dorsata</i>)	13 ^a
Tracheal mite	156 ^b
Small hive beetle	142 ^c
<i>Varroa</i> and <i>Tropilaelaps</i> mite ^d	557 ^e
Total	868

a The development of floral maps and coordinated floral sweep netting began in late 2014 around Australia for the detection of pest bees. This figure is the number of floral sweep netting surveillance runs conducted.

b Tracheal mite specimens examined included 30–60 bees from sentinel hives being randomly selected and morphologically dissected to determine tracheal mite presence.

c Small hive beetle samples included APITHOR traps, oil traps and hive inspection of sentinel hives in the Northern Territory, Tasmania and Western Australia.

d Number of sentinel hives tested with an acaricide and a sticky mat.

e 800 additional sugar shaking, alcohol washing and drone uncapping samples were collected from hives across Australia during 2014.

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 Department of Agriculture's NAQS 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 Indigenous 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.

Existing surveillance measures focus on early detection and reporting 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 2014, 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, rabies, SWF and highly pathogenic avian influenza
- contributing to national surveillance programs, including NAMP, the SWFFAP and the NAIWB Surveillance Program

- expanding the level of participation in biosecurity surveillance in Aboriginal and Torres Strait Islander communities through the community animal health reporting project and other initiatives
- participating in offshore surveillance and capacity-building activities in Timor-Leste and Papua New Guinea (coordinated by the Animal Health Policy Branch of the Department of Agriculture).

Specific disease surveillance strategies of interest in 2014 included the following:

- The community animal health reporting project in Aboriginal and Torres Strait Islander communities, which has been conducted since 2012, was expanded in 2014 to include island communities in Torres Strait. Through this project, land and sea ranger groups provide syndromic reports focused 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 on a quarterly basis from targeted groups within each community, including human health clinics, police stations, animal management or environmental health workers, hunters and private veterinarians. This has proven to be 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, and encourages community participation in the reporting of unusual signs of pests and diseases.
- Avian influenza surveillance included an integrated program of public awareness to encourage reporting of mortality events in domestic and wild avian species, and testing of serum, faecal environmental samples, and opportunistically collected cloacal and tracheal swabs from domestic poultry, wild waterbirds (ducks and waders) and shorebirds. In 2014, more than 1000 samples were tested as part of this surveillance program. No highly pathogenic avian influenza viruses were detected. Low pathogenicity H5 virus was detected from two sites, and subtypes H11N9, H4N2 and H2N7 were also identified. This surveillance contributes important information about the epidemiology of circulating avian influenza viruses in Australia and improves the sensitivity of laboratory diagnostic capability in Australia.
- 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. No evidence of JE virus transmission on the mainland was found, although inconclusive serological results were obtained from a single animal on the mainland during an animal health survey in May 2014. 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 visits 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 2014 were:

- 13 targeted animal health surveys delivered across northern Australia, with no confirmed detections of exotic pests or diseases
- 622 wild and domestic animals, including pigs, cattle, buffalo, horses, chickens and dogs, tested for a range of exotic pests and diseases
- 1440 environmental faecal and cloacal samples tested for avian influenza viruses
- 27 sentinel herd visits, with 413 samples tested
- 106 SWF traps set and inspected
- 30 000 biting midges (*Culicoides* spp.) identified from northern traps
- 45 community animal health reports received from 28 individual communities.

3.3.2 State and territory animal biosecurity in northern Australia

Surveillance and awareness activities for endemic and emergency pests and diseases are conducted across northern Australia by DAFWA, the Northern Territory Department of Primary Industry and Fisheries, and Queensland DAFF. 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. They also contribute to national pest and disease surveillance programs, including:

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

Activities are also conducted in aquatic animal health surveillance, EAD preparedness, and livestock identification and traceability.

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
- managing emergency pest and disease incidents
- on-farm biosecurity planning
- investigating suspect animal pests or diseases
- animal disease prevention strategies, including swill-feeding regulations
- animal welfare and ethics
- live animal export.

Government agencies also investigate reported outbreaks of disease and losses in livestock, wildlife and domestic animals.

There were no significant EAD events in northern Australia during 2014. Numerous exclusions of Hendra virus were made across the north, particularly in Queensland. Typical cases for Hendra virus exclusion involved horses with neurological symptoms and fever. Other EAD exclusions included examination of maggots collected from myiasis cases.

Extension programs conducted in northern Australia during 2014 included:

- visits by veterinary officers to private veterinary clinics to discuss procedures for investigation of suspected Hendra virus cases 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
- promotions at agricultural shows and field days, focusing on biosecurity programs
- one-on-one awareness sessions with cattle producers and private veterinarians about reporting or collecting maggots from wounds on cattle and other animals to exclude SWF
- 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 School of Veterinary and Biomedical Sciences, and practical field placements of veterinary science students from universities across Australia to provide students with experience in national surveillance programs, EAD preparedness and response, and on-farm biosecurity planning
- information sessions for apiarists on Asian honey bee, and bee pests and diseases
- information sessions for cattle producers on bovine Johne's disease.

3.4 Public health surveillance for zoonotic diseases

The Communicable Diseases Network Australia (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.

3.4.1 Communicable Diseases Intelligence

The Australian Government Department of Health publishes *Communicable Diseases Intelligence*,⁵⁷ an online, quarterly, peer-reviewed journal that disseminates information on the epidemiology of communicable diseases in Australia, including surveillance, prevention and control.

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 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 website⁵⁸ and quarterly in *Communicable Diseases Intelligence*. Data on five important zoonoses are reproduced in *Animal Health Surveillance Quarterly*.

Table 3.6 reports the incidence of selected zoonotic diseases in 2014 and compares these data with those for 2013 and the five-year mean.

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

58 www.health.gov.au/internet/main/publishing.nsf/Content/cda-surveil-ndss-ndssintro.htm

Table 3.6 Incidence of selected zoonotic diseases in humans, 2014

Zoonotic disease	Number of cases ^a		
	2013	2014	5-year mean (2010–14)
Anthrax	0	0	0.2
Barmah Forest virus infection	4238	739	2008.0
Brucellosis ^b	14	17	24.0
Kunjin virus infection	2	1	1.4
Leptospirosis	88	88	127.2
Murray Valley encephalitis virus infection	1	0	3.6
Ornithosis	47	38	61.6
Q fever ^c	485	450	400.2
Ross River virus infection	4309	5331	4918.6

a Data accessed on 30 January 2015 by diagnosis date

b Australia is free from zoonotic *Brucella* spp. except *B. suis*, which is endemic in feral pigs in some areas.

c The Australian Q Fever Register stores information on the Q fever immune status of individuals. The website www.qfever.org has general information on Q fever and information on the register.

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 nonhuman 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 2014 were campylobacteriosis⁵⁹ (19 651 cases) and salmonellosis (16 320 cases).

⁵⁹ This disease is not notifiable in New South Wales.





Chapter 4

Managing animal health emergencies

Emergency animal disease 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, emergency animal diseases (EADs). It also provides information on disease incidents involving terrestrial animals that occurred during 2014. Information on management of aquatic animal health emergencies and aquatic animal disease incidents during 2014 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) participates on behalf of 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).

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 Review of foot-and-mouth disease preparedness – response to the Matthews review

Following recommendations made by Mr Ken Matthews AO in *A review of Australia's preparedness for the threat of foot-and-mouth disease*,⁶⁰ Australia's National Biosecurity Committee agreed to develop a National Foot-and-Mouth Disease (FMD) Action Plan. The plan identifies priority activities for national action to address policy and capacity gaps, as well as actions currently under way and areas to be addressed through industry–government collaboration.

Through the collaborative efforts of the Australian Government Department of Agriculture, the states and territories, livestock industry groups and AHA, significant progress has been made in strengthening Australia's preparedness for an outbreak of FMD. Specific national FMD preparedness programs include:

- the training program for Australian veterinarians and livestock handlers in the real-time detection and control of FMD, run in Nepal by the European Commission for the Control of Foot-and-Mouth Disease (EuFMD; see Section 4.2.3)
- Exercise Odysseus – a national livestock standstill program; this was a national program of exercises based on simulation of the early days of an FMD outbreak (see Section 4.2.5).

In March 2014, the Department of Agriculture and the New Zealand Ministry for Primary Industries (MPI) signed a memorandum of understanding to collaborate on FMD preparedness. The Trans-Tasman FMD Action Plan builds on the strong collaboration in FMD preparedness and response between Australia and New Zealand. In addition to an increased level of information and intelligence sharing, this agreement has already led to:

- the training of 12 New Zealand veterinarians under the Australian FMD real-time training program
- several New Zealand MPI officers observing activities under Exercise Odysseus
- the start of a Centre of Excellence for Biosecurity Risk Analysis collaborative modelling project between the Department of Agriculture, the New Zealand MPI,ASUREQuality (a New Zealand–based biosecurity company) and the Australian National University; this project will assist decision making on appropriate response strategies for FMD in both countries, including the potential use of vaccination.

States and territories have also been improving their FMD preparedness, particularly through their involvement in Exercise Odysseus and other specific activities. For example, Queensland has initiated a three-year FMD Preparedness Program, which focuses on surveillance, prevention and response systems. The program includes consideration of vaccination strategies, mass animal destruction and disposal challenges, 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 are well advanced and are intended to be shared with other jurisdictions to enhance the national preparedness agenda.

Queensland has taken the lead for reporting progress in national FMD preparedness to the National Biosecurity Committee, and is working with all jurisdictions to provide a complete picture of the work being done in this area across the country.

4.1.2 Preparedness for 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 World Organisation for Animal Health (OIE) *Terrestrial animal health code*. Throughout 2014, reports continued of outbreaks of HPAI H5N1 in wild birds, poultry and humans in Asia. In addition, the low pathogenicity avian influenza (LPAI) H7N9 strain continued to cause human deaths in China.

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. The Department of Agriculture also maintains the Avian Influenza Toolkit website,⁶¹ which provides resources to help countries manage the threat of avian influenza and other EADs.

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 November 2013, Animal Health Committee (AHC) established a working

60 www.agriculture.gov.au/pests-diseases-weeds/animal/fmd/review-foot-and-mouth-disease

61 www.aitoolkit.org

group to provide advice on measures that might be adopted to reduce the recent and 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. Discussions with industry have been initiated, and will continue in 2015, to identify and implement the most practical ways to minimise the risk of avian influenza infection in the poultry industries.

The Department of Agriculture also focuses on border security activities, to detect illegally imported poultry and poultry products.

Through Wildlife Health Australia, the Department of Agriculture 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 8140 wild birds during 2014, and a variety of LPAI virus subtypes (including H5 and H7) were found.

In 2014, surveillance of poultry flocks for avian influenza continued. There were no detections of avian influenza in Australia during 2014.

4.1.3 Emergency Animal Disease Response Agreement

The EADRA⁶² is a legally binding agreement between the Australian Government, state and territory governments, livestock industries (currently 14 industries) and AHA. It supports a rapid and efficient response to an EAD outbreak. 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 2014, only minor and administrative updates were made. The latest version of the EADRA can be found on the AHA website.



Animal Health Australia

⁶² www.animalhealthaustralia.com.au/programs/emergency-animal-disease-preparedness/ead-response-agreement

Parties to the EADRA endorsed two new guidance documents, which are published on the AHA website:⁶³

- *Interpretation of compensation and cost sharing in the Emergency Animal Disease Response Agreement*
- *Normal commitments for parties to the Emergency Animal Disease Response Agreement.*

4.1.4 Australian Veterinary Emergency Plan

AUSVETPLAN⁶⁴ 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 briefs⁶⁵ 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*⁶⁶ describes the components of AUSVETPLAN and outlines their functional relationships.

Improved usability

AUSVETPLAN manuals are moving to an online system as part of a new edition 4 format that uses generic text that applies across all manuals. This will allow manuals to be revised more efficiently, and will also allow people involved in outbreaks to download or print documents that are tailored to their particular operational needs. Existing manuals are being entered into the online system in an agreed order of priority.

Updating prioritised AUSVETPLAN manuals

In 2014, AHA worked with the AUSVETPLAN Technical Review Group, industry and government experts, AHC and scientific editors to revise and publish updated prioritised AUSVETPLAN manuals.

The updated manuals published were:

- African swine fever (disease strategy) – a major revision to update the manual to the new edition 4 standardised format; and to incorporate new scientific knowledge about the disease and its control, updated information relating to recent amendments to the OIE standards, case definitions, and movement control matrixes
- an enterprise manual for the zoo industry – a major revision to update the format of the manual, and information relating to national requirements and international guidelines
- a guidance document on declared areas and premises classifications in an EAD response – a major revision to better define declared areas and other areas (e.g. transmission area) used for disease control purposes; and to include relevant considerations regarding OIE zoning and compartmentalisation, guidelines for reclassifying previously declared areas, definitions for various types of premises (approved processing facilities, dangerous contact processing facilities and premises of relevance), and improved flowcharts for the transition of premises classifications in restricted and control areas
- two new resource documents – one on destruction of birds, and one on trapping procedures for *Culicoides* insect vectors
- a new public information manual – this was developed by the Biosecurity Incident National Communications Network, comprising members from animal and plant health organisations and communications managers from relevant national, and state and territory agencies.

63 www.animalhealthaustralia.com.au/programs/emergency-animal-disease-preparedness/eadra-guidance-documents

64 www.animalhealthaustralia.com.au/programs/emergency-animal-disease-preparedness/ausvetplan

65 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.

66 www.animalhealthaustralia.com.au/wp-content/uploads/2011/04/AUSVETPLAN-Summary-Document.pdf (Note that the *Summary document* is in the process of being reviewed and renamed *Overview of AUSVETPLAN*.)

In addition to these major updates, AHA made minor updates to the FMD and Newcastle disease manuals. The FMD manual was updated with editorial changes. The Newcastle disease manual was updated by replacing the appendix on standard operating procedures for vaccination with a reference to the *Newcastle disease vaccination program – standard operating procedures*.⁶⁷

Revisions were also made in 2014 to the AUSVETPLAN disease strategies for Australian bat lyssavirus, avian influenza, porcine reproductive and respiratory syndrome, scrapie and screw-worm fly; and to the *Control centres management manual*, the *Disposal operational manual*, the *Valuation and compensation manual*, and the *enterprise manual* for the wool industry. These revisions are undergoing formal approvals processes.

4.1.5 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 a 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 website⁶⁸ address topics relevant to animal disease emergencies, such as personal decontamination, collecting samples, managing stock during a national livestock standstill and transporting carcasses.

The Biosecurity Emergency Preparedness Working Group of the National Biosecurity Committee has accepted responsibility for developing generic NASOPs that apply to all biosecurity responses, such as conducting briefings and debriefings.

In 2014, NASOPs relating to the implementation of a national livestock standstill were assessed as part of Exercise Odysseus (the program of exercises for a national livestock standstill; see Section 4.2.5). These NASOPs may be reviewed following analysis of the outcomes of Exercise Odysseus.

4.1.6 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 Department of Agriculture, 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.

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 chairs the NMG, and 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*.⁶⁹

67 www.animalhealthaustralia.com.au/wp-content/uploads/2011/04/Newcastle-disease-vaccination-program-Standard-operating-procedures.pdf

68 www.animalhealthaustralia.com.au/programs/emergency-animal-disease-preparedness/nasops

69 www.animalhealthaustralia.com.au/wp-content/uploads/2011/04/AUSVETPLAN-Summary-Document.pdf (Note that the *Summary document* is in the process of being reviewed and renamed *Overview of AUSVETPLAN*.)

4.1.7 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.

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. Development of Australia's EAD preparedness is coordinated through the Emergency Animal Disease Preparedness and Response Service Stream, which is

managed by AHA. 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 FMD outbreak 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. A new manufacture, storage and supply agreement came into effect on 15 December 2014, following expiry of the previous arrangements.

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 on to help eradicate or control the disease. AUSVETPLAN defines how a response to an EAD incident is to be conducted and the roles that require specific training.

The National Emergency Animal Disease Training Program provides education and training in the various EAD response functions. Face-to-face EAD awareness training provides government officers, private practitioners and industry members with a basic understanding of Australia's agreed response strategies. Formal accredited training, covering the skills and knowledge needed to perform a function during an EAD response, is available for government officers through in-house jurisdictional programs, and for industry members through AHA.



Governance

Oversight for the training program is provided by the National Animal Health Training Steering Committee (NAHTSC), which has representation from all relevant government agencies and industry. It coordinates the various elements of the training program, ensures national consistency in delivery of training and helps to prioritise 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 maintains a team of personnel capable of responding to biosecurity emergencies. This 'first-response' team is responsible for managing the initial response to an EAD, including staffing control centres and beginning field activities. First-response team members receive training in their EAD 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. AHA also 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 2014, training personnel participated in workshops on developing online learning courses, advanced training skills, and delivering training to people with diverse language, literacy and numeracy skills.

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 EAD 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.

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 4.1.6) – during an EAD response. In 2014, as part of the Exercise Odysseus national livestock standstill exercise (see Section 4.2.5), CCEAD and NMG representatives were able to practise their roles in simulation exercises.

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 2014, the RRT participated in numerous activities as part of Exercise Odysseus, a national program of exercises based on simulation of the early days of an FMD outbreak (see Section 4.2.5).

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.

Industry training

In 2014, industry personnel participated in regional, state and national exercises as part of the Exercise Odysseus program of activities (see Section 4.2.5).

4.2.3 Nepal real-time FMD training

In 2014, the Department of Agriculture extended its agreement with the EuFMD for the provision of real-time FMD training. Costs of the program are shared between the Australian Government, some state governments and peak industry organisations, and the New Zealand MPI. During 2014, six courses were conducted by the EuFMD in Nepal; three courses are confirmed for 2015. Since the first course in 2012, 139 Australian veterinarians and stock handlers 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. During 2014, Australia provided technical expertise and modelling capabilities to the EuFMD using the Department of Agriculture's newly developed national simulation model, the Australian Animal Disease model. This tool has been developed as a decision-support tool for EAD planning and preparedness.

Australia also continued to contribute actively to a multicountry FMD vaccination modelling study coordinated through the EpiTeam, a subgroup of the Emergency Management Working Group of the Quadrilateral Group of Countries (Australia, Canada, New Zealand and the United States). The use of vaccination to control an outbreak of FMD in a previously FMD-free country is increasingly being recognised as important, particularly given changes to the OIE guidelines on regaining FMD-free status.⁷⁰ In 2014, the EpiTeam completed a model comparison study⁷¹ that evaluated different vaccination strategies, to identify conditions under which vaccination may, or may not, be beneficial in managing an FMD outbreak. Data from the 2010 FMD exercise in the United Kingdom, Exercise Silver Birch, was used as the basis for the study.

Using the United Kingdom scenario, disease spread models predicted that vaccination was more effective than stamping out alone (i.e. destruction of infected herds) in reducing outbreak size and duration. Vaccination was also more effective when commenced earlier in the outbreak and when resource shortages were expected.

However, other work using certain Australian FMD scenarios has shown that vaccination did not reduce outbreak size and duration, particularly in extensive grazing situations.

The study provided important information on operational issues associated with using vaccines for FMD control, and added credibility to the use of simulation models in decision making about disease control. The findings will be used to develop and support more robust and acceptable policies for FMD control. Australia is also collaborating on an international project to evaluate the use of ensemble modelling methods – these attempt to improve the quality of model predictions by pooling findings from a range of models.

At a national level, modelling studies are used to support animal health policies in Australia. These studies include evaluating the resources needed to manage a large FMD outbreak, assessing welfare implications of movement restrictions during an EAD response and evaluating active surveillance measures to improve early detection of an FMD incursion. In 2014, the Department of Agriculture provided modelling support to the national standstill exercise (Exercise Odysseus) and to FMD preparedness projects in Queensland.

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.

As part of Australia's EAD preparedness, Exercise Odysseus – a series of discussion exercises and field-based activities – was conducted throughout 2014 to strengthen government and industry arrangements for implementation of a national livestock standstill. Testing response arrangements is an important part of preparedness for an EAD such as FMD.

Exercise Odysseus was planned and conducted by Australian, state and territory government biosecurity agencies; livestock and associated industries; and AHA.

The exercise was based on the scenario of an FMD outbreak and the first week of the response to the outbreak. It considered the roles of governments and industry, disease response plans and arrangements, livestock in transit, and the rapid provision of accurate public information. Issues associated with extending the standstill beyond 72 hours were also examined.

70 Under Article 8.7.9 of the OIE *Terrestrial animal health code*, six months are required before a country can regain its FMD-free status when a stamping-out policy, emergency vaccination and serological surveillance are applied.

71 Roche SE, Garner MG, Sanson RL, Cook C, Birch C, Backer JA, Dube C, Patyk KA, Stevenson MA, Yu ZD, Rawdon TG and Gauntlett F (2014). Evaluating vaccination strategies to control foot-and-mouth disease: a model comparison study. *Epidemiology and Infection* 31 Jul (Epub ahead of print):1–20.

In addition to assessing response arrangements, Exercise Odysseus provided an opportunity to raise awareness of:

- FMD and its potential impact on Australia's agricultural industries, environment, communities and economy
- the national plans and arrangements that enable a rapid response to FMD
- what people in various roles need to do when a national livestock standstill is implemented
- the importance of biosecurity practices and surveillance activities for early detection of EADs.

An essential element of Exercise Odysseus was continuous evaluation to identify potential improvements in current plans and arrangements, to ensure that a national livestock standstill can be implemented effectively.⁷²

4.2.6 Animal health diagnostic laboratories

Australia's animal health laboratories play a crucial role in the national capacity to respond to a disease emergency. Australia's 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 laboratories also serve as the national and/or OIE reference laboratories for specific EADs, providing in-depth investigational and research capacities, as well as training.

AHA contributes to Australia's network of animal health laboratories by managing AUSVETPLAN, the National Animal Health Laboratory Coordination Program⁷³ and the Australian Animal Pathology Standards Program (AAPSP).⁷⁴ These national programs meet future requirements for disease surveillance, in-depth case investigations, testing during emergencies, quality assurance and training. The AUSVETPLAN *Laboratory preparedness* management manual⁷⁵ details current laboratory standards and practices in 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 comprises images of endemic and exotic diseases in a wide range of terrestrial and aquatic animal species, for training and education of AAPSP members. The archive has been steadily growing in 2014, and currently holds more than 5000 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 in Australia participate in a quarterly histopathology proficiency testing program, which was launched in 2006. The testing covers written descriptions, morphological diagnosis and interpretation, and comments on the pathological changes detected in digitally scanned, stained tissue sections. The assessment forms part of the records of accredited laboratories that are audited by the National Association of Testing Authorities. In 2014, 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 the Sub-Committee on Animal Health Laboratory Standards (SCAHLs), aims to standardise or harmonise testing services for targeted EADs of terrestrial and aquatic animals in all member laboratories. This ensures 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 been working to standardise testing services for a number of EADs, including avian influenza, Newcastle disease, bluetongue, infection with Hendra virus, white spot syndrome and infection with ostreid herpesvirus-1 microvariant.

In 2013, through a project funded by the Department of Agriculture, LEADDR established screening capability for FMD, using serology and real-time polymerase chain reaction rather than proliferation of live virus, in interested member laboratories. In 2014, the Department of Agriculture continued to provide funding support to LEADDR for FMD proficiency testing as part of the network's ongoing quality assurance program.

72 More information on Exercise Odysseus can be found at the Australian Government Department of Agriculture website at www.agriculture.gov.au/animal-plant-health/emergency/exercises/exercise_odysseus.

73 www.animalhealthaustralia.com.au/programs/livestock-health/national-animal-health-laboratory-network

74 www.animalhealthaustralia.com.au/programs/livestock-health/australian-animal-pathology-standards-program

75 www.animalhealthaustralia.com.au/programs/emergency-animal-disease-preparedness/ausvetplan/management-manuals

In December 2014, a number of laboratory working groups were abolished as a result of the Australian Government Smaller Government reforms to eliminate duplication and waste, streamline services and reduce the cost of government administration. AHC will ensure that experts who provide laboratory-related advice on Australia's national animal health system will come together as needed.

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 2014, in addition to participating in various proficiency testing programs as part of its quality assurance program, LEADDR members continued to meet regularly, exchange scientific and technical information, and discuss new technical issues as they arose.

Regional and international networking for laboratories

To strengthen Australia's international relevance in 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, 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 2014, nationally consistent minimum guidelines for monitoring compliance with the prohibition on feeding of swill (prohibited pig feed), as well as enforcement actions, were further developed. Work is also progressing to reflect previously agreed definitions in legislation. These activities, which were facilitated by AHA, brought together the Australian Government, state and territory governments, and the pork industry. The work is currently being finalised, and will be implemented in early 2015.

While the national guidelines are being developed, existing state work plans addressing swill feeding are being implemented.

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 pest and disease outbreaks, and animal welfare incidents. Members are communication managers from the Australian, state and territory government agencies responsible for biosecurity, and from animal and plant health organisations.

In 2014, the *Biosecurity incident public information manual* was finalised and published as an AUSVETPLAN resource document.⁷⁶ The manual describes how public information will be delivered across all jurisdictions during a biosecurity incident.

The NCN continues to support national FMD preparedness initiatives, including participating in Exercise Odysseus. Two national communication exercises were held as part of Exercise Odysseus, involving industry communication managers from affected industries.

The NCN is also progressing work under the National FMD Action Plan to deliver more nationally consistent FMD communication and engagement activities across the country.

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 communicate its messages about 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 the Emergency Animal Disease Watch Hotline⁷⁷ and the Exotic Plant Pest Hotline⁷⁸ to report unusual signs of diseases or pests.

76 www.animalhealthaustralia.com.au/programs/emergency-animal-disease-preparedness/ausvetplan/resource-documents

77 Emergency Animal Disease Watch Hotline: 1800 675 888

78 Exotic Plant Pest Hotline: 1800 084 881

In 2014, a number of activities took place, including production and promotion of two videos featuring information on biosecurity practices for producers. These are the third and fourth videos of a series of six to be produced and made available on the Farm Biosecurity website and through other channels.

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. All plans can be found on the AHA⁷⁹ and Farm Biosecurity websites.⁸⁰

Australia's *National farm biosecurity technical manual for egg production*,⁸¹ published in 2015, is a cooperative initiative of AHA and Australia's egg production industry. The manual documents and raises awareness of best practice in biosecurity. Designed as an industry resource, the manual can be used by egg producers to gauge their own biosecurity requirements and implement biosecurity practices suitable for their particular circumstances. The practices listed in the manual have been incorporated as standards into the egg industry's quality assurance program, Egg Corp Assured. Every year, a third party audits each accredited egg producer against these standards.

4.5 Emergency animal disease responses in 2014

Appendix 3 lists investigations of potential exotic diseases and other EADs in Australia during 2014. 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.

4.5.1 Hendra virus in New South Wales and Queensland

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.

In 2014, four incidents were reported: in March in Bundaberg, Queensland; in June in Beenleigh, Queensland; in June in Murwillumbah, New South Wales; and in July in Gladstone, Queensland (see Table 4.1 and Figure 4.1). The Queensland and New South Wales governments implement well-established biosecurity and public health responses to Hendra virus incidents.

To date, 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. Hendra virus infection 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.

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 that have become infected have had very close contact with sick or dead infected horses. Infected 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 of flying foxes in any particular area being 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.

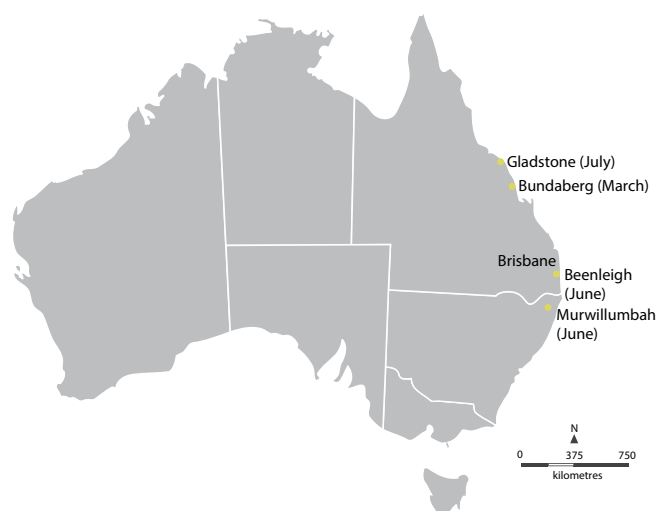
79 www.animalhealthaustralia.com.au/programs/biosecurity/biosecurity-planning

80 www.farmbiosecurity.com.au

81 www.farmbiosecurity.com.au/toolkit

Table 4.1 Hendra virus incidents, 2014

Location	State	Month	Equine cases	Canine cases	Human cases	Human deaths
Bundaberg	Queensland	March	1	0	0	0
Beenleigh	Queensland	June	1	0	0	0
Murwillumbah	New South Wales	June	1	0	0	0
Gladstone	Queensland	July	1	0	0	0
Total			4	0	0	0

**Figure 4.1 Locations of Hendra virus incidents, 2014**

4.5.2 Anthrax in sheep in New South Wales

Anthrax affected a small number of sheep on a single property near Cobar in western New South Wales in late September 2014 (see Section 2.4.5). Control measures were implemented based on agreed national response policy, including tracing and quarantine, burning of carcasses and vaccination. The disease did not spread beyond the single property. Human health authorities were notified, and public health precautions were implemented.

4.5.3 Atypical scrapie in sheep in Victoria and Western Australia

Single cases of atypical scrapie in aged sheep were confirmed in Victoria in July 2014, and in Western Australia in September 2014 and December 2014. In all three cases, CSIRO-AAHL confirmed that testing was consistent with the diagnosis of atypical scrapie and not classical scrapie. These were the third, fourth and fifth cases of atypical scrapie detected nationally.

Atypical scrapie, which can arise spontaneously in aged sheep, is not an OIE-listed disease. Australia continues to be recognised as free from classical scrapie (a transmissible spongiform encephalopathy), and has a legislated ruminant feed ban and other controls to minimise the risk of this disease. The confirmed cases of atypical scrapie indicate that our surveillance systems are active and functional, and can detect and exclude animals showing signs consistent with OIE-listed transmissible spongiform encephalopathies.

4.5.4 Pigeon paramyxovirus in Victoria

Pigeon paramyxovirus was confirmed in separate lofts of racing pigeons in Victoria in September and December 2014. The disease is considered to be endemic in Victoria. The pigeons had not been vaccinated. The outbreaks in both premises were self-limiting.

4.5.5 Theileriosis in cattle in South Australia

In October 2014, South Australia recorded its first cases of theileriosis (Ikeda strain), a tick-borne disease that causes anaemia and can result in mortalities in cattle. The disease is endemic in parts of New South Wales and Victoria, and appears to have spread to South Australia through cattle movement.

4.5.6 Leishmaniasis in a dog in Victoria

A breeding cocker spaniel dog imported from Spain in October 2013 was found to be infected with *Leishmania* in Victoria in October 2014. Leishmaniasis is a zoonotic disease that is primarily transmitted by insect vectors. It causes ongoing chronic illness, which can be fatal to infected animals. The disease is nationally notifiable in Australia. Australian import requirements have recently been amended to require that dogs imported from endemic areas test negative for leishmaniasis. However, such testing is not always reliable because the disease has an incubation period of one month to seven years.

Australia is considered to be free from the specific sandfly vector required for transmission of canine and human forms of the disease. A version of the disease occurs in kangaroos, but the vector involved has not been identified. Recent research shows that canine leishmaniasis may be sexually transmissible.

The Victorian case has been fully investigated. The infected dog was euthanased. All breeding and other contacts of the infected dog have tested negative and are being monitored. Australia is updating its response arrangements via a national response policy brief.

4.5.7 Triple D syndrome in cattle in New South Wales

A mysterious 'diarrhoea, drooling and death' (triple D) syndrome that resulted in deaths of cattle in late 2013 in an isolated region of western New South Wales

subsided and disappeared in early 2014. Despite the efforts of a wide range of experts, including veterinary epidemiologists, laboratory diagnosticians, toxicologists, botanists and others, the cause of the syndrome remains unknown. The 2013 event is the third time the syndrome has occurred in the region; previous events, in 2006 and 2009, were on a smaller scale. As occurred previously, a thorough infectious disease diagnostic process – including sequencing by CSIRO-AAHL and covering all possible notifiable diseases – failed to identify a causative infectious agent. Together with an apparent association with hot, dry weather patterns, this suggests that the syndrome may have a noninfectious cause, possibly relating to plant, soil or water toxicity.



Animal Health Australia



iStock photo: Howard Chew



Chapter

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 2014, 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.⁸²

In 2014, 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 2014 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 2014, are listed in Table 5.2.

82 www.agriculture.gov.au/animal-plant-health/aquatic/reporting

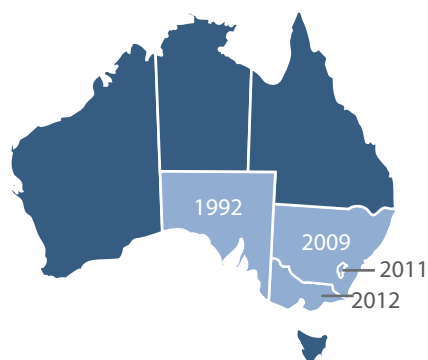
Table 5.1 Australia's status for OIE-listed diseases of aquatic animals, 2014

Disease or agent	Status
Finfish diseases	
Epizootic haematopoietic necrosis	Locally present
Infection with <i>Aphanomyces invadans</i> (epizootic ulcerative syndrome)	Locally present
Infection with <i>Gyrodactylus salaris</i>	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 <i>Bonamia exitiosa</i>	Never reported
Infection with <i>Bonamia ostreae</i>	Never reported
Infection with <i>Marteilia refringens</i>	Never reported
Infection with <i>Perkinsus marinus</i>	Never reported
Infection with <i>Perkinsus olseni</i>	Locally present
Infection with <i>Xenohaliotis californiensis</i>	Never reported
Crustacean diseases	
Crayfish plague (<i>Aphanomyces astaci</i>)	Never reported
Infectious hypodermal and haematopoietic necrosis	Locally present
Infectious myonecrosis	Never reported
Necrotising hepatopancreatitis	Never reported
Taura syndrome	Never reported
White spot disease	Never reported
White tail disease	Locally present
Yellow head disease	Never reported
Amphibian diseases	
Infection with <i>Batrachochytrium dendrobatidis</i>	Locally present
Infection with ranavirus	Locally present

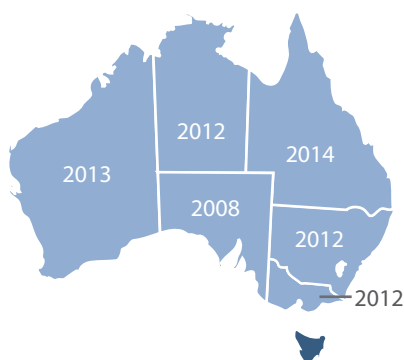
OIE = World Organisation for Animal Health

Note: Aquatic animal diseases that were reportable to the OIE in 2014 are those listed in the OIE's 2013 *Aquatic animal health code*.

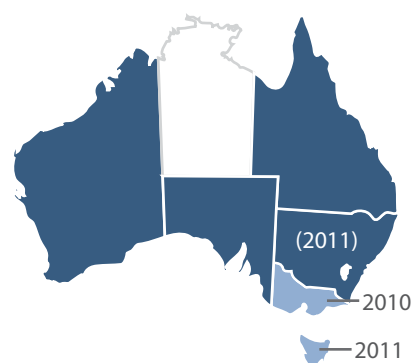
Epizootic haematopoietic necrosis



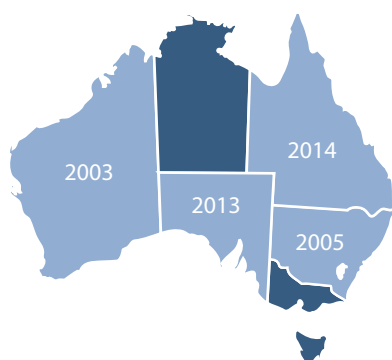
Epizootic ulcerative syndrome



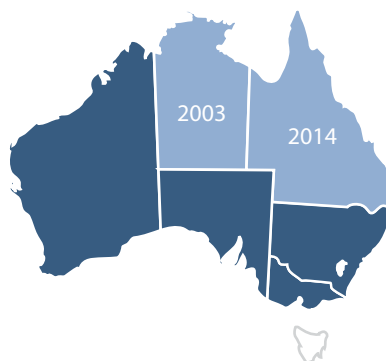
Infection with abalone herpesvirus



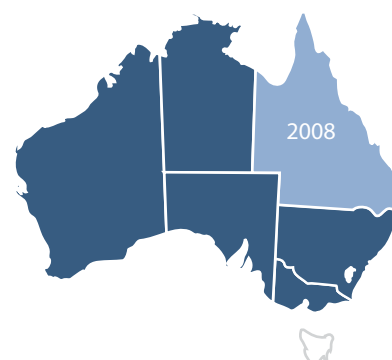
Infection with *Perkinsus olseni*



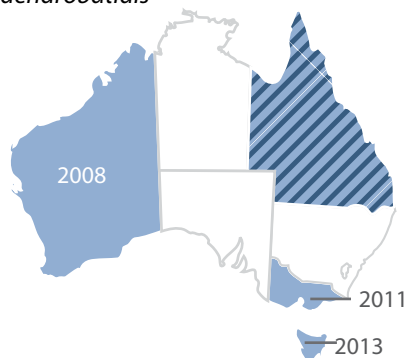
Infectious hypodermal and haematopoietic necrosis



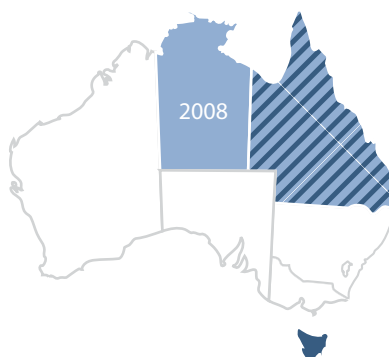
White tail disease



Infection with *Batrachochytrium dendrobatidis*



Infection with ranavirus



- States and territories reporting the occurrence of the specific disease and the year the disease last occurred
- States and territories reporting that the specific disease has never been reported within their jurisdictional boundaries or has previously occurred but has been eradicated (date of last occurrence indicated in brackets)
- States and territories reporting that presence of the specific disease is suspected, but no information is available to indicate the year when it last occurred
- States and territories reporting that no information is available

Figure 5.1 Distribution of OIE-listed aquatic animal diseases in Australia

Table 5.2 Australia's status for other significant diseases of aquatic animals, 2014

Disease or agent	Status
Finfish diseases	
<i>Aeromonas salmonicida</i> – atypical strains	Locally present
Bacterial kidney disease (<i>Renibacterium salmoninarum</i>)	Never reported
Channel catfish virus disease	Never reported
Enteric redmouth disease (<i>Yersinia ruckeri</i> – Hagerman strain)	Never reported
Enteric septicaemia of catfish (<i>Edwardsiella ictaluri</i>)	Reported from wild native catfish in one river in 2014
Epizootic haematopoietic necrosis – European catfish virus/European sheatfish virus	Never reported
Furunculosis (<i>Aeromonas salmonicida</i> subsp. <i>salmonicida</i>)	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 (<i>Piscirickettsia salmonis</i>)	Never reported
Viral encephalopathy and retinopathy	Locally present
Whirling disease (<i>Myxobolus cerebralis</i>)	Never reported
Mollusc diseases	
Infection with <i>Bonamia</i> species	Locally present
Infection with <i>Marteilia sydneyi</i>	Locally present
Infection with <i>Marteilioides chungmuensis</i>	Never reported
Infection with <i>Mikrocytos mackini</i>	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
<i>Monodon</i> 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*⁸³ 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 and state and territory governments, and aquatic animal industries. The Australian Government Department of Agriculture coordinates AQUAPLAN programs. AHC and SCAAH, in close collaboration with industry, oversee national implementation of AQUAPLAN activities and projects. Australia has had two previous five-year AQUAPLANs.

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.

5.2.2 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, implemented by CSIRO-AAHL and the Australian National Quality Assurance Program, and accredited by the National Association of Testing Authorities.

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 2014 confirmed that Australia continues to have strong diagnostic capabilities for these seven diseases.

5.2.3 National guidelines for translocation of domestic bait

Work to develop national policy guidelines for translocation of domestic bait continued in 2014. Draft guidelines have been produced that aim to guide development of nationally consistent state and territory policy on bait translocation. These guidelines are being considered by the relevant state and territory government departments.

83 www.agriculture.gov.au/animal-plant-health/aquatic/aquaplan

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
- 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.

There were no aquatic animal disease outbreaks in 2014 requiring coordination by the Aquatic CCEAD.

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

For terrestrial animal and plant diseases, Australia has emergency response deeds that establish responsibilities of industries and governments, and arrangements for cost sharing between them. These agreements permit rapid response to disease emergencies. There is also an intergovernmental arrangement for pests and diseases that mainly affect the environment, such as wildlife diseases. However, there are currently no arrangements between governments and aquatic animal industries for response and cost sharing in the event of an aquatic animal disease emergency.

In August 2014, a four-year project was commenced to develop 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). It aims to establish formal response arrangements on a sectoral basis, starting with the abalone industries (aquaculture and wild-caught sectors) as a model. This will build on the abalone industries' detailed knowledge of emergency response arrangements and the existing investment by that sector in establishing formal response arrangements.

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. These manuals provide background information and guidance on how to respond to a disease outbreak in Australia. AQUAVETPLAN is based on the Australian Veterinary Emergency Plan (AUSVETPLAN), which is for terrestrial animal diseases. Disease strategy manuals relating to specific EADs allow animal health professionals to respond appropriately to an outbreak of that EAD in Australia. Operational manuals address important procedural issues and complement the disease strategy manuals.

In 2014, the new AQUAVETPLAN disease strategy manual for abalone viral ganglioneuritis was published online. The draft disease strategy manual for OSHV-1 microvariant and the enterprise manual are currently being considered for endorsement by governments and industry.

Manuals are considered for revision every five years or in the event of significant new developments. Revisions of four manuals commenced in 2014: viral encephalopathy and retinopathy, whirling disease, withering syndrome of abalone and crayfish plague.

AQUAVETPLAN manuals can be downloaded from the Department of Agriculture website.⁸⁴

5.3.3 Surveillance

Each jurisdiction 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

84 www.agriculture.gov.au/animal-plant-health/aquatic/aquavetplan

particular industries or specific diseases of importance to Australia. It meets OIE standards, or uses methods required 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).⁸⁵

5.3.4 Communication

Neptune is a web-based repository of information on all known aquatic animal diseases and pathogens reported from Australia. This centralised database aims to increase the availability and exchange of information on aquatic animal diseases in Australia; it facilitates interactions between industry, biosecurity officials, research laboratories and pathologists. The latest version of the database, launched in September 2014, allows users to search for disease information using a variety of fields, including host species, disease, disease agent, event location and affected host organs. Users can also view supplementary reference material, such as disease maps and photos of diseased animals.

In addition to the database, a digital microscopy platform is available that provides access to microscope images of the histopathology and pathogens of key endemic and exotic diseases. The technology allows visualisation of true-colour digital whole-slide images, in which a region of interest can be magnified up to 400 times. This provides a unique platform for pathology analysis and training, and overcomes the limitations associated with the use of physical specimens. The current collection includes 180 images contributed by Australian aquatic animal disease laboratories, and the library is anticipated to grow as more slides are collected for scanning.

Free webinars on a range of topics relevant to aquatic animal disease research and management are another aspect of the Neptune project. Topics in 2014 included histopathology, finfish parasite management, management of bacteria in prawn hatcheries and use of Neptune.

5.4 Disease events in 2014

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. Testing has confirmed seasonal occurrence of the virus in subsequent years. The virus has been detected in research populations of Pacific oysters, most recently in the estuaries of the Hawkesbury River and the Georges River in November 2014.

New South Wales continues to manage the disease through movement controls on 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. In September 2014, the New South Wales Government released the POMS Incursion Response Policy, which sets out response actions and responsibilities that will apply in the event of further outbreaks of the disease.

OsHV-1 microvariant was not detected elsewhere in Australia in 2014.

As part of the strategic approach to management and containment of POMS, projects to inform response and management of the disease are under way. Information on these projects is available on the website of the Fisheries Research and Development Corporation (FRDC).⁸⁶

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 the subprogram's research projects (project applications, project management, communication, etc.)
- 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.

⁸⁵ www.enaca.org/modules/library/publication.php?tag_id=279&label_type=1&title=quarterly-aquatic-animal-disease-report

⁸⁶ http://frdc.com.au/research/aquatic_animal_health/Pages/default.aspx

Projects begun in 2014 included:

- strategic approaches to identifying pathogens of quarantine concern associated with the importation of ornamental fish
- development of stable positive control material and internal controls for molecular tests for detection of important endemic and exotic pathogens
- development of a national aquatic animal health curriculum for delivery by tertiary institutions.

Information on the subprogram, including current projects and final reports of projects funded by the FRDC, are available on the FRDC website.⁸⁷

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 13th meeting in Ho Chi Minh City, Vietnam, in November 2014. 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, assessed progress against the elements of the *Asia regional technical guidelines on responsible movement of live aquatic animals*, and developed recommendations and action points for consideration by the NACA Secretariat and member governments. Further information is available on the NACA website.⁸⁸

5.6.2 Regional Proficiency Testing Program for Aquatic Animal Disease Laboratories

The Regional Proficiency Testing Program for Aquatic Animal Disease Laboratories in Asia, funded by the Department of Agriculture, was completed in late 2014. The program aimed to strengthen regional capability to diagnose important aquatic animal diseases that could affect trade, industry sustainability or productivity. The program was implemented with NACA, the Australian National Quality Assurance Program and CSIRO. More than 40 laboratories in 13 countries in the region participated in the program, which assessed laboratory testing for 10 pathogens of significance. Two rounds of testing were run during 2014. The program resulted in significant improvements in accuracy of testing in most laboratories that participated in the program.

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 seeks comment from a network of Australian experts on draft standards proposed by the OIE Aquatic Animal Health Standards Commission (Aquatics Commission). Australia’s official responses to the OIE are provided through Australia’s delegate, the Australian Chief Veterinary Officer.

In 2014, an elected Australian member of the OIE Aquatics Commission from the Department of Agriculture participated in two meetings of the commission, and represented the commission when delivering a keynote address to the Ninth Symposium on Diseases in Asian Aquaculture (DAA9) held in Ho Chi Minh City, Vietnam, on 24–28 November 2014.

87 http://frdc.com.au/research/aquatic_animal_health/Pages/default.aspx

88 www.enaca.org (under ‘Publications’ on the right-hand bar, then ‘Health’)



Tasmanian Department of Primary Industries, Parks, Water and Environment



istock photo: hxdyl

Chapter 6

Imports and exports

Australia is progressively applying a risk-based approach to imports and exports across the biosecurity continuum (i.e. pre-border, at the border and post-border). This approach draws on rigorous science, evidence and intelligence, and allows resources to be managed according to the level of risk.

This chapter outlines the import- and export-related activities of the Australian Government Department of Agriculture in 2014. Four divisions of the department manage pest and disease risks associated with imports: Sustainability and Biosecurity Policy, Biosecurity Animal, Biosecurity Plant and Compliance.

The Biosecurity Animal, Biosecurity Plant and Exports divisions facilitate technical market access for exporters of agricultural products, including live animals and plants, and reproductive material. The Trade and Market Access Division provides a coordinating role, by pursuing market access in multilateral forums and bilateral free trade agreement negotiations with Australia's principal trading partners.

A major project taskforce is overseeing the construction and operation of a new post-entry quarantine (PEQ) facility at Mickleham, Victoria. The facility will consolidate on one site all the operations currently spread across four PEQ facilities around Australia. It will provide facilities for the quarantine of plants, bees, dogs, cats and horses. Construction commenced in early 2014 on phase 1 of the project, and the facility will start taking imported material from late 2015.

Phase 2 is scheduled for completion towards the end of 2018. This will provide quarantine facilities for fertile poultry eggs, live pigeons and alpacas, and extend the capacity to quarantine cats and dogs. Planning for transition of quarantine operations from the existing facilities to the new site is well under way and will ensure minimal disruption to import processes for importers.

The new PEQ facility will continue Australia's commitment to managing imports of plant and animal species that are associated with a high biosecurity risk.

6.1 Imports

The importation of animals and animal products into Australia is regulated by the Department of Agriculture 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.

The Australian Government plans to replace the century-old *Quarantine Act 1908* and to progress the Biosecurity Bill 2014 (see Section 1.2).

6.1.1 Import risk analyses

Many of Australia's biosecurity requirements are based on standards, guidelines and recommendations established by international organisations, including the World Organisation for Animal Health (OIE). Sometimes, additional measures are needed to reduce import risk to a level that protects Australia's unique environment. Import conditions are only applied to the extent necessary to protect human, animal and plant health in the least trade-restrictive manner possible.

A regulated import risk analysis (IRA) process came into effect in 2007. The timeframes for the completion of IRAs are prescribed through regulations. They provide for either a standard or an expanded IRA process, depending on the complexity of the science and the nature of the biosecurity risks. A standard IRA is completed within 24 months, and an expanded IRA within 30 months. A biosecurity risk analysis can also be conducted using a nonregulated pathway – for example, for review of an existing policy.

The methods used to conduct IRAs are in line with Australian Government policy, the *Quarantine Act 1908* and its subordinate legislation, the requirements of the World Trade Organization (WTO) Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement), and relevant international animal health standards. The IRA report assesses the biosecurity risks and, where appropriate, recommends risk management measures. The IRA process provides for public consultations, including consultation on the draft report.

In 2014, the Department of Agriculture continued to focus on managing the biosecurity risks associated with live ornamental fish imports, following completion of the IRA of biosecurity risks associated with iridovirus



and related viruses (including megalocytivirus) that are found in gouramis (a type of freshwater aquarium fish). Consistent with the IRA's recommendations, new import conditions will be introduced in 2016 that require the aquatic animal health authorities of the exporting country to ensure that all fish belonging to the gourami, cichlid and poeciliid groups are sourced from megalocytivirus-free populations, or are batch tested and found free from the virus before export. The department has been working closely with the aquatic animal health authorities of exporting countries to ensure the effective implementation of the new conditions during 2014–15.

The IRA also included a recommendation that these species be subject to an ongoing program of risk-based post-arrival testing for megalocytivirus, to provide ongoing confidence in exporting country systems; this is part of broader reforms to the management of import risks associated with ornamental fish.

Since 2013, Australia's ornamental fish industry has actively participated in trials to test the operational feasibility of the proposed risk-based testing program. Further development of an automated data analysis system, extensive trialling, and agreement on new cost-recovery arrangements are necessary before the program can be fully implemented. Full implementation of the changes is expected to take 2–3 years.

Examination of the IRA process

The Australian Government, through the Department of Agriculture, began an examination of Australia's IRA process in July 2014, delivering on a government election commitment. The purpose was to identify issues with the process and look for opportunities to improve it. The most important element of the IRA examination was stakeholder consultation, which took place from July to September 2014. The variety of stakeholders involved – from exporters, scientific organisations and industry groups to representative bodies, government agencies and importers – meant that the opinions, comments, ideas and suggested improvements expressed were as varied as the agricultural sector itself.

Any recommendations for administrative or regulatory changes as a result of this consultation process will be considered by the government. The department will also consider the outcomes of the examination in the development of regulations and policies for conducting import risk analyses under the Biosecurity Bill 2014.

6.1.2 Policy reviews and competent authority evaluations

The Animal Biosecurity Branch progressed two reviews of animal biosecurity policy in 2014:

- A policy review of gamma irradiation as a treatment for pathogens of animal biosecurity concern was finalised on 6 November 2014. Stakeholder input was considered in finalising the import policy review. The revised policy is potentially beneficial to importers and consumers because it allows lower irradiation doses in some circumstances, while ensuring that biosecurity risks remain acceptably low. The WTO and its members were notified of the final policy review (reference G/SPS/N/AUS/315/Add.1).
- A policy review of hatching eggs with respect to avian paramyxovirus types 2 and 3 was prepared for release in late 2014. The final policy review takes into account comments received from stakeholders in response to a draft policy review released on 7 August 2013. The WTO and its members will be notified of the final policy review (reference G/SPS/N/AUS/326/Add.1).

The department evaluates the animal disease status of trading partner countries 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 Australian markets, the competent authorities of potential trading partners must submit an application that demonstrates their ability to manage biosecurity risks in their country and comply with Australia's import requirements for the commodities that they want to export to Australia.

In 2014, the department's competent authority assessment program included review of procedures for 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.

6.1.3 Biological products

Biological products include a wide range of goods derived from animals (including humans), plants and microorganisms. They include animal feeds, foods for human consumption (e.g. prawns, dairy products), fertilisers, laboratory materials and reagents, diagnostic kits, biological samples, bioremediation agents, human and veterinary therapeutics, and veterinary vaccines.

The Quarantine Act 1908 regulates the importation of biological products into Australia. Under the Act, importation of many biological products is prohibited unless an import permit is granted by the Director of Quarantine. 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 Animal and Biological Import Assessment Branch (ABIAB) makes an important contribution to maintaining Australia's animal health status by managing disease threats from imported biological products. ABIAB works across the biosecurity continuum to manage biosecurity risks 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.

ABIAB is staffed by veterinarians, scientists and program administrators. As well as assessing import permit applications, it develops assessment procedures, work instructions and import conditions. It also works to improve ICON (the import conditions database) and website information, and contributes to the development of BICON, the new database that will replace ICON.

In 2014, ABIAB received approximately 6950 permit applications for importation of biological products, provided advice in response to about 17 000 email enquiries relating to biological products and responded

to about 11 000 phone calls relating to biological products through the public helpline.

Stakeholder engagement through formal and informal consultations was a key focus for ABIAB in 2014. 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. Stakeholders are represented on the Biological Consultative Group, which met in March and September 2014. The group's role is to ensure that all components of the biological importing system work together to serve the interests of Australia.

6.1.4 Live animal imports

Australia imports live animals – including dogs, cats, horses, ruminants, hatching eggs, live pigeons, ornamental fish and bees – to improve genetic stocks in agricultural industries, for racing purposes, or for use as assistance, military or companion animals. ABIAB implements import policies for live animals and reproductive material. The branch provides advice to prospective importers on processes and requirements for importation of live animals and reproductive material, assesses applications to import animals and issues import permits with appropriate conditions. For some animal species, the branch inspects and approves overseas pre-export quarantine facilities. The branch also liaises with overseas competent authorities to verify that health certification of animals is consistent with import conditions and international standards for the live animal trade.

In 2014, ABIAB received approximately 7400 permit applications for importation of animals, provided advice in response to about 7000 animal-related email enquiries and responded to about 6000 animal-related phone calls through the public helpline.

6.2 Exports

The Australian Government continues its endeavours to improve trade opportunities and access arrangements for Australian agricultural products through the Doha Development Round of WTO negotiations. In addition to this participation at the multilateral level, Australian producers benefit from free trade agreements with members of the Association of Southeast Asian Nations (ASEAN), Chile, Malaysia, New Zealand, Singapore, Thailand and the United States.

On 7 December 2013, WTO members agreed to a package of trade reforms at the Ninth Ministerial

Conference Meeting (MC9). As part of the package, WTO members agreed to the principles contained in the Trade Facilitation Agreement (TFA), covering issues relating to fees and formalities associated with the import, export and transit of goods, as well as processes relating to the publication of trade regulations. Members also reached agreement on trade and development issues such as food stockpiling, export subsidies and quotas. The MC9 recognised that a number of issues from the Doha Development Round were not finalised, requiring WTO members to develop a work program, by July 2015, to address the outstanding issues.

The WTO General Council incorporated the TFA into an annex of the WTO Agreement on 27 November 2014, in line with the decisions reached at the MC9. Economic modelling has estimated that adherence to the principles contained in the TFA may contribute between US\$400 billion and US\$1.2 trillion to the world economy. These gains can be achieved through simplifying customs procedures and increasing use of technology. The TFA will ensure that there is no reduction in the rights and obligations derived from both the Agreement on Technical Barriers to Trade (TBT Agreement) and the SPS Agreement.

The trade ministers of Australia and the Republic of Korea signed the Korea–Australia Free Trade Agreement on 8 April 2014. The Republic of Korea is Australia's third-largest goods export market and third-largest market for

beef. The agreement, which eliminates tariffs on beef, dairy and seafood, will significantly improve market access for Australian exporters. Importantly, the agreement will protect Australia's competitive position, given that the Republic of Korea is currently giving preferential access to Australia's major competitors, including the United States, the European Union and ASEAN countries.

The Japan Australia Economic Partnership Agreement (JAEPA) was signed on 8 July 2014. Japan is Australia's second most valuable agricultural export market (\$4.3 billion in 2013) and highest-value export market for food (\$4 billion). The JAEPA eliminates or significantly reduces Japan's tariffs on a wide range of Australian agricultural exports, including beef, dairy, wine, horticulture, seafood and grains. The reduction in tariffs will be introduced gradually over a period of 15–18 years. Outcomes in the JAEPA provide significant opportunities for Australian agricultural exporters and give Australia an advantage over competitor countries.

Completion of the China–Australia Free Trade Agreement negotiations was announced on 17 November 2014. Australia and the People's Republic of China each have to complete their domestic ratification processes before the agreement comes into effect. Australia exports more than \$9 billion of agricultural products to China, at tariffs up to 30%. The agreement with China opens new opportunities for Australian agriculture, particularly in key areas of growth. The agreement will eliminate tariffs, mostly



Barnhill Angus

within 4–8 years, for Australian exports, including beef, sheepmeat, hides and skins, livestock, dairy, horticulture, wine and seafood.

Free trade agreement negotiations are continuing with the Gulf Cooperation Council, India and Indonesia. Australia is also participating in the negotiation of a Pacific Agreement on Closer Economic Relations Plus agreement with Pacific island nations; the Regional Comprehensive Economic Partnership agreement; and a Trans Pacific Partnership agreement with Brunei, Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, the United States and Vietnam. The Department of Agriculture and the European Union have also resumed their SPS Agreement dialogue.

The department works with industries to take advantage of market access opportunities. Major activities include:

- consulting with industries on export priorities and strategies
- identifying impediments to trade in importing country requirements and international standards, and developing strategies and actions to resolve the impediments
- developing relationships with key trading partners and, where appropriate, implementing bilateral formal agreements or memorandums
- maintaining and restoring access to foreign markets during disease or pest emergencies by contributing to technical negotiations with overseas authorities
- contributing to the development of international standards to ensure that they are consistent with agricultural sector needs.

6.2.1 Livestock export standards

As a condition of a licence to export livestock, exporters must meet the requirements of the Australian Standards for the Export of Livestock, as well as all other relevant state and territory legislation. Chapter 8 provides detailed information on animal welfare and Australian provisions that promote the welfare of animals.

6.2.2 Technical input for market access

In 2014, the Animal Biosecurity Branch assisted with 74 issues involving more than 40 countries or areas outside the quarantine barrier. These included negotiating animal health requirements for the export of:

- alpaca to China, the Republic of Korea and Thailand
- barramundi fingerlings to China, India, Indonesia, Saudi Arabia, Sri Lanka and Vietnam, and continued technical assistance in exporting live barramundi fingerlings to Singapore
- bovine semen to Canada, Chile, the European Union, French Polynesia, Guatemala, India, Iran, Kazakhstan, Mexico, Peru and the United States
- bovine embryos to Mexico, Peru and the United States
- breeder goats to Egypt and Iran
- camelids to China, Qatar and the Republic of Korea
- ovine and caprine semen to Colombia, Mexico, Nepal, New Zealand, Peru, the Republic of Korea, Serbia and Uruguay
- ovine and caprine embryos to Colombia, Mexico, New Zealand, Peru and Uruguay
- cattle to Algeria; Bahrain; Cambodia; China; the Customs Union of Belarus, Kazakhstan and Russia; Egypt; Indonesia; Iran; Lebanon; Papua New Guinea; Qatar; Taiwan; and Thailand
- corals to Brazil
- dogs and cats to Brazil and the European Union
- egg powder to India
- fertile poultry eggs to Christmas Island
- goats to Chile, Lebanon and the Republic of Korea
- horses to Malaysia, New Caledonia, Singapore and Taiwan
- live aquatic animals for aquaculture to Canada
- live lungfish to Thailand
- live Murray cod for breeding purposes, and live seahorses, to Malaysia
- live oyster spat for breeding purposes to the Republic of Korea
- live rotifers for research and aquaculture purposes to Papua New Guinea
- live sheep to Chile, Iran and Lebanon
- oyster spat to the Republic of Korea
- rabbits to India
- reptiles to Colombia
- spiny lobsters for research purposes to Malaysia.

6.2.3 Food and byproducts derived from animals

The Department of Agriculture, through the Exports Division, 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 byproducts (such as rendered meals, pet food, skins and hides, wool, and technical and pharmaceutical goods). The division responds to challenges associated with trade disruptions; changes in importing country requirements, such as changes in food safety requirements; changes in animal or public health status; and specialised requirements (such as halal slaughter).

In 2014, the Exports Division continued reviewing the content of the Manual of Importing Country Requirements (MICO⁸⁹). MICO⁸⁹ is a database of the import requirements of more than 100 trading partners for meat, fish, dairy and egg commodities; nonprescribed goods (such as pet foods and honey); and live animal exports. Exporters can apply for access to MICO⁸⁹ to obtain guidance on how to comply with the import requirements of their intended trading destinations.⁹⁰

The Exports Division manages visits by competent authorities of trading partners, who regularly audit or inspect Australia's export meat, fish and dairy systems and establishments. On average, the division hosts nine visits by trading partner delegations each year. These involve system audits and listing inspections. System audits cover the entire export system, including Australian legislation, compliance and enforcement, and establishments. In listing inspections, individual establishments are inspected for compliance with the trading partner's import requirements. The division writes pre-visit submissions, advises visiting delegations on the Australian production and export system, and responds to audit and other findings. In 2014, visits included:

- a systems audit by the European Commission's Food and Veterinary Office (FVO) in June, which assessed the Australian system for producing and exporting organic products
- a systems audit by the FVO in July, which assessed the production of mincemeat, meat products, meat preparations, casings and wild boar to maintain access for these commodities to European Union countries
- a joint listing inspection of Australian red meat establishments in late September and early October by the Department of Islamic Development, Malaysia,

and the Department of Veterinary Services, Malaysia, which assessed compliance with Malaysia's food safety and halal slaughter requirements

- a systems audit of red meat establishments, and Australia's microbiological and residue capabilities by the United States Food Safety and Inspection Service in late November and early December.

The Exports Division established, maintained or improved market access for a range of commodities and markets, including:

- establishing new market access for T-bone steaks from cattle aged up to 30 months and animal feed to Japan
- maintaining access and negotiating new certificate content for beef and bovine byproducts to the United States, poultry products to South Africa, edible tallow to Taiwan, calf vells and bovine stomachs to Italy, and all food products to New Caledonia
- gradually reopening markets for poultry meat and eggs after the 2013 avian influenza outbreak in New South Wales
- re-establishing access for hides and skins to Brazil.

The Exports Division also assisted Australian exporters when problems arose in clearing consignments in importing countries.



⁸⁹ www.daff.gov.au/micor/Pages/Welcome.aspx

⁹⁰ www.daff.gov.au/micor/Pages/Apply-for-access.aspx

6.2.4 Export certification arrangements

The Department of Agriculture provides export certification for animal genetic material, live animals, foods derived from animals and animal byproducts under the *Export Control Act 1982* (see Appendix 4).

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 (TRACE) system supports the electronic submission of export applications for livestock and reproductive material, livestock export licence applications, registered premises applications and applications for accreditation under the Accreditation Program for Australian Veterinarians. TRACE supports more than 100 external stakeholders and handled 601 live animal export consignments in the 2013–14 financial year.

In conjunction with MCoR and the Exporter Supply Chain Assurance System (ESCAS), the export certification system reduces the administrative burden on exporters, informs the exporter about importing country requirements, and aims to ensure that animal welfare standards are maintained.

The department's national office assesses export applications, and licenses livestock exporters and veterinary officers in regions to inspect livestock and prepare certification documentation.

The assessment, inspection and certification processes include:

- verifying that Australian legislation and the importing country animal health requirements have been met
- verifying that slaughter and feeder livestock are prepared in accordance with ESCAS
- 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
- helping to negotiate technical market access for live animals and animal reproductive material.

Export certification for edible animal products and byproducts

The Exports Division is responsible for regulating the export of edible animal products and byproducts prescribed under the *Export Control Act 1982*, such as meat, dairy, fish, eggs, wool, skins and hides. The division 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 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 6.2.3).

6.3 International standards

The Department of Agriculture contributes to the development of international standards through its involvement in multilateral organisations and groups. These include the WTO and its committees, the Animal Health Quadrilateral forums (comprising Australia, Canada, New Zealand and the United States), the OIE, the International Plant Protection Convention of the Food and Agriculture Organization of the United Nations (FAO), and the Codex Alimentarius Commission, which is a joint commission of the World Health Organization and the FAO.

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.

Australia's delegate to the OIE and Chief Veterinary Officer became a member of the OIE Council in May 2012. In 2013 and 2014, consultation within the OIE Regional Commission for Asia, the Far East and Oceania before OIE Council meetings led to increased engagement and cooperation within the region. Key issues addressed by the OIE Council in 2014 included the development of the OIE's Sixth Strategic Plan for 2016–20 (to be adopted in May 2015) and the process for self-declaration of disease freedom.

Other Australian experts participated in the OIE Aquatic Animal Health Standards Commission (see Chapter 5) and the OIE Biological Standards Commission. Several Australian officials participated in OIE expert groups, including the OIE ad hoc groups on *Salmonella* in pigs (a joint OIE/Codex group), *Salmonella* in cattle, and evaluation of foot-and-mouth disease status of member countries.



Image courtesy of Meat & Livestock Australia Ltd. www.mla.com.au



istock photo: egal



Chapter

7

Consumer protection

Food must be safe, whether it is imported, exported or traded domestically. The Australian Government, state and territory authorities, and industries work together to ensure the safety of food consumed in Australia or exported to Australia's trading partners.

The Australian Government Department of Agriculture,⁹¹ Food Standards Australia New Zealand (FSANZ),⁹² the Australian Government Department of Health,⁹³ state and territory government authorities, and Animal Health Australia⁹⁴ all have consumer protection programs. Activities in the networks and partnerships that help to protect consumers include:

- Australian food standards, based on international food standards
- identification, surveillance, prevention and control of outbreaks of foodborne illness
- monitoring of chemical residues, pathogens and environmental contaminants in products
- traceability systems for livestock that can pinpoint issues if they arise (see Section 1.4)
- management and transport systems that deliver hygienic food products to the marketplace.

91 www.agriculture.gov.au

92 www.foodstandards.gov.au

93 www.health.gov.au

94 www.animalhealthaustralia.com.au

7.1 Regulations and standards

This section outlines the international and national standards that apply for the protection of consumers.

7.1.1 International arrangements – Codex Alimentarius Commission

Australia plays a strong leadership role in the development of international science-based food standards through the Codex Alimentarius Commission (Codex) and its subsidiary bodies. Australia 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 2014, Australia's participation continued to ensure that Codex outcomes are based on the principles of sound scientific analysis and evidence.

Australia continued to chair the Codex Committee on Food Import and Export Inspection and Certification Systems. In 2014, the committee agreed to propose to Codex new work on:

- development of principles and/or guidelines for the exchange of information (including questionnaires) between countries to support food import and export
- guidance on monitoring the performance of national food control systems
- revision of *Principles and guidelines for the exchange of information in food safety emergency situations* (CAC/GL 19-1995)
- revision of *Guidelines for the exchange of information between countries on rejections of imported food* (CAC/GL 25-1997).

Work on these four items will start in electronic working groups and possibly a physical working group in the lead-up to the next session of the committee in February 2016.

In April 2014, the 28th session of the Codex Committee on General Principles agreed on guidance to promote collaboration between Codex and the World Organisation for Animal Health (OIE), in line with the agreements that the OIE has with the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO); *'Guidelines on cooperation between*

*the Codex Alimentarius Commission and international intergovernmental organizations in the elaboration of standards and related texts'*⁹⁵ and the OIE organic rules, Chapter III, Article 6(k).⁹⁶ The guidance is intended to foster ongoing collaboration between Codex and the OIE and their members at the national and regional levels.

Australia was an active participant in the development of draft guidelines for the control of non-typhoid *Salmonella* in beef and pork meat that were considered at the 46th session of the Codex Committee on Food Hygiene in late 2014. The committee agreed that more work was required on these guidelines, which will be undertaken by electronic and face-to-face working groups leading up to the next session of the committee, in November 2015. Australia will again be involved in this work. The Codex Committee on Food Hygiene also completed the *Guidelines for control of specific zoonotic parasites in meat: Trichinella spiralis*, taking into account proposed changes by the OIE to better align the guidelines to the OIE *Terrestrial animal health code* chapter 'Infection with *Trichinella* spp.'

Australia continued to chair working groups to establish priorities in both the Codex Committee on Pesticide Residues and the Codex Committee on Residues of Veterinary Drugs in Foods. Leadership of these working groups ensures that development by Codex of maximum residue limits for newer, safer chemicals will ensure positive outcomes for all consumers.

7.1.2 National arrangements

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 both 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.

95 Codex Alimentarius Commission (2015). *Codex Alimentarius Commission procedural manual*, 23rd edn, Joint FAO/WHO Food Standards Programme, WHO & FAO, Rome, 205–207, [ftp://ftp.fao.org/codex/Publications/ProcManuals/Manual_23e.pdf](http://ftp.fao.org/codex/Publications/ProcManuals/Manual_23e.pdf).

96 www.oie.int/about-us/key-texts/basic-texts/organic-rules

Food safety policy focuses 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.

Food standards

Primary production and processing standards for Australia have been developed for seafood, meat and meat products (including game meat, ready-to-eat meat and poultry meat), dairy products, eggs and egg products, and seed sprouts. All states and territories are implementing these standards. FSANZ is currently developing a primary production and processing standard for raw milk products. New standards generally have a two-year phase-in period from the date of approval.

Country-of-origin labelling is currently required for all packaged food and unpackaged fresh or processed fruit, vegetables, seafood, pork, beef, sheepmeat and chicken meat sold in Australia.

7.2 Protective measures

Australia monitors communicable diseases through the Communicable Diseases Network Australia (CDNA) and OzFoodNet. Residues and chemical contamination of foods are monitored by a number of government programs.

7.2.1 Communicable disease surveillance

Communicable Diseases Network Australia

The CDNA⁹⁷ 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 nongovernment 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.

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 CDNA and are published in *Communicable Diseases Intelligence*, a quarterly publication of the Department of Health.⁹⁸

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.

7.2.2 Residue monitoring

A number of Australian animal and plant industries participate in residue monitoring programs to determine the levels of pesticides, veterinary medicines and environmental contaminants in commodities. This provides information on whether existing controls on the use of these chemicals are effective and addresses importing country requirements for residue monitoring. The monitoring is risk based, and designed to identify and assess chemical inputs into Australian agricultural production systems. Results from residue and contaminant monitoring are compared with relevant Australian standards. If a noncompliance is detected, the state or territory authority completes a traceback investigation to identify the source of the noncompliance and resolve the problem. The results of monitoring programs provide confidence for Australian consumers and overseas markets that Australian agricultural products meet relevant standards.

The National Residue Survey (NRS), within the Department of Agriculture, conducts national 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 of Agriculture website.⁹⁹ The NRS consults with relevant industry peak councils to ensure that monitoring programs address any specific export market access requirements, as well as any domestic requirements. The National Association of Testing Authorities accredits laboratories involved in

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

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

99 www.agriculture.gov.au/agriculture-food/nrs

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 survey provides a national, independent monitoring program for residues of 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.

FSANZ monitors the Australian food supply to ensure that existing food regulatory measures provide adequate protection of consumer health and safety. The Australian Total Diet Study¹⁰⁰ is part of that monitoring. By testing food samples representative of the total diet, the study assesses Australian consumers' dietary exposure to, or intake of, pesticide residues, contaminants and other substances. FSANZ coordinates the study, and the state and territory food regulatory agencies collect the samples. The study takes place approximately every two years.

The Department of Agriculture has responsibility under the *Imported Food Control Act 1992* for conducting the Imported Food Inspection Scheme. The scheme inspects imported food to check that it meets Australian requirements for public health and safety, and complies with domestic standards detailed in the Australia New Zealand Food Standards Code. The code applies to all food for sale, whether it is manufactured in Australia or overseas.

7.3 Antimicrobial resistance

7.3.1 Antimicrobial Resistance Prevention and Containment Steering Group

Development and implementation of Australia's National Antimicrobial Resistance (AMR) Strategy¹⁰¹ is being overseen by the Australian Antimicrobial Resistance Prevention and Containment (AMRPC) Steering Group. The steering group is jointly chaired by the secretaries of the departments of health and agriculture, and includes the Australian Chief Medical Officer and the Australian Chief Veterinary Officer.

In August 2014, the AMRPC Steering Group approved the establishment of an Australian Strategic and Technical Advisory Group on AMR (ASTAG) to provide ongoing technical, scientific and clinical advice and expertise to inform the development of the national AMR Strategy,

and to ensure that actions under the strategy are effectively and efficiently implemented.

To support a united human and animal medicine approach, the AMRPC Steering Group agreed that ASTAG members would include both veterinary and medical disciplines, and agriculture and food representatives, and would be co-chaired by the Chief Medical Officer and the Chief Veterinary Officer. The group also includes state and territory representatives to support consideration and implementation of actions at the state and territory level.

In October 2014, the Department of Health released a discussion paper seeking stakeholder input to help guide the development of the national AMR Strategy. It provided a high-level overview of the proposed key elements of the strategy and identified some possible priority areas for action. For each key element, the paper provided an overview of what the element aims to achieve, why it is important, what is happening now, current gaps and where changes could be made.

7.3.2 Report on antimicrobial resistance and antibiotic use

In 2013, the Department of Agriculture sought the services of Griffith University and the University of Adelaide to report on surveillance and reporting of antibiotic use and antimicrobial resistance in animals and agriculture in Australia. The report – *Surveillance and reporting of antimicrobial resistance and antibiotic usage in animals and agriculture in Australia*¹⁰² – was completed in August 2014. It presents an analysis of, and recommendations on, the issue, and complements a similar report produced for the human sector in 2013. The work included a stakeholder consultation event in May 2014 to inform the content of the report.

On 1 December 2014, the Department of Agriculture held a roundtable event to discuss the report. Governments, animal industries, AMR experts and other stakeholders were brought together to develop an agricultural AMR surveillance strategy, focusing on the 'how' of surveillance, and taking into account previous work.

7.3.3 National Antibiotic Awareness Week

National Antibiotic Awareness Week took place on 17–23 November 2014, with activities led by the Australian Commission on Safety and Quality in Health Care.¹⁰³ The Department of Agriculture participated in associated activities.

100 www.foodstandards.gov.au/science/surveillance/Pages/australiantotaldiets1914.aspx

101 www.agriculture.gov.au/animal-plant-health/animal/amr

102 www.agriculture.gov.au/SiteCollectionDocuments/animal-plant/animal-health/amria.pdf

103 www.safetyandquality.gov.au/our-work/healthcare-associated-infection/antimicrobial-stewardship/antibiotic-awareness-week



Animal Health Australia

7.3.4 Senate Inquiry into JETACAR

In 2013, a Senate inquiry was completed into progress on implementation of the recommendations of the 1999 Joint Expert Technical Advisory Committee on Antibiotic Resistance (JETACAR). JETACAR was established in 1998 by the agriculture and health departments to review the use of antibiotics in food-producing animals. The final report from the Senate inquiry was released on 7 June 2013.¹⁰⁴ The Australian Government, led by the Department of Health, is currently drafting its responses to the report recommendations.

7.4 Inspection and monitoring

The Australian Government, and state and territory food safety authorities provide consumer protection through audit, inspection and monitoring. Good hygienic practices, and hazard analysis and critical control points (HACCP) systems 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 meat, dairy, seafood and eggs, and their products for export as food must be registered with the Department of Agriculture. They must also comply with the *Export Control Act 1982* and its subordinate legislation (see Appendix 4). These establishments must have an Approved Arrangement – a

fully documented arrangement that includes practices and procedures that demonstrate compliance with legislative requirements, including hygiene, structural and operational requirements. The Department of Agriculture inspects and verifies establishments to ensure compliance with the Approved Arrangement, thus supporting export certification. Noncompliance with legislation may result in the suspension of the Approved Arrangement or the establishment's registration, and the product from the establishment will no longer be eligible for export.

These controls ensure that Australian export industries continue to meet importing country requirements, while facilitating market access to expand Australia's export industry for meat and live animals. For details on volume of production and exports, see Appendix 1.

7.4.1 Exports of meat

The Australian Government, through the Department of Agriculture, has primary responsibility for verifying the systems at export meat establishments. State and territory governments are responsible for verifying systems at domestic establishments and at some export-registered establishments operating under state and territory supervision. The Department of Agriculture works closely with state and territory governments, and industry to implement control measures for animal health, food safety and chemical residues. Together, these bodies review and update regulations, rules and industry practices in response to national and international developments in food safety.

Since 1985, the Australian export meat industry has progressively adopted quality assurance systems and implemented a culture of continuous improvement. Quality assurance systems are closely aligned with

¹⁰⁴ www.aph.gov.au/Parliamentary_Business/Committees/Senate/Finance_and_Public_Administration/Completed_inquiries/2010-13/jetacar/index

international standards developed by Codex and the International Organization for Standardization. They are designed to ensure that industry assumes responsibility for the quality and safety of its products and the accuracy of its documentation. This is achieved through the development of product and process controls, based on meat hygiene assessment and HACCP, which focus on minimising pathogens on carcasses and in processed meat.

Australian red meat processors are required to follow HACCP-based procedures under the Australian standard *Hygienic production and transportation of meat and meat products for human consumption* (AS 4696:2007). Other Australian standards exist for game, rabbit, ratite and poultry meat. The standards describe the requirements that must be met by all Australian slaughter and meat-processing establishments during the inspection (antemortem and postmortem), slaughter, processing and transport of meat.

The *Export Control Act 1982* and its subordinate regulations require export-registered meat establishments to implement Approved Arrangements that describe all procedures underpinning food safety and supply chain integrity. These arrangements are subject to audit by the department. The Approved Arrangements:

- cover each stage of production, from sourcing to consignment, of all meat and meat products in the establishment
- provide for the implementation of good hygienic practices and HACCP plans
- contain controls that ensure that meat and meat products are safe and wholesome, and accurately identified to ensure traceability and supply chain integrity
- contain controls for animal handling and animal welfare at the establishment
- contain controls that ensure that meat and meat products unfit for human consumption are removed from the food chain and segregated from safe, wholesome food
- identify surveillance, monitoring and testing programs required by the department, including residue and microbiological testing
- identify the applicable importing country requirements for which export certification is required
- require establishments to verify compliance with these and other programs on an ongoing basis.

Establishments that process red meat and game for export have Department of Agriculture–employed veterinarians on-site, supported by a regulatory team, to verify that Australian and export certification

requirements are met. Senior departmental veterinarians and food safety auditors conduct regular audits of the export meat system.

Since 2011, a suite of reforms through the Australian Export Meat Inspection System (AEMIS), developed in partnership with Australian industry, has delivered more efficient export certification and inspection services. AEMIS ensures the safety, suitability and integrity of Australian meat and meat products. Underpinning AEMIS are objective hygiene and performance standards, which the Department of Agriculture monitors continually. In 2014, the department introduced an improved audit system for export-registered meat establishments. The new program, the Export Meat Systems Audit Program, focuses on an in-depth review of the systems in place at each establishment, to ensure that these systems are effective in meeting the appropriate food safety and regulatory outcomes.

7.4.2 Exports of dairy, seafood and eggs

The Department of Agriculture provides export inspection, audit and certification services to the dairy, seafood and egg industries, in line with the *Export Control Act 1982* and its subordinate regulations and orders.

The department is responsible for compliance with export requirements at dairy, seafood and egg export establishments. On behalf of the department and under formal agreements, state and territory regulatory authorities conduct audits of all export dairy establishments, and export egg establishments in New South Wales and Queensland. The department audits export egg establishments in other states, and export seafood establishments and vessels nationally.



Arthur Mostead



Ryan Jorgensen



Chapter 8

Animal welfare

The Australian Government is committed to ensuring the health and welfare of all animals.

Each state and territory government is responsible for implementing and enforcing domestic animal welfare legislation. The legislation is enforced by the RSPCA inspectorate, or officers from the state or territory department of primary industries (or equivalent authority).

The Australian Government Department of Agriculture regulates the live animal export industry to meet the standards set by Australian legislation and importing country requirements, through the Exporter Supply Chain Assurance Scheme.

8.1 Jurisdictional updates

8.1.1 Australian Government

During 2014, the Australian Government worked with organisations such as the World Organisation for Animal Health (OIE) to support the development of scientifically based international animal welfare guidelines. It continued dialogue on current animal welfare systems, activities and priorities, and regulation of live animal exports.

8.1.2 Australian Capital Territory

In 2014, the Australian Capital Territory (ACT) Government introduced a number of legislative reforms in animal welfare. The Animal Welfare (Factory Farming) Amendment Bill 2013 was passed by the ACT Legislative Assembly, resulting in a ban on caged egg production, debeaking of laying fowl and use of sow stalls in intensive pig production. Further amendments to the *Animal Welfare Act 1992* allow for 'on the spot' fines to be issued on all strict liability offences. Although serious offences will continue to be brought before the courts, minor offences can now be dealt with at the time, in an expeditious and cost-effective manner.

On 1 October 2014, the *Domestic Animals Amendment Act 2014* came into force. The Act makes a distinction between offences for a dog that harasses and a dog that attacks, causing serious injury. A new offence has also been introduced for owning a dog that has been declared dangerous and subsequently attacks. The new offences allow for increased penalties and/or a jail sentence.

The ACT's Animal Welfare Advisory Committee created or reviewed three draft codes of practice in 2014. A review of the existing dog code includes updated advice on exercise, housing, breeding and general husbandry. The draft *Code of practice for the welfare of native wildlife: rescue, rehabilitation and release* is near completion. This new code lists mandatory enforceable standards for licensed wildlife carers. The draft *Code of practice for the private keeping of native reptiles* covers activities of the home-based reptile enthusiast; it will complement the current licensing system and will contain enforceable provisions.



Barbara Crichton

8.1.3 New South Wales

The New South Wales Department of Primary Industries continues to develop a number of animal welfare codes and standards, including:

- boarding of cats and dogs
- dogs and cats in council pounds and animal shelters
- rodeos
- the keeping and trading of birds.

The following policies relating to the use of animals in research were revised:

- annual reporting by animal ethics committees to accredit animal research establishments
- support for animal ethics committees from accredited animal research establishments
- differentiation between animal research and veterinary treatment
- the use of restricted drugs and the conduct of restricted acts of veterinary science in animals.

The department is currently reviewing the Animal Research Review Panel wildlife survey guidelines, and is working to finalise the *Australian animal welfare standards and guidelines: exhibited animals* (see Section 8.3.3). Dialogue with Australian, state and territory government departments responsible for primary industries has also begun, in preparation for the development of *Australian animal welfare standards and guidelines for poultry*.

8.1.4 Northern Territory

The Department of Primary Industry and Fisheries is responsible for all animal welfare legislation in the Northern Territory.

A current review of the *Animal Welfare Act* is nearing completion. In 2013, the Act was amended to include criteria for the 'minimum level of care' owed to animals. An offence for 'aggravated cruelty' was also established, with increases in the penalties for cruelty to animals.

The department has also been working closely with territory-based emergency response and recovery agencies to ensure that the welfare and management of animals are incorporated into disaster planning. A plan has been developed for the management of domestic animals, livestock and wildlife in an emergency, as part of the Territory Emergency Plan.

8.1.5 Queensland

The Queensland Government has introduced a number of legislative reforms in animal welfare.

In June 2013, the Animal Care and Protection Regulation 2012 was amended to permit stocking densities for free-range layer hens above 1500 birds per hectare, on the strict condition that additional outcome-based animal welfare requirements are met at higher densities. The Regulation now specifies that, for densities above 1500 birds per hectare, rotational grazing must be used and a level of continuous fodder cover must be maintained to prevent unsuitable conditions. The birds must also have easy access to an outdoor area for at least eight hours per day.

The amendments allow Queensland poultry producers to compete with producers in other states that do not limit stocking densities for free-range layer hens, while maintaining appropriate animal welfare standards. The Poultry Welfare Monitoring Program that ensures compliance with the Regulation also continued in 2014.

In January 2014, the *Australian animal welfare standards and guidelines: land transport of livestock*¹⁰⁵ were adopted under the *Animal Care and Protection Act 2001* as a compulsory code of practice for transport of livestock. Adoption of the code demonstrates Queensland's commitment towards national consistency in the welfare of livestock in transport. Inspectors from the Queensland Department of Agriculture, Fisheries and Forestry, and RSPCA Queensland will regulate compliance with the code.

In August 2014, a new indictable offence of 'serious animal cruelty' under the *Criminal Code Act 1899* was introduced. The new offence carries a maximum sentence of seven years imprisonment and will apply to 'a person who unlawfully kills, seriously injures or causes an animal prolonged suffering and does so intending to inflict severe pain or suffering on the animal'.

The Queensland Government developed a new teaching resource that will increase Indigenous students' understanding of animal welfare and empathy for animals. A key focus is the cultural significance and welfare of dogs within 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*.¹⁰⁶

The government has also contributed to various national processes throughout 2014, including:

- reference group meetings for the development of Australian animal welfare standards and guidelines for cattle, sheep, and livestock at saleyards and depots
- writing group meetings for the development of Australian animal welfare standards and guidelines for rodeos
- the Animal Welfare Task Group (see Section 8.2)
- development of the National Animal Welfare Research, Development and Extension Strategy.

8.1.6 South Australia

On 19 June 2014, the South Australian Government increased the level of funding to the RSPCA to \$1 million per year for the three financial years 2013–14 to 2015–16. This funding will be used to enforce the *Animal Welfare Act 1985*, including investigation of alleged breaches under the Act. The memorandum of understanding between the Department of Environment, Water and Natural Resources, the Department of Primary Industries and Regions, and the RSPCA is currently under review.

In July 2014, the South Australian Government proposed major reforms to all government boards and committees to make government more accessible and efficient. The Animal Welfare Advisory Committee and a number of livestock advisory groups (alpaca, deer, bee, horse and goat) were abolished following this review; new models of stakeholder engagement will be developed. Reforms to the appointment of members to animal ethics committees were also announced. Members will now be appointed by the licensed institution, rather than by the Minister for Sustainability, Environment and Conservation. On 11 November 2014, a Bill to this effect was introduced into the South Australian Parliament.

During 2014, the South Australian Research and Development Institute joined the Animal Welfare Science Centre as a full partner, bringing key scientific expertise and research infrastructure, especially in the intensive pig and poultry industries.

8.1.7 Tasmania

The Animal Welfare Amendment Bill 1994, introduced into the Tasmanian Parliament in November 2014, proposes changes to the *Animal Welfare Act 1993* to increase penalties for animal cruelty, improve accountability and professional standards for animal welfare offices, and streamline the operation of the Animal Welfare Advisory Committee. Debate on the Bill will continue in 2015.

105 www.animalwelfarestandards.net.au/land-transport

106 www.nhmrc.gov.au/guidelines-publications/ea28

Following public consultation, animal welfare standards and guidelines for dogs were developed by the Tasmanian Animal Welfare Advisory Committee, and regulations are currently being drafted to adopt these standards under legislation. The regulations will operate in two parts: one applies to all dogs, and a second applies only to dogs kept in domestic animal enterprises, such as commercial breeding establishments.

Random inspections of intensive piggeries and poultry farms continue to be undertaken, as well as inspection of vehicles used to transport livestock in Tasmania. The majority of livestock transported across Bass Strait are in roll-on/roll-off vehicles, and their management falls under the standards in the Animal Welfare (Transport of Livestock) Regulations 2013.

Animal welfare compliance in Tasmania is delivered through a partnership between the Department of Primary Industries, Parks, Water and Environment, and the RSPCA. 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.

8.1.8 Victoria

The Victorian Government has developed a toolkit to help stakeholders manage and comply with the new mandatory *Code of practice for the operation of breeding and rearing businesses* (2014),¹⁰⁷ which applies to breeding cats and dogs as a business. The toolkit includes a free online training course for dog and cat breeders.

In August 2014, the Victorian Parliament Legislative Assembly introduced the Primary Industries Legislation Amendment Bill 2014. The Bill strengthens the regulation of animal breeders and provides for greater controls against animal cruelty. A 'fit and proper person' test has been introduced to prevent a person who has been found guilty of animal cruelty offences from being able to register, own or be the proprietor of a breeding business, and to require pet shops to keep specific records on the source of their animals. RSPCA inspectors have been given wider powers to enforce compliance with legislation by pet shops and breeding businesses.

In 2014, owners of pet reptiles, amphibians, ferrets, rats, mice and guinea pigs were surveyed to determine how well they understood their pets' welfare needs. Five key welfare needs were assessed:

- environment
- diet
- behaviour

- companionship
- health.

The survey results are currently being analysed to assess whether animals in Victoria are receiving adequate care from their owners.

The Victorian Government implemented the Responsible Pet Ownership Program¹⁰⁸ for schools and preschools, educating children aged 4–12 years on living safely with dogs and responsible pet ownership. The We Are Family Program was also implemented to educate expectant parents and parents of children up to four years old about pet safety around young children, to ensure that the relationship between children and pets is a happy and safe one. These programs are also being provided in New South Wales and South Australia.

8.1.9 Western Australia

The Department of Agriculture and Food Western Australia (DAFWA) is responsible for administering the *Animal Welfare Act 2002*. Animal welfare compliance and enforcement are shared between DAFWA and the RSPCA. DAFWA takes the lead in monitoring commercial livestock matters at aggregation points. The RSPCA is responsible for receiving and assessing public complaints about animal cruelty, and providing an enforcement service for noncommercial livestock and companion animals.

DAFWA continued to work on draft legislation to implement the *Australian animal welfare standards and guidelines: land transport of livestock*. The department also engaged with industry representatives on the development of animal welfare standards and guidelines for other livestock species and enterprises, with a focus on the proposed sheep and cattle standards.

Work continued among various organisations to clarify roles and responsibilities for the welfare of companion animals, livestock and wildlife during an emergency such as a bushfire or flood.

8.2 Animal Welfare Task Group

In December 2013, the Council of Australian Governments (COAG) agreed to streamline and refocus its priorities and, as a result, remove the Standing Council on Primary Industries from the COAG council structure. Ministers responsible for primary industries could, however, choose to continue to meet outside the COAG structure to make decisions on important areas of cooperation between the Australian and state and territory governments. In

107 www.depi.vic.gov.au/pets/community-and-education/breeder-training-course

108 www.depi.vic.gov.au/pets/community-and-education/responsible-pet-ownership-for-children

February 2014, the Agriculture Ministers' Forum and the Agriculture Senior Officials Committee (AGSOC) were formed to make decisions on agricultural issues of national significance.

The Animal Welfare Task Group (the national successor to the Animal Welfare Committee) has prioritised national animal welfare policy issues referred to it by AGSOC. The 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 will continue to oversee the development and implementation of national animal welfare standards and guidelines for the land transport of livestock, and for cattle, sheep, exhibited animals, livestock at saleyards and depots, and poultry.

8.3 Standards and guidelines

A priority for the Animal Welfare Task Group is to develop nationally consistent standards and guidelines for the welfare of livestock. A new standards and guidelines development framework will be implemented in 2015 to support the development of *Australian animal welfare standards and guidelines for poultry*.

8.3.1 Australian animal welfare standards and guidelines: land transport of livestock

In September 2012, the *Australian animal welfare standards and guidelines: land transport of livestock* was finalised.

The standards and guidelines are now being implemented by state and territory governments. They apply to all commercial livestock species, and to all people responsible for the care and management of livestock transported through the supply chain. This includes the transport of livestock by road, rail and livestock transport vehicle aboard a ship.

8.3.2 Australian animal welfare standards and guidelines for cattle and sheep

The development of the cattle and sheep standards and guidelines is well advanced, and the documents are now ready for consideration by governments.¹⁰⁹ The standards

and guidelines provide a basis for developing and implementing consistent animal welfare legislation and enforcement across Australia.

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.

8.3.3 Australian animal welfare standards and guidelines for exhibited animals

The New South Wales Department of Primary Industries has continued to coordinate the development of national standards and guidelines for exhibited animals. One general and six taxon-related standards and guidelines documents were released nationally for public comment, accompanied by a national regulatory impact statement. The comments are currently being assessed by a consultant and a project team.

As part of the process, proposals to clarify off-exhibit holding requirements for exhibited animals have been presented to the zoo industry in New South Wales for comment. Draft policies for the controlled breeding of species held under the *New South Wales Exhibited Animals Protection Act 1986*, and escape management requirements for exhibitors of large cats under the Act are being modified following industry comment.

Advice and recommendations were provided to all petting zoos in New South Wales regarding minimising the risks of transmission of *Escherichia coli* from animals to patrons.

8.3.4 Australian animal welfare standards and guidelines for livestock at saleyards and depots

On 11 September 2014, the Victorian Department of Environment and Primary Industries invited public submissions on the proposal to introduce nationally consistent rules for the care and management of livestock during their transition through saleyards and depots in Australia. The 90-day public consultation process closed on 12 December 2014.

¹⁰⁹ www.animalwelfarestandards.net.au

The proposed national standards and guidelines are based on a revision of the 1991 *Model code of practice for the welfare of animals: animals at saleyards*.¹¹⁰ The standards and guidelines apply to the main commercial livestock species – cattle, goats, horses, pigs and sheep – that are handled through Australian saleyards and depots. They apply to all Australian livestock saleyard enterprises and depots, and to those responsible for the care and management of livestock that are handled through saleyards and depots.

8.3.5 Australian animal welfare standards and guidelines for poultry

A review of the existing *Model code of practice for the welfare of animals: domestic poultry*¹¹¹ will form the basis of the development of Australian animal welfare standards and guidelines for poultry.

The New South Wales Department of Primary Industries is leading the development process and has begun preliminary discussions in preparation for the review.

8.4 Australian Animal Welfare Strategy

In December 2013, the Australian Government announced the decision to withdraw financial and staff support for the Australian Animal Welfare Strategy (AAWS). As a result, the states and territories, which are best placed to drive reform in this area, are now responsible for the future growth of the AAWS.

In 2014, the Crisis Response for Animal Welfare project was finalised; the final report is available on the AAWS website.¹¹² The project evaluated the capacity, arrangements and available resources to resolve different types of animal welfare crises. It was funded by the AAWS Livestock and Production Animals Working Group and the livestock industries, including Meat & Livestock Australia, Dairy Australia and Australian Wool Innovation.

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 research, development and extension (RD&E) resources in the field of animal welfare.¹¹³

Participants in the strategy include:

- Animal Welfare Science Centre, University of Melbourne
- Australian Egg Corporation Limited
- Australian Meat Processors Corporation
- Australian Pork Limited
- Australian Wool Innovation
- Commonwealth Scientific and Industrial Research Organisation (CSIRO)



110 www.publish.csiro.au/nid/22/sid/11.htm

111 www.publish.csiro.au/nid/22/sid/11.htm

112 www.australiananimalwelfare.com.au/content/livestock-and-production-animals/crisis-response-for-animal-welfare

113 www.npirdef.org/files/resourceLibrary/resource/16_Animal_Welfare_RDE_Strategy.pdf

- Dairy Australia
- LiveCorp
- Meat & Livestock Australia
- Murdoch University
- Queensland Department of Agriculture, Fisheries and Forestry
- Rural Industries Research and Development Corporation (Chicken Meat Program)
- South Australian Research and Development Institute
- University of Adelaide
- University of Queensland
- University of Western Australia
- Victorian Department of Environment and Primary Industries.

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.

In April 2014, the final report for the project 'Develop a public attitude monitoring scheme to inform animal welfare policy development', by the Animal Welfare Science Centre, University of Melbourne, was presented. The report will form the basis for a potential new project to develop a regular process to monitor public attitudes to animal welfare.

The strategy has commissioned two further projects in 2014:

- '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 a key outcome of the 3rd National Animal Welfare RD&E Strategy Forum,¹¹⁴ held in Adelaide in 2013. This project will produce a 'living' catalogue of animal welfare RD&E activities in Australia, which will be used in the development of a capability analysis of the animal welfare RD&E sector.

On 28 August 2014, the 4th National Animal Welfare RD&E Strategy Forum was held at the University of Sydney. 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 Livestock exports

In September 2014, the Minister for Agriculture, the Hon. Barnaby Joyce MP, announced three reforms to the Exporter Supply Chain Assurance System (ESCAS), to be implemented by the Department of Agriculture. The reforms address the government's election commitment to reduce red tape and increase performance efficiency in ESCAS.¹¹⁵

In November 2014, the department advised all exporters that ESCAS approval had been separated from individual consignment approvals through amendments to the Export Control (Animals) Order 2004. This reform changes the way that ESCAS applications are received, assessed and charged. It focuses the system on managing risk, rather than paperwork, and reduces costs to industry.

Other announced reforms involve:

- adding the option of risk-based auditing for compliant supply chains
- consolidating, streamlining and improving audits or checklists used to assess compliance with international animal welfare standards.

To increase the skills of independent auditors, the government has provided Meat & Livestock Australia with funding of \$256 000 to deliver an ESCAS auditor training program on the updated animal welfare checklist in Southeast Asia and the Middle East.

Implementation of these reforms, along with ongoing evaluation of export processes and identification of further opportunities for improvement, may assist the department to develop a more efficient and cost-effective system for ensuring welfare of exported livestock.

¹¹⁴ <http://www.animalwelfare.net.au/sites/default/files/Forum%202013%20Presentations.pdf>

¹¹⁵ www.agriculture.gov.au/biosecurity/export/live-animals/livestock/information-exporters-industry/escas

8.7 International animal welfare

8.7.1 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 four 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 nontariff barriers to international trade through prescriptive animal welfare requirements. The Australian Government consults closely with the livestock industries and nongovernment 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*. 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.¹¹⁶ 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). The content for

the training program has been developed, and initial knowledge workshops for facilitators will commence in March 2015. These workshops and lectures will be delivered across China, Malaysia, Thailand and Vietnam. Other countries covered by the Regional Animal Welfare Strategy (RAWS) will be invited to participate (see Section 8.7.2).

8.7.2 Regional Animal Welfare Strategy for Asia, the Far East and Oceania

On 24 March 2014, the 7th RAWS Coordination Group Meeting was held in Bangkok, Thailand. At this meeting, the Coordination Group:

- updated the *RAWS action plan*, in line with countries' animal welfare activities
- noted the completion of the RAWS website¹¹⁷
- officially handed over RAWS secretariat duties from the Australian Government Department of Agriculture to the OIE Regional Representation for Asia and the Pacific.

On 11 November 2014, the 8th RAWS Coordination Group Meeting was held in Canberra. The Coordination Group discussed animal welfare activities undertaken by member countries in the past six months. Achievements included the development of guidelines by Malaysia for religious festivals where sheep and cattle are slaughtered, and further development of animal welfare legislation and standards in countries of the region.

The future of RAWS beyond June 2015 was also discussed. It was unanimously agreed that the Coordination Group has been a strong and necessary driver. The RAWS Coordination Group will recommend in a paper to the OIE Regional Commission for Asia, the Far East and Oceania that the Coordination Group be continued, with options for ongoing funding. The Coordination Group will take this opportunity to review its terms of reference, membership and action plan.

¹¹⁶ www.animalwelfarestandards.org

¹¹⁷ <http://www.rr-asia.oie.int/strategies/regional-animal-welfare-strategy/>



Animal Health Australia



Australian Government Department of Agriculture



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 also 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 are conducted 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 (DFAT¹¹⁸) and the Australian Centre for International Agricultural Research (ACIAR¹¹⁹), respectively.

Australia also provides leadership, and technical and financial assistance at global and regional levels. It supports the World Health Organization (WHO), 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 Australia, as well as for the collaborating countries.

¹¹⁸ <http://dfat.gov.au/aid>

¹¹⁹ www.aciar.gov.au

9.1 Regional representation

The Australian Chief Veterinary Officer and Delegate to the OIE, Dr Mark Schipp, is a member of the OIE Council, where he represents the OIE Regional Commission for Asia, the Far East and Oceania. In 2013 and 2014, consultation took place within the region, and regional animal health issues were presented to the OIE Council for consideration. This process has led to increased engagement and cooperation within the region.

The Regional Commission is developing a revised regional work plan framework, which is expected to be adopted at the next Regional Conference, in September 2015.

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 undertakes these activities in collaboration with the PNG National Agriculture Quarantine and Inspection Authority (NAQIA) and the Timor-Leste Ministry of Agriculture and Fisheries under memorandums of understanding.

In 2014, joint animal health surveys were conducted in the Western Province of PNG and the western districts of Timor-Leste.

The Department of Agriculture also funded:

- an animal health monitoring program in PNG, in which NAQIA planned and conducted six activities in various locations
- rabies response training for five Timorese veterinarians in Flores, Indonesia
- biosecurity public awareness activities in border villages in PNG and Timor-Leste
- exotic animal disease training for 40 Timor-Leste ministry staff
- publication of the first animal disease textbook in Tetun (one of the official languages of Timor-Leste)
- pilot studies of serological responses to Newcastle disease and classical swine fever vaccination in chickens and pigs, respectively, in Timor-Leste
- rabies public awareness activities in high-risk coastal areas in Timor-Leste; Timor-Leste is currently free from rabies, and some of these activities aimed to help maintain that status.

Activities such as these provide information about the presence and distribution of animal diseases 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. This increases the capacity of the PNG NAQIA and the Timor-Leste Ministry of Agriculture and Fisheries to respond to animal disease emergencies, and helps to reduce exotic animal disease threats to Australia.

9.2.2 Norfolk Island

The Department of Agriculture has continued its pest and disease surveys of Norfolk Island. Testing of samples collected from livestock and companion animals – including cattle, sheep, pigs, horses, dogs, cats and chickens – identified no diseases of concern. This indicates that the animal disease status of Norfolk Island is broadly similar to, or better than, Australia's status for the diseases tested. Testing of environmental samples from nine species of migratory birds revealed no evidence of infection with avian influenza. No impediment to the inclusion of Norfolk Island within the Australian quarantine barrier was identified during the survey.

9.3 Overseas aid

The Australian Government's overseas aid program is guided by a new policy statement, *Australian aid: promoting prosperity, reducing poverty, enhancing stability*,¹²⁰ released in June 2014, which aligns the goal of poverty reduction with the pursuit of economic growth in the Indo-Pacific region. Under this policy, Australia is working with the governments and people of developing countries to strengthen private sector development and enable human development through investments in health and education. In health, transboundary challenges such as emerging infectious diseases (EIDs) are a significant threat to economic growth and health security.

The international community has made progress in improving the health of the world's poor and tackling global health threats. However, the world's poorest and most vulnerable people bear the greatest burden of disease, including infectious disease, and ill health. EIDs such as Ebola and avian influenza, and other public health issues such as antimicrobial drug resistance present significant new threats.

Through its overseas health investments, Australia will support regional solutions to public health threats such as malaria and emerging transboundary diseases by working

120 www.dfat.gov.au/about-us/publications/Documents/australian-aid-development-policy.pdf

with partners to mobilise political leadership, technical support and financial investments. Australia is also committed to working with the private sector to develop innovative ways to improve health in the region and prevent the costs of health care exacerbating poverty.

Australia supports partner governments in building surveillance systems and improving their ability to respond to emerging disease threats. A key element of this support is improving coordination between the human and animal health sectors. Animal health initiatives are highly relevant in the EID context because many devastating human diseases originate in animals. Animal disease control and capacity building, including strengthening veterinary services, can have major benefits for human health security, as well as for productivity at the farm level.

9.3.1 Previous contributions to pandemics and EIDs

Australia has played a leading role in the response to pandemics and EIDs in the Indo-Pacific region. Since 2003, Australia has provided more than \$200 million to partner governments, nongovernment organisations, and regional and multilateral institutions to assist countries to strengthen their EID prevention, detection and response capabilities. This assistance has significantly improved the capacity of countries in the region to respond to pandemics and EIDs.

9.3.2 Current commitments to pandemics and EIDs

Current and recently concluded commitments include:

- \$12 million to WHO to assist countries in the Asia–Pacific region to build better laboratories, develop national pandemic preparedness plans and implement innovative surveillance systems, under the WHO Asia Pacific Strategy for Emerging Diseases (2010); this support has now concluded
- \$12.7 million to the OIE to strengthen veterinary services, and to control foot-and-mouth disease (FMD) and rabies in Southeast Asia, under the Stop Transboundary Animal Diseases and Zoonoses (STANDZ) initiative
- \$6 million to support the PREVENT project of the United States Agency for International Development (USAID), which conducts community-based research and behavioural change communications activities to reduce the risk of pandemic threats emerging from zoonotic disease transmission among vulnerable populations in the Mekong region.

Four current Australian aid programs that include animal health activities are described below.

Stop Transboundary Animal Diseases and Zoonoses

The Australian-funded STANDZ initiative in Southeast Asia (2011–16) was launched in September 2011 and is being implemented by the OIE. Its overarching goal is to reduce the impact of EIDs on food security, public health and livelihoods in Southeast Asia. STANDZ supports strengthening of national veterinary systems and services, consistent with OIE tools and standards; regional and in-country FMD eradication efforts, guided by the South East Asia and China FMD (SEACFMD) 2020 Roadmap; veterinary human resource development; and regional and in-country rabies prevention and control efforts under the One Health approach of collaboration between the animal and human health sectors in managing zoonotic EIDs. In 2014, STANDZ launched the following activities to intensify regional efforts to control FMD and rabies:

- a two-year FMD vaccination project covering 26 high-risk districts in northern Laos, which aims to eliminate FMD in this region by 2016
- a two-year project to support implementation of the Philippines National Rabies Control and Prevention Strategy, including dog vaccination and public awareness campaigns in priority sites such as Camarines Norte, Camarines Sur, Masbate Island and Albay Province
- development of a South East Asia Rabies Strategy; this was accepted by the Association of Southeast Asian Nations (ASEAN) Sectoral Working Group on Livestock and was used by ASEAN member states in developing an intersectoral human–animal health ASEAN Rabies Elimination Strategy, which was endorsed by countries in 2014.

The Department of Agriculture continues to provide technical and governance support to DFAT for the STANDZ initiative.

PREVENT Community-based Emerging Infectious Disease Risk Reduction in the Mekong

The Australian Government partnered with 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 EID transmission 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 high-risk, poor communities 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 already been provided to local, industry and government stakeholders; more activities are planned for 2015.

Australia's funding for PREVENT has also supported immediate responses to EID outbreaks. In 2013, the governments of Laos, Cambodia 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.

Australia Indonesia Partnership for Emerging Infectious Diseases: Animal Health Program

The Australia Indonesia Partnership for Emerging Infectious Diseases (AIP-EID) Animal Health Program is a \$22 million government-to-government program to be delivered over four years from mid-2011 to mid-2015. Its focus is the sustainable strengthening of Indonesia's veterinary services to prevent, detect and control emerging and priority infectious diseases of animals. The program is implemented by the Australian Government Department of Agriculture in partnership with the Indonesian Ministry of Agriculture.

Consistent with the OIE pathway (Performance of Veterinary Services) for strengthening national veterinary services, the AIP-EID program supports:

- strengthening of Indonesia's government veterinary institutions at the national and subnational level, particularly in the areas of planning, management, policy development and coordination

- enhancement of skills, expertise and capacity to deliver veterinary services.

Achievements of the AIP-EID program in 2014 include:

- strengthening of emergency management systems and response policies, and the conduct of disease simulation exercises
- development and establishment of an integrated national animal health information system
- preparation of regulations and policies to support control of several priority endemic diseases
- implementation of the Indonesia Veterinary Leadership initiative to strengthen leadership and management within the Ministry of Agriculture
- support for national reference laboratories to provide quality assurance and harmonised methods for the diagnosis of rabies, brucellosis, anthrax and avian influenza
- support for local brucellosis control programs in several districts of South Sulawesi
- 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.

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.

Public Sector Linkages Program

In 2014, the Department of Agriculture completed its remaining project in the Asia–Pacific region funded by the Public Sector Linkages Program. The program, which has been superseded by the Government Partnerships for Development Program, provided funds to Australian Government agencies and statutory authorities to work with their counterpart public sector agencies in partner countries. Program activities included training, work placements and twinning arrangements. These activities aimed to transfer capacity-building skills and expertise, and strengthen links that focus on sustainable development.

One part of the program, completed in February 2014, was to build Timor-Leste's animal health laboratory capacity, following training provided by the FAO under its previous biosecurity strengthening project. A well-

functioning and sustainable animal health laboratory is a key component of Timor-Leste's progress towards a functional animal health system.

Government Partnerships for Development Program

With funding from the Australian Government's new Government Partnerships for Development Program, the Timor-Leste Village Poultry Health and Biosecurity Program began in March 2014 and will run until 30 June 2016. This is a joint program between the Australian Government Department of Agriculture and the Timor-Leste Ministry of Agriculture and Fisheries, working with experts from the University of Sydney. The program aims to increase the number of village chickens and their eggs in three pilot villages, and to strengthen biosecurity arrangements in Timor-Leste using poultry disease risks as a focus. It will take a holistic approach to village chicken health; the central component is to establish an effective and sustainable model for the national Newcastle disease vaccination program.

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 and the Department of Agriculture) and international organisations, such as the FAO, the OIE and 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 website¹²¹ and via other media.



¹²¹ www.aciar.gov.au

9.4.1 Indonesia and Timor-Leste

Research to support strategies to manage animal diseases in Indonesia and Timor-Leste includes:

- a new project on smallholder pig systems in Timor-Leste and eastern Indonesia, with a focus on control of classical swine fever
- a large, new multidisciplinary project (IndoBeef) that aims to improve the health and production of smallholder beef cattle and the marketing of beef in Indonesia.

In Timor-Leste, a new project will examine 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 projects include:

- a project focusing 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
- two projects on improving pig health and production in Laos, with 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 new project, implemented through the OIE, that will examine livestock movement and the control of transboundary animal diseases in SEACFMD countries.

9.4.3 Philippines

A new project in the Philippines, building on previous work on respiratory diseases of pigs, 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 means to strengthen animal health services to improve the health and production of smallholder livestock, which will improve the livelihood of smallholder livestock producers and their communities. In Vanuatu, a new project will examine the health and production of smallholder beef cattle and ways to improve the marketing of beef.

9.4.5 Eastern and southern Africa

In Botswana, a project implemented through the International Livestock Research Institute aims to increase the competitiveness of smallholder beef producers. It is examining constraints on smallholder livestock production and ways to improve livestock marketing systems. A new project will build on this work and focus on improving the health, production and marketing of small ruminants in Botswana.

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.





Commonwealth Scientific and Industrial Research Organisation



Chapter 10

Research and development

The Commonwealth Scientific and Industrial Research Organisation, 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 that may enter, emerge, establish or spread 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 ensuring 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 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 (AHA) to develop and coordinate the implementation of the National Animal Biosecurity RD&E Strategy.¹²² Published in July 2014, the strategy meets the requirements of both the National Primary Industries RD&E Framework, and Schedule 8 of the Intergovernmental Agreement on Biosecurity.

¹²² www.npirdef.org/cms_strategy/project/15/15

The 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; the Commonwealth Scientific and Industrial Research Organisation (CSIRO); rural research and development (R&D) corporations; industry; and university sectors. This will lead to better harmonisation of the roles of these organisations in RD&E relating to primary industries, and ensure that they work together effectively to maximise net benefits to Australia. The framework strengthens national research capability to address sector and cross-sector issues (including animal biosecurity), and focuses RD&E resources so that they are used in a more effective, efficient and collaborative way, thereby reducing capability gaps, fragmentation and unnecessary duplication.

The National Animal Biosecurity RD&E Strategy has been endorsed by all stakeholders – that is, the Australian Government, the state and territory governments, nine animal-based R&D corporations, seven universities with veterinary schools, and CSIRO – and is supported by AHA'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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Animal Biosecurity RD&E Strategy



National Primary Industries Research, Development and Extension Framework



'Working together for animal health'

10.2 CSIRO Australian Animal Health Laboratory and Biosecurity Flagship

The CSIRO Australian Animal Health Laboratory (CSIRO-AAHL), through CSIRO's Biosecurity Flagship, undertakes world-renowned science and research into terrestrial and aquatic animal health, and diseases that affect both people and animals. The research manages the risks of exotic, emerging and new diseases. It underpins Australia's diagnostic activities and informs decision makers on the most effective ways to manage the biosecurity risks facing Australia, including both preventive activities and responding to incursions.

CSIRO-AAHL is one of a handful of animal health high-containment laboratories in the world that enable work on pathogens that require containment at biosafety level 4. Facilities and expertise at CSIRO-AAHL are unique in enabling the development of animal models to study deadly viruses such as Ebola.

Lessons learned from CSIRO's research activities are provided through published peer-reviewed scientific papers and participation in biosecurity technical committees.

Projects are directed mainly towards:

- evaluating new diagnostic technologies, including developing and validating new diagnostic tests
- studying the pathogenesis of new and emerging diseases that affect animals and humans
- identifying novel markers of infection and critical control points for reducing disease transmission
- developing novel strategies for disease control, including animals with innate resistance to infectious diseases
- developing a predictive framework for infectious disease threats
- studying vector-borne diseases, including characterising arboviruses (arthropod-borne viruses) and their vectors, insect innate immunity, vaccines and episytems (the biological and environmental factors affecting a disease at a particular time and place).

Scientists at CSIRO-AAHL have well-established collaborative networks with many international research organisations to help solve some of the most serious infectious disease challenges affecting the world.

Research activity is supported by funding from CSIRO, the Australian Government Department of Agriculture and external funding bodies.

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10.3 Biosecurity Animal Division of the Australian Government Department of Agriculture

The Biosecurity Animal Division of the Department of Agriculture provides sound scientific advice to inform animal health policy. This role is becoming more challenging as the complexity of issues and the rate of change increase. Strategic foresight is useful when managing uncertainty, both now and in the future. The division therefore uses strategic foresight to consider emerging trends in 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 division to identify, understand and respond to significant emerging issues before they establish or become critical.

Some of the division's strategic foresight activities in 2014 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 nanotechnology (e.g. for diagnostic and therapeutic purposes), antimicrobial resistance, and the growing use of drones and sensors in agriculture for disease surveillance purposes
- consideration of key emerging issues using foresight techniques, such as causal layered analysis, to assist with future planning

- cooperative work with Quadrilateral Group partners (Canada, New Zealand and the United States) on future approaches to emergency animal disease management
- participation in the Australasian Joint Agencies Scanning Network, which consists of representatives from the Ministry for the Environment (New Zealand); Environment Waikato (New Zealand); CSIRO; the Australian National University; the University of New South Wales (Canberra) School of Physical, Environmental and Mathematical Sciences; Ergon Energy (Queensland); and the Cotton Research and Development Corporation. The group is facilitated by a professional futurist, Kate Delaney.

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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 research to improve animal health and reduce antibiotic use through Program 2 (Herd Health Management) of its research portfolio. Program 2 has three subprograms:

- 2A – Novel disease diagnostics. Research effort concentrates on refining existing diagnostic tools developed for enteric pathogens and developing PCR analysis of respiratory pathogen loads.
- 2B – Healthy, robust pig genotypes. Research uses selection strategies and genetic technologies to develop new pig genotypes with better disease resilience and robustness than current Australian genotypes. The program uses existing and unique overseas lines
- 2C – Replacement of antibiotics with effective integrated health strategies. Research is aimed at reducing expenditure on therapeutics while maintaining or improving production efficiency.

Pork CRC research projects funded between 2011 and 2014 are detailed on the Pork CRC website.

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10.4.2 Dairy Futures Cooperative Research Centre

The Dairy Futures CRC is a large-scale partnership between dairy farmers, pasture and cattle breeding companies, government and researchers that aims to deliver breakthrough bioscience applications to benefit the dairy industry. Two programs – Designer Forages and Animal Improvement – are developing new on-farm innovations, with the following aims:

- Program – Animal Improvement
 - Deliver technology that substantially increases the reliability of genomic selection, for both elite sires and commercial cows.
 - Further improve the commercialisation process for the use of genomic selection in Holstein and Jersey breeds.
 - Further expand an international collaboration to map the entire DNA sequence of 1000 key ancestor bulls.
 - Use genomic selection to drive progress on focus traits such as fertility, and to assess new traits such as feed conversion efficiency.

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Commonwealth Scientific and Industrial Research Organisation

10.4.3 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 37 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 methodology to industry.
- Program 2 (Nutrition & Environment) provides information and methods to industry to increase resource use and reduce effects on the environment.
- Program 3 (Safe & Quality Food Production) aims to control foodborne illness associated with poultry products, and improve egg quality.

The Poultry CRC has now begun research activities on all 28 outputs as agreed with the Australian Government. Most research projects have two or more collaborators, including many industry participants. There is a clear focus on delivering frontier science that has practical applications.

The Poultry CRC's education program is progressing well ahead of schedule. Each year, CRC postgraduate students and postdoctoral researchers attend a workshop, followed by industry visits to partners such as feed companies, pharmaceutical producers, and hatchery or breeder farms. These events are vital to forming strong links between current and future researchers and industry, to keep research relevant and end-user focused.

Strong demand for the Poultry CRC's teaching materials for schools has continued, and new information is now accessible from the CRC's Poultry Hub website to help schools with keeping poultry. Recently developed vocational education and training materials are helping industry personnel develop their skills via in-house training and through institutions such as Technical and Further Education (TAFE) organisations. The CRC's internship program has been very successful, with most interns retained in the poultry industry.

Information about the CRC's progress is available from the Poultry CRC and Poultry Hub websites, and by subscribing to the newsletter *eChook*.

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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 and Veterinary Sciences has Australian partners and collaborators – through research centres such as the Graham Centre for Agricultural Innovation – and international partners in countries including Pakistan, India, Indonesia, Papua New Guinea and China. These links allow the school to offer a breadth of exciting PhD training opportunities to Australian and international students.

The National Life Sciences Hub on the university's Wagga Wagga campus 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.

Academic staff in the School of Animal and Veterinary Sciences undertake research in animal health across a range of species and disciplines. The school offers research training focusing on production animals, with an emphasis on sustainable livestock production systems. Other research areas are companion animal medicine and surgery, pathology, microbiology and wildlife medicine. The school 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.

The school has formed the following research clusters to support further research development:

- animal physiology, reproduction and genetics
- parasitology, infectious diseases and animal health
- animal welfare, nutrition and production
- clinical science
- research in teaching.

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10.5.2 University of Adelaide

The School of Animal and Veterinary Sciences at the University of Adelaide began taking 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, the Department of 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 2014, 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, and wildlife health and disease.

The research profile of the school continues to expand, with the recent appointment of a new leader in equine science and medicine.

Contact: Professor Gordon S Howarth

Email: gordon.howarth@adelaide.edu.au

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.

Contact: Professor Andrew Fisher

Email: adfisher@unimelb.edu.au

Website: <http://fvas.unimelb.edu.au/research/projects>

10.5.4 University of New England

In February 2014, the licence to manage ParaBoss was competitively awarded by the Sheep CRC to the University of New England.

ParaBoss

ParaBoss is the national organisation that leads the development and extension of best-practice information, training and tools to improve parasite management of sheep. It was developed as a project of the CRC for Sheep Industry Innovation (Sheep CRC), with start-up support from Australian Wool Innovation and Meat & Livestock Australia.

ParaBoss is supported by a technical committee that provides specialist expertise in the control of worms, flies and lice across all sheep-producing regions, and close connections with industry. Members of the technical committee include representatives from state

departments of agriculture, universities, the private advisory sector, pharmaceutical companies, and industry R&D corporations.

ParaBoss manages the websites WormBoss, FlyBoss and LiceBoss. These websites provide an active problem-solving approach to parasite problems, based on decision-support tools and decision guides, with flow-through to product information. The websites also provide demand-driven information through new online learning programs. The monthly user audience of Boss websites doubled during 2014 to 10 000 users, with 30 000 page views.

The new ParaBoss Forum, a limited-access website for professionals closely involved with parasite control, is developing as a rapid-interaction vehicle for queries and issues. It will help to identify important and contentious issues that could be considered for future R&D.

ParaBoss News has been expanded to provide feature articles and regional outlooks on a monthly basis to 3500 subscribers.

Contact: Lewis Kahn

Email: lewis@paraboss.com.au

Website: www.paraboss.com.au

10.5.5 University of Sydney

The Faculty of Veterinary Science, University of Sydney, has an international research profile and continues to have outstanding success in attracting competitive research grants. It has strong links to veterinary and animal health professional bodies, public health authorities, prestigious national CRCs, and industry-based R&D corporations.

The faculty's research strengths are concentrated in the following areas:

- animal production systems
- infectious diseases
- veterinary public health and epidemiology
- veterinary pathology
- comparative genomics
- reproduction and genetics
- companion animal health and behaviour
- animal welfare science
- wildlife health and conservation biology
- equine medicine and performance sciences.

Contact: Marie Wildridge

Email: Marie.wildridge@sydney.edu.au

Website: <http://sydney.edu.au/vetscience/research/index.shtml>

10.6 Research and development corporations

The rural R&D corporations listed in this section invest in research by various service providers (CSIRO, universities, commercial research organisations, government departments, CRCs), but do not, in the main, undertake research themselves.

10.6.1 Australian Egg Corporation

The Australian Egg Corporation Limited (AECL) is a public, nonlisted company limited by guarantee and established under the *Egg Industry Service Provision Act 2002*. The company provides on-farm, through-chain and market services for its stakeholders, including egg producers. The AECL is mainly funded through statutory promotional and R&D levies received from all egg producers, which are collected under the Act, and through Australian Government funds for R&D activities in agreed program areas, including animal health.

The egg industry has experienced incursions of exotic or 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 both 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.

The 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.

The AECL is a major contributor to, and core participant in, the Poultry CRC (see Section 10.4.3).

Contact: James Kellaway

Email: james@aecl.org

Website: <https://www.aecl.org/r-and-d>



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 2014 calendar year was covered by two operational plans (2013–14 and 2014–15). With regard to on-farm R&D, the plans 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 and the shearing industry
 - support for trainer development and national consistency
- education and extension
 - improving grower skills capacity (including support for grower extension networks)
 - stakeholder engagement and education (including leadership development and conduct of forums).

Contact: Dr Paul Swan

Email: paul.swan@wool.com

Website: www.wool.com/on-farm-research-and-development

10.6.3 Dairy Australia

Dairy Australia is the dairy industry's service company. It is committed to supporting the current high levels of animal health and welfare on Australian dairy farms. Australia is fortunate in having few diseases of importance affecting Australian dairy herds; most diseases that do occur are relatively well understood.

Animal health and welfare are essential for the efficient and productive operations of dairy farms, and good outcomes help to maintain the excellent reputation of the industry and dairy products. Industry investment in RD&E has focused on projects for prevention and control of cattle diseases, genetic improvement, improved nutrition, and improved animal handling and husbandry practices. Priorities for the dairy industry are the integration of biosecurity measures into whole-farm management and improved calf management.

Research projects provide information for dairy farmers and their advisers to prevent the occurrence of disease, achieve good animal welfare outcomes, and establish appropriate animal management systems and practices. The industry conducts several national projects addressing animal health topics, and a large number of small, regionally based projects. Countdown 2020 is Australia's national extension program for preventing, diagnosing and treating mastitis. The InCalf project focuses on improving reproductive performance, and BJD Aware promotes strategies to manage and control bovine Johne's disease. CowTime, which has a focus on milk harvesting, delivers extension on ways to reduce stress for cows at milking, including principles of stock handling, dairy design and cow behaviour.

Building on the successful control of enzootic bovine leucosis (EBL) in dairy cattle, the Australian Dairy Industry Council and animal health authorities implemented a national program to eradicate EBL from the Australian dairy herd. Provisional freedom from EBL was achieved in December 2009, and freedom was confirmed in December 2012. Testing has continued, with negative results.

To improve the skills of dairy farmers and their employees, Dairy Australia has established the National Centre of Dairy Education Australia to develop and deliver vocational education and training for the dairy industry. The animal health and welfare content is regularly revised and updated. The Dairy Futures CRC was established

in January 2010 through a government and industry partnership to deliver major improvements in plant and animal breeding.

Contact: Dr Robin Condon

Email: RCondon@dairyaustralia.com.au

Website: www.dairyaustralia.com.au/Industry-information/Research-and-development.aspx

10.6.4 Fisheries Research and Development Corporation – Aquatic Animal Health

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 46% (\$1.1 billion) of Australian fisheries' gross value of production (\$2.3 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 noncommercial 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 underwent a major review in 2011. Six key research areas remain:

- 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 revised Aquatic Animal Health Subprogram R&D Plan can be obtained by contacting the subprogram leader.

Contact: Dr Mark Crane

Email: mark.crane@csiro.au

Website: http://frdc.com.au/research/aquatic_animal_health/Pages/default.aspx

10.6.5 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 (ovine and bovine) – 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 – management, diagnosis and epidemiology
- vector-borne diseases such as *Theileria orientalis* – diagnosis and epidemiology
- control of scouring in sheep and young calves
- reproductive diseases of sheep and cattle
- 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 increase biosecurity. This includes better tools for screw-worm fly diagnosis and incursion control, bluetongue diagnosis and assessment of vector distribution, response to foot-and-mouth disease, and capripox diagnosis.

Completed final research reports are available on the MLA website.

Contact: Johann Schröder

Email: jschroder@mla.com.au

Website: www.mla.com.au/Research-and-development

10.6.6 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 2014, 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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Animal Health Australia



Animal Health Australia

Appendix

1

Livestock industries in Australia¹²³

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 2010–11 are shown in Table A1.1. Values for previous years may differ from those shown in previous publications as a result of revisions by the Australian Bureau of Statistics.

Table A1.1 Australian livestock numbers (millions)

Livestock species	2010–11	2011–12	2012–13	2013–14
Sheep	73.1	74.7	75.5	72.7
Cattle				
Beef	25.9	25.7	26.5	24.7
Dairy	2.6	2.7	2.8	2.9
Total	28.5	28.4	29.3	27.6
Pigs	2.3	2.3	2.1	2.2
Poultry ^a	90.7	94.2	98.7	na

na = not available

a Meat chickens and laying hens only

Sources: Australian Bureau of Agricultural and Resource Economics and Sciences (2014).

Agricultural commodities: December quarter 2014, ABARES, Canberra. [www.agriculture.gov.au/abares/publications/display?url=http://143.188.17.20/anrd/DAFFService/display.php?fid=pb_agcomd9abcc20141209_11a.xml](http://143.188.17.20/anrd/DAFFService/display.php?fid=pb_agcomd9abcc20141209_11a.xml)

Australian Bureau of Statistics (2014). *Agricultural commodities, Australia, 2012–13*, cat. no. 7121.0, ABS, Canberra. www.abs.gov.au/AUSSTATS/abs@nsf/ProductsbyCatalogue/97B95C93A7FD9B75CA2573FE00162CAF?OpenDocument (for poultry data only)

¹²³ 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 2013–14, the gross value of Australian livestock and livestock products was estimated to be \$23.2 billion. Exports of livestock and livestock products were worth \$18.3 billion.

Meat, wool and eggs

Australia has a highly developed meat industry. In 2013–14, the gross value of slaughtered Australian livestock was estimated to be \$14.0 billion.

In 2013–14, Australian exports of beef, veal, sheepmeat, poultry and pork (not including live animals) were worth \$8.6 billion. Selected export statistics are shown in Table A1.2. Australia is the world's second largest exporter of beef, veal and sheepmeat.

Table A1.2 Volume of Australian meat exports (kilotonnes of shipped weight)				
Type of meat	2010–11	2011–12	2012–13	2013–14
Beef and veal	937	948	1014	1184
Mutton	86	89	144	181
Lamb	157	174	201	226
Pork	31	29	26	27
Poultry	31	38	32	37

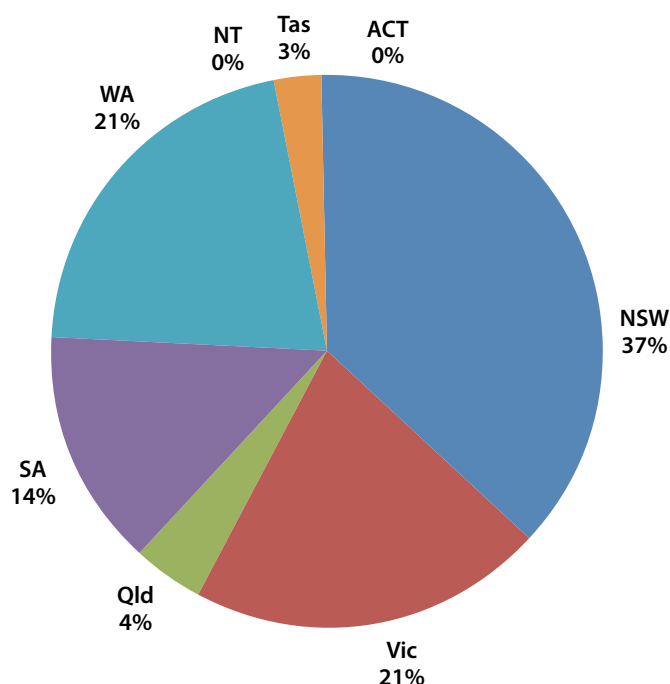
Source: Australian Bureau of Agricultural and Resource Economics and Sciences (2014). *Agricultural commodities: December quarter 2014*, ABARES, Canberra. [www.agriculture.gov.au/abares/publications/display?url=http://143.188.17.20/anrdl/DAFFService/display.php?fid=pb_agcomd9abcc20141209_11a.xml](http://143.188.17.20/anrdl/DAFFService/display.php?fid=pb_agcomd9abcc20141209_11a.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 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 A1.1). Most Australian sheep are produced as part of mixed-farming enterprises, frequently along with cropping and beef production.

In 2013–14, sheep numbers were estimated to have declined by 4% from the previous year to 73 million. This decline follows three consecutive years of strong



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 (2014). *Agricultural commodities, Australia, 2012–13*, cat. no. 7121.0, ABS, Canberra. www.abs.gov.au/AUSSTATS/abs@.nsf/ProductsbyCatalogue/97B95C93A7FD9B75CA2573FE00162CAF?OpenDocument

Figure A1.1 Sheep distribution by state and territory, 30 June 2013

growth in sheep numbers as favourable seasonal conditions, combined with positive returns for wool production and relatively strong lamb prices, resulted in strong restocking activity.

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 (nonbreeding adult male 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 declined by 1% in 2013–14 to 430 700 tonnes. Average wool cut per head is estimated to have declined by 1% to 4.37 kilograms per sheep, following a high of 4.41 kilograms per sheep in 2012–13. Total wool exports declined by 2% to 427 800 tonnes in greasy equivalent. However, the value of wool exports increased marginally to \$2.9 billion. Selected production and export figures for the wool and sheepmeat industries are shown in Table A1.3.

Table A1.3 Australian sheep industry production

Sheep production	2011–12	2012–13	2013–14
Sheep numbers (millions)	74.7	75.5	72.7
Sheep slaughtered (millions)	5.2	8.2	10.1
Lambs slaughtered (millions)	18.9	21.1	21.9
Total wool production (kilotonnes)	410.8	435.1	430.7
Mutton production (kilotonnes carcase weight)	119.7	183.2	227.9
Lamb production (kilotonnes carcase weight)	419.3	457.0	474.3
Sheepmeat exports (kilotonnes shipped weight)	262.9	344.2	407.5
Value of sheepmeat exports (\$ million)	1422.0	1563.6	2218.6
Live sheep exports (millions)	2.6	2.0	2.0
Value of wool exports (\$ million)	3123.0	2869.0	2877.0

Source: Australian Bureau of Agricultural and Resource Economics and Sciences (2014). *Agricultural commodities: December quarter 2014*, ABARES, Canberra.
www.agriculture.gov.au/abares/publications/display?url=http://143.188.17.20/anrd/DAFFService/display.php?fid=pb_agcomd9abcc20141209_11a.xml



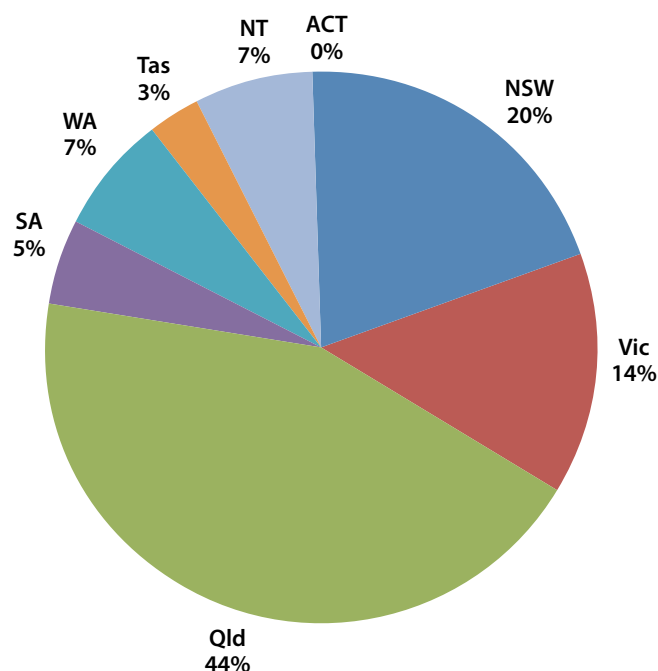
John Coppi: www.scienceimage.csiro.au

Beef cattle

Cattle are raised over much of Australia (see Figure A1.2). 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 *Bos 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 (2014). *Agricultural commodities, Australia, 2012–13*, cat. no. 7121.0, ABS, Canberra. www.abs.gov.au/AUSSTATS/abs@.nsf/ProductsbyCatalogue/97B95C93A7FD9B75CA2573FE00162CAF?OpenDocument

Figure A1.2 Beef cattle distribution by state and territory, 30 June 2013

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 25.7 million. However, dry seasonal conditions in 2013–14, particularly in northern Australia, led to a decline to an estimated 24.7 million animals.

The volume of Australian beef exports increased by 17% in 2013–14 to approximately 1.2 million tonnes. The value of these exports increased by 29% to approximately

\$6.3 billion. The number of live cattle exported for slaughter increased by 94% in 2013–14 to 996 462 animals (Table A1.4).

Table A1.4 Australian beef industry production

Beef cattle production	2011–12	2012–13	2013–14
Total beef cattle (millions)	25.7	26.5	24.7
Cattle slaughtered (millions)	7.9	8.5	9.5
Beef and veal production (kilotonnes carcase weight)	2114.8	2245.0	2464.1
Live cattle exports (thousands) ^a	578.6	513.1	996.5
Value of live cattle exports (\$ million) ^a	411.7	338.6	779.9
Beef exports (kilotonnes shipped weight)	948.3	1013.9	1184.4
Value of beef exports (\$ million)	4466.6	4871.0	6264.8

a Live exports of feeder and slaughter cattle only; excludes breeder cattle

Source: Australian Bureau of Agricultural and Resource Economics and Sciences (2014). *Agricultural commodities: December quarter 2014*, ABARES, Canberra. www.agriculture.gov.au/abares/publications/display?url=http://143.188.17.20/anrd/DAFFService/display.php?fid=pb_agcomd9abcc20141209_11a.xml

Pigs

The number of pigs slaughtered increased by 1% in 2013–14 compared with 2012–13, to 4.8 million (Table A1.5). Pigmeat production increased by approximately 1% to 359 800 tonnes, while the volume of Australian pigmeat exported increased by approximately 2%, to 26 800 tonnes (shipped weight). In 2013–14, exports (in carcase weight equivalent) accounted for approximately 13% of the total volume of Australian pigmeat production.

In recent years, the number of farms with pigs has declined steadily. The Australian Bureau of Statistics indicates that, at 30 June 2013, Australia had 1452 pig farms, holding 224 500 sows.¹²⁴ This compares with 2007–08, when Australia had 1625 pig farms, holding 263 000 sows. In 2012–13, Victoria had the largest number of pigs, followed by Queensland and New South Wales.

¹²⁴ Australian Bureau of Statistics (2014). *Agricultural commodities, Australia, 2012–13*, cat. no. 7121.0, ABS, Canberra. www.abs.gov.au/AUSSTATS/abs@.nsf/ProductsbyCatalogue/97B95C93A7FD9B75CA2573FE00162CAF?OpenDocument

Table A1.5 Australian pig industry production

Pig production	2011–12	2012–13	2013–14
Total pigs (millions)	2.3	2.1	2.2
Breeding sows, including gilts (thousands)	267.0	310.0	na
Pigs slaughtered (millions)	4.7	4.7	4.8
Pigmeat production (kilotonnes carcase weight)	350.5	355.8	359.8
Pigmeat exports (kilotonnes shipped weight)	29.4	26.2	26.8
Value of pigmeat exports (\$ million)	100.1	81.2	84.6
Gross value of production (\$ million)	933.7	933.7	1050.0

na = not available

Sources: Australian Bureau of Agricultural and Resource Economics and Sciences (2014). *Agricultural commodities: December quarter 2014*, ABARES, Canberra. www.agriculture.gov.au/abares/publications/display?url=http://143.188.17.20/anrdl/DAFFService/display.php?fid=pb_agcomd9abcc20141209_11a.xml
 Australian Bureau of Agricultural and Resource Economics and Sciences (2014). *Agricultural commodity statistics 2014*, ABARES, Canberra. www.agriculture.gov.au/abares/publications/display?url=http://143.188.17.20/anrdl/DAFFService/display.php?fid=pb_agcstd9abcc0022014_11a.xml (for breeding sow data only)

Table A1.6 Australian poultry industry production

Poultry production	2011–12	2012–13	2013–14
Meat chickens (millions)	80.8	84.0	na
Layer hens and pullets for egg production (millions)	13.4	13.6	na
Chickens slaughtered (millions)	551.3	563.3	579.9
Chicken meat production (kilotonnes carcase weight)	1030.1	1046.2	1084.3
Exports of poultry meat (kilotonnes shipped weight) ^a	37.8	31.9	36.7
Value of poultry meat exports (\$ million) ^a	45.4	42.8	49.7
Value of egg production (\$ million)	583.4	653.0	670.0
Value of meat production (\$ million)	2078.1	2213.8	2314.1

na = not available

a Excludes processed poultry meat

Sources: Australian Bureau of Agricultural and Resource Economics and Sciences (2014). *Agricultural commodities: December quarter 2014*, ABARES, Canberra. www.agriculture.gov.au/abares/publications/display?url=http://143.188.17.20/anrdl/DAFFService/display.php?fid=pb_agcomd9abcc20141209_11a.xml
 Australian Bureau of Statistics (2014). *Agricultural commodities, Australia, 2012–13*, cat. no. 7121.0, ABS, Canberra. www.abs.gov.au/AUSSTATS/abs@.nsf/ProductsbyCatalogue/97B95C93A7FD9B75CA2573FE00162CAF?OpenDocument (for meat chicken, layer hen and pullet data only)

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 located within 50 kilometres of capital cities.

In 2012–13, approximately 5662 businesses produced more than 334 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 increased by approximately 3% in 2013–14 to \$670 million (Table A1.6).

Goats

Australia is the world's largest exporter of goat meat. In 2011–12, 1.78 million goats were slaughtered, supporting meat exports of 26 729 tonnes, valued at \$113.6 million. The two largest export markets for Australian goat meat in the three years to 2011–12 were the United States and Taiwan, which accounted for 53% and 28% of these exports, respectively. Additionally, 71 900 live goats were exported in 2011–12, with an estimated value of \$9.7 million. The largest markets for live goat exports in the three years to 2011–12 were Malaysia and Singapore, which accounted for 87% and 10% 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.

More recent data for goat products are not available.

Game products

Australia produces high-quality game products from animals grazed on native grasslands. Game products include venison, kangaroo and buffalo. Data later than 2011–12 are not available.

Venison

In 2010–11, 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 has resulted in deer farmers leaving the industry.

Kangaroo

The gross value of production of the kangaroo industry in 2011–12 was \$28.6 million, down from a peak of \$54 million in 2005–06. Production and prices were considerably lower than in the mid-2000s because the Russian Federation withdrew from the kangaroo meat market in 2009. In 2011–12, approximately 1.77 million kangaroos were harvested for meat, yielding approximately 17 700 tonnes of meat for human consumption and pet food.

The value of kangaroo meat exports for human consumption in 2011–12 was \$20.4 million, down from a peak of around \$47 million in 2006–07. In the past, more than 70% of kangaroo meat exports were shipped to the Russian Federation, but withdrawal of the Russian Federation from the market reduced this share to zero in 2011–12. The major export destinations for kangaroo meat in 2011–12 were South Africa (28% of total exports), Germany (19%), the Netherlands (17%), Papua New Guinea (14%) and Belgium (11%).

Buffalo

The gross value of production of the buffalo industry in 2011–12 was approximately \$3.2 million, mainly from milk and meat production, and live exports from the Northern Territory. Live exports decreased to 1003 animals in 2011–12, down from 2166 in 2010–11 and a peak of 6564 in 2006–07. The main markets in the past five years have been Brunei Darussalam, Indonesia and Malaysia.

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 2012–13. Victoria has 65% of the national dairy herd, followed by New South Wales (12%) and Tasmania (9%).

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 1.69 million in 2013–14 (Table A1.7).

Australian milk production was largely unchanged in 2013–14 compared with 2012–13, at approximately 9.2 billion litres. A higher farm-gate price for milk is estimated to have resulted in the gross value of milk production rising by 25% in 2013–14, to \$4.6 billion.

Table A1.7 Australian dairy industry production

Dairy production	2011–12	2012–13	2013–14
Dairy cow numbers (millions)	1.70	1.69	1.69
Total milk production (million litres)	9480.1	9200.7	9238.8
Milk yield per cow (litres)	5576.5	5449.7	5466.7
Gross value of milk production (\$ million)	3986.4	3687.3	4619.0

Source: Australian Bureau of Agricultural and Resource Economics and Sciences (2014). *Agricultural commodities: December quarter 2014*, ABARES, Canberra. www.agriculture.gov.au/abares/publications/display?url=http://143.188.17.20/anrd/DAFFService/display.php?fid=pb_agcomd9abcc20141209_11a.xml

In 2013–14, the dairy products Australia exported to about 100 countries (Table A1.8) were worth \$2.73 billion.

Fisheries and aquaculture

Australia has diverse wild-catch and aquaculture fisheries that produce both native and introduced species. In 2012–13, the gross value of fisheries production was approximately \$2.4 billion. The volume and value of fisheries production for 2011–12 and 2012–13 are shown in Table A1.9.

Table A1.8 Australian dairy production and exports (kilotonnes)

Species	Total production			Exports		
	201–12	2012–13	2013–14	2011–12	2012–13	2013–14
Cheese	346.5	338.3	311.5	161.2	174.1	150.6
Butter and butter fat	119.7	118.2	116.1	48.6	53.7	49.3
Milk powders ^a	375.5	337.4	340.8	247.9	237.8	240.5

a Includes whole milk powder, skim milk powder and casein

Source: Australian Bureau of Agricultural and Resource Economics and Sciences (2014). *Agricultural commodities: December quarter 2014*, ABARES, Canberra.
www.agriculture.gov.au/abares/publications/display?url=http://143.188.17.20/anrdl/DAFFService/display.php?fid=pb_agcomd9abcc20141209_11a.xml

Table A1.9 Australian fisheries production by species

Fishery	Volume of production (kilotonnes)		Value of production (\$ million)	
	2011–12	2012–13	2011–12	2012–13
Abalone	5.1	5.3	169.7	189.7
Oysters	12.6	12.5	90.1	94.5
Prawns	22.5	21.1	266.5	277.1
Rock lobster	9.1	10.5	394.3	451.0
Salmonids	44.2	43.0	513.6	496.9
Scallops	3.6	6.8	8.2	14.7
Tuna	10.1	11.4	172.3	177.2
Other fish	113.1	105.6	456.3	441.3
Other crustaceans and molluscs ^a	16.5	17.0	233.9	239.1
Total^{a,b}	236.6	233.1	2304.8	2381.5

a Volume excludes pearl oysters

b Figures may not add to totals due to rounding. Includes aquaculture production but excludes hatchery production

Source: Australian Bureau of Agricultural and Resource Economics and Sciences (2014). *Australian fisheries and aquaculture statistics 2013*, ABARES, Canberra.
www.agriculture.gov.au/abares/publications/display?url=http://143.188.17.20/anrdl/DAFFService/display.php?fid=pb_afastats13d9abmd20141121_11a.xml

Farmed aquaculture production in Australia includes many major species, such as abalone, barramundi, oysters, salmon and tuna. It is an important component of Australian fisheries production. Between 2002–03 and 2012–13, aquaculture's share of the total value of Australian fisheries production grew from 31% to 43%. The volume of aquaculture production in Australia declined by 2% in 2012–13, to approximately 80 100 tonnes. The value of aquaculture production declined by 1%, to approximately \$1.03 billion.

Selected figures for the volume of production and gross value of aquaculture harvests in 2012–13 are shown in Table A1.10.

Exports of Australian edible fisheries products, shown in Table A1.11, totalled 35 304 tonnes and were worth \$1 billion in 2012–13.

Bees

In 2013–14, honey production was estimated to be 21 633 tonnes. The gross value of the whole industry was estimated to be \$87 million, of which \$76 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 12 400 registered beekeepers, operating about 528 000 hives of European honey bees. Most honey bee operators are small, family-owned and family-operated businesses. Many of these, particularly

Table A1.10 Australian aquaculture production, 2012–13

Aquaculture production	Volume of production (kilotonnes)	Gross value of production (\$ thousand)
Fish		
Barramundi	3.6	32 771
Salmonids	43.0	496 863
Silver perch	0.3	3 277
Tuna	7.5	153 500
Other ^a	1.4	20 184
Total ^b	55.7	706 595
Crustaceans		
Marron	0.06	1 881
Prawns	3.7	60 062
Redclaw	0.04	738
Yabbies	0.04	720
Total ^b	3.9	63 402
Molluscs		
Abalone	0.7	23 685
Mussels	3.6	10 195
Oysters – edible	12.5	94 539
Oysters – pearl	na	79 170
Total ^b	16.8	207 589
Production not included elsewhere	3.6	55 040
Total^{b,c} (all categories)	80.1	1 032 626

na = not available

a Includes eels, other native fish and aquarium fish

b Figures may not add to totals due to rounding.

c Total volume excludes pearl oysters

Source: Australian Bureau of Agricultural and Resource Economics and Sciences (2014). *Australian fisheries and aquaculture statistics 2013*, ABARES, Canberra.

www.agriculture.gov.au/abares/publications/display?url=http://143.188.17.20/anrd/DAFFService/display.php?fid=pb_afastats13d9abmd20141121_11a.xml

Table A1.11 Exports of Australian fisheries products^a

Type of food	Volume (kilotonnes)			Value (\$ thousand)		
	2010–11	2011–12	2012–13	2010–11	2011–12	2012–13
Edible	42.4	40.5	35.3	990 346	1 000 719	1 002 341
Non-edible	na	na	na	257 865	226 050	172 848

na = not available

a Excludes live tonnage but includes live value

Source: Australian Bureau of Agricultural and Resource Economics and Sciences (2014). *Australian fisheries and aquaculture statistics 2013*, ABARES, Canberra.

www.agriculture.gov.au/abares/publications/display?url=http://143.188.17.20/anrd/DAFFService/display.php?fid=pb_afastats13d9abmd20141121_11a.xml

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 5).

Other Australian agricultural statistics and forecasts are available from the website of the Australian Bureau of Agricultural and Resource Economics and Sciences.¹²⁵



www.scienceimage.csiro.au

¹²⁵ www.agriculture.gov.au/abares



Appendix 2

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Appendix 3

Investigations of emergency animal diseases

Table A3.1 reports investigations during 2014 of suspect emergency animal diseases that are on Australia's National List of Notifiable Animal Diseases. This table excludes disease investigations recorded elsewhere in individual programs, such as equine infectious anaemia.

Table A3.1 Investigations of suspect emergency animal diseases listed on Australia's National List of Notifiable Animal Diseases, 2014

Disease	Species	State	Month	Response code ^a	Finding
American foulbrood (<i>Paenibacillus larvae</i>)	Bees	NSW	May	2	Negative
	Bees	NSW	Jul	2	Positive
	Bees	NSW	Sep	2	Positive
	Bees	NT	Apr	3	Negative (2 unrelated investigations)
	Bees	Qld	Jan	2	Positive (5 unrelated investigations)
	Bees	Qld	Jan	2	Negative (2 unrelated investigations)
	Bees	Qld	Feb	2	Positive (4 unrelated investigations)
	Bees	Qld	Feb	2	Negative (4 unrelated investigations)
	Bees	Qld	Mar	2	Positive (6 unrelated investigations)
	Bees	Qld	Mar	2	Negative
	Bees	Qld	Apr	2	Positive (7 unrelated investigations)
	Bees	Qld	Apr	2	Negative (3 unrelated investigations)
	Bees	Qld	May	2	Positive (2 unrelated investigations)
	Bees	Qld	May	2	Negative
	Bees	Qld	Jun	2	Positive (2 unrelated investigations)
	Bees	Qld	Jun	2	Negative (2 unrelated investigations)
	Bees	Qld	Jul	2	Positive (9 unrelated investigations)
	Bees	Qld	Aug	2	Positive (4 unrelated investigations)
	Bees	Qld	Aug	2	Negative (6 unrelated investigations)
	Bees	Qld	Sep	2	Positive (33 unrelated investigations)
	Bees	Qld	Sep	2	Negative (13 unrelated investigations)

Table A3.1 Investigations of suspect emergency animal diseases listed on Australia's National List of Notifiable Animal Diseases, 2014 *continued*

Disease	Species	State	Month	Response code ^a	Finding
Anaplasmosis in tick-free areas	Cattle	Tas	Feb	2	Negative
Aujeszky's disease	Pig	SA	Mar	3	Negative
Australian bat lyssavirus	Dog	Qld	Jun	3	Negative
	Dog	Qld	Jul	2	Negative (2 unrelated investigations)
	Horse	Qld	Apr	2	Negative
	Horse	Qld	May	2	Negative
	Horse	Qld	Jun	2	Negative
	Horse	Qld	Aug	2	Negative (4 unrelated investigations)
	Horse	Qld	Sep	2	Negative (2 unrelated investigations)
	Pig	SA	Mar	3	Negative
Babesiosis in tick-free areas	Cattle	NSW	May	2	Negative
	Cattle	NSW	Jun	2	Negative
	Cattle	Tas	Feb	2	Negative
Bluetongue – clinical disease ^b	Cattle	NSW	Jan	2	Negative (4 unrelated investigations)
	Cattle	NSW	May	2	Negative
	Cattle	Vic	Mar	2	Negative
	Sheep	NSW	Apr	2	Negative
	Sheep	NSW	Jul	2	Negative
	Sheep	NSW	Aug	2	Negative
	Sheep	Tas	Jun	2	Negative
	Sheep	Vic	Jan	2	Negative
	Sheep	Vic	Feb	2	Negative
	Sheep	Vic	Mar	2	Negative (2 unrelated investigations)
Bovine virus diarrhoea type 2	Cattle	Vic	Jun	2	Negative
Brucellosis (<i>B. abortus</i> , <i>B. suis</i> , <i>B. canis</i> and <i>B. melitensis</i>)	Cattle	Qld	May	2	Negative
	Cattle	WA	Apr	2	Negative (2 unrelated investigations)
	Cattle	WA	May	2	Negative
	Dog	NSW	Jun	2	Positive (2 unrelated investigations) ^c
	Dog	Qld	Mar	3	Negative (2 unrelated investigations)
	Dog	Qld	Apr	3	Negative
	Dog	Qld	Jun	2	Negative
	Dog	Qld	Jul	2	Negative (5 unrelated investigations)
	Dog	Qld	Aug	3	Negative (2 unrelated investigations)
	Dog	Qld	Sep	2	Negative (4 unrelated investigations)
	Dog	Vic	Jun	3	Negative
	Horse	NSW	Jun	2	Negative

Table A3.1 Investigations of suspect emergency animal diseases listed on Australia's National List of Notifiable Animal Diseases, 2014 *continued*

Disease	Species	State	Month	Response code ^a	Finding
Brucellosis (<i>B. abortus</i> , <i>B. suis</i> , <i>B. canis</i> and <i>B. melitensis</i>) <i>continued</i>	Horse	Qld	Aug	2	Negative (2 unrelated investigations)
	Pig	Qld	Jan	2	Negative
	Pig	Qld	May	2	Negative
	Sheep	Vic	Apr	2	Negative
	Sheep	Vic	May	2	Negative
	Sheep	Vic	Jun	2	Negative (7 unrelated investigations)
Classical swine fever	Pig	SA	Mar	3	Negative
Cysticercus bovis (<i>Taenia saginata</i>)	Cattle	Tas	Aug	2	Positive
Enzootic bovine leucosis	Cattle	NSW	Apr	2	Negative
	Cattle	NSW	May	2	Negative
Epizootic haemorrhagic disease – clinical disease	Cattle	NSW	Jan	2	Negative (3 unrelated investigations)
	Cattle	NSW	May	3	Negative
	Deer	SA	Jun	3	Negative
Equine influenza	Horse	NSW	May	2	Negative
	Horse	NSW	Sep	2	Negative
	Horse	Qld	Jan	2	Negative
	Horse	Qld	May	2	Negative
	Horse	Qld	Jun	2	Negative
	Horse	Qld	Jul	2	Negative (2 unrelated investigations)
Equine piroplasmiasis (<i>Babesia equi</i> , <i>B. caballi</i> and <i>Theileria equi</i>)	Horse	Qld	Sep	3	Negative
European foulbrood (<i>Melissococcus plutonius</i>)	Bees	NT	Apr	3	Negative (2 unrelated investigations)
	Bees	Qld	Jan	2	Negative (2 unrelated investigations)
	Bees	Qld	Feb	2	Negative (5 unrelated investigations)
	Bees	Qld	Mar	2	Positive (2 unrelated investigations)
	Bees	Qld	Mar	2	Negative
	Bees	Qld	Apr	2	Negative (4 unrelated investigations)
	Bees	Qld	May	2	Negative
	Bees	Qld	Jun	2	Positive (2 unrelated investigations)
	Bees	Qld	Jun	2	Negative (2 unrelated investigations)
	Bees	Qld	Jul	2	Negative (5 unrelated investigations)
	Bees	Qld	Aug	2	Positive (2 unrelated investigations)
	Bees	Qld	Aug	2	Negative (7 unrelated investigations)
	Bees	Qld	Sep	2	Positive (11 unrelated investigations)
	Bees	Qld	Sep	2	Negative (21 unrelated investigations)

Table A3.1 Investigations of suspect emergency animal diseases listed on Australia's National List of Notifiable Animal Diseases, 2014 *continued*

Disease	Species	State	Month	Response code ^a	Finding
Foot-and-mouth disease	Cattle	NSW	Feb	2	Negative
	Cattle	NSW	Apr	2	Negative
	Cattle	NSW	Apr	3	Negative
	Cattle	NSW	May	3	Negative
	Cattle	NSW	Jun	3	Negative
	Cattle	NSW	Sep	3	Negative
	Cattle	Tas	Jan	3	Negative
	Cattle	Tas	Sep	3	Negative
	Cattle	Vic	Feb	2	Negative
	Cattle	Vic	Jun	2	Negative (2 unrelated investigations)
	Cattle	Vic	Jul	3	Negative (3 unrelated investigations)
	Cattle	Vic	Aug	3	Negative
	Cattle	Vic	Sep	3	Negative
	Deer	SA	Jun	3	Negative
	Goat	Vic	Aug	3	Negative
	Pig	NSW	Aug	3	Negative
	Pig	SA	Jun	3	Negative
	Sheep	NSW	Aug	2	Negative
	Sheep	SA	Mar	3	Negative
	Sheep	Vic	Mar	2	Negative
	Sheep	Vic	Jul	3	Negative
	Sheep	Vic	Aug	3	Negative (3 unrelated investigations)
Hendra virus infection	Cat	NT	Apr	2	Negative
	Dog	Qld	Mar	5	Negative
	Dog	Qld	Apr	5	Negative (2 related investigations)
	Dog	Qld	May	3	Negative
	Donkey	Qld	Sep	2	Negative (2 unrelated investigations)
	Eastern grey kangaroo	Qld	Sep	2	Negative
	Horse	NSW	Jan	2	Negative
	Horse	NSW	Mar	2	Negative (2 unrelated investigations)
	Horse	NSW	Apr	2	Negative (16 unrelated investigations)
	Horse	NSW	May	2	Negative (19 unrelated investigations)
	Horse	NSW	Jun	2	Negative (20 unrelated investigations)
	Horse	NSW	Jun	5	Positive
	Horse	NSW	Jul	2	Negative (7 unrelated investigations)
	Horse	NSW	Aug	2	Negative (40 unrelated investigations)

Table A3.1 Investigations of suspect emergency animal diseases listed on Australia's National List of Notifiable Animal Diseases, 2014 *continued*

Disease	Species	State	Month	Response code ^a	Finding
Hendra virus infection <i>continued</i>	Horse	NSW	Sep	2	Negative (28 unrelated investigations)
	Horse	NT	May	2	Negative (2 unrelated investigations)
	Horse	NT	Jun	2	Negative
	Horse	NT	Jul	2	Negative
	Horse	NT	Aug	2	Negative (2 unrelated investigations)
	Horse	NT	Sep	2	Negative
	Horse	Qld	Jan	2	Negative (28 unrelated investigations)
	Horse	Qld	Jan	3	Negative
	Horse	Qld	Feb	2	Negative (27 unrelated investigations)
	Horse	Qld	Mar	2	Negative (2 related investigations)
	Horse	Qld	Mar	2	Negative (32 unrelated investigations)
	Horse	Qld	Mar	3	Negative
	Horse	Qld	Mar	5	Positive
	Horse	Qld	Apr	2	Negative (43 unrelated investigations)
	Horse	Qld	Apr	3	Negative
	Horse	Qld	Apr	5	Negative (4 related investigations)
	Horse	Qld	May	2	Negative (28 unrelated investigations)
	Horse	Qld	May	3	Negative (2 unrelated investigations)
	Horse	Qld	Jun	2	Negative (30 unrelated investigations)
	Horse	Qld	Jun	3	Negative (2 unrelated investigations)
	Horse	Qld	Jun	5	Positive
	Horse	Qld	Jun	5	Negative (3 related investigations)
	Horse	Qld	Jul	2	Negative (131 unrelated investigations)
	Horse	Qld	Jul	5	Positive
	Horse	Qld	Jul	5	Negative (2 related investigations)
	Horse	Qld	Aug	2	Negative (92 unrelated investigations)
	Horse	Qld	Aug	3	Negative (4 unrelated investigations)
	Horse	Qld	Aug	5	Negative
	Horse	Qld	Sep	2	Negative (100 unrelated investigations)
	Horse	Qld	Sep	3	Negative (2 unrelated investigations)
	Horse	SA	Mar	3	Negative (2 unrelated investigations)
	Horse	SA	Apr	3	Negative
	Horse	SA	May	3	Negative
	Horse	SA	Jun	3	Negative (5 unrelated investigations)
	Horse	Tas	Mar	3	Negative
	Horse	Tas	May	3	Negative
	Horse	Tas	Nov	3	Negative
	Horse	Vic	Jan	2	Negative (2 unrelated investigations)
	Horse	Vic	Mar	2	Negative (2 unrelated investigations)
	Horse	Vic	May	2	Negative (2 unrelated investigations)
	Horse	Vic	Jun	2	Negative (3 unrelated investigations)

Table A3.1 Investigations of suspect emergency animal diseases listed on Australia's National List of Notifiable Animal Diseases, 2014 *continued*

Disease	Species	State	Month	Response code ^a	Finding
Hendra virus infection <i>continued</i>	Horse	Vic	Jul	3	Negative (4 unrelated investigations)
	Horse	Vic	Aug	3	Negative
	Horse	Vic	Sep	3	Negative (3 unrelated investigations)
	Horse	WA	Apr	2	Negative
	Horse	WA	May	2	Negative
	Horse	WA	Sep	3	Negative (2 unrelated investigations)
	Pig	SA	Mar	3	Negative
Japanese encephalitis	Pig	SA	Mar	3	Negative
Lumpy skin disease	Cattle	NSW	Aug	3	Negative
Maedi-visna	Goat	WA	Apr	3	Negative
Malignant catarrhal fever – wildebeest associated	Cattle	Tas	Sep	3	Negative
Rabies	Dog	Qld	Jun	3	Negative
Screw-worm fly – Old World (<i>Chrysomya bezziana</i>)	Cattle	WA	Jan	2	Negative
Swine influenza	Pig	WA	Apr	3	Negative
	Pig	WA	Aug	3	Negative (2 unrelated investigations)
Swine vesicular disease	Pig	SA	Jun	3	Negative
Transmissible gastroenteritis	Pig	SA	Mar	3	Negative
Tuberculosis (<i>Mycobacterium bovis</i>)	Cattle	Qld	Jan	2	Negative (7 granulomas examined)
	Cattle	Qld	Apr	2	Negative (14 granulomas examined)
	Cattle	Qld	Jul	2	Negative (7 granulomas examined)
	Cattle	Vic	Jan	2	Negative (3 granulomas examined)
	Cattle	Vic	Apr	2	Negative (3 granulomas examined)
	Cattle	Vic	Jul	2	Negative (23 granulomas examined)
	Cattle	WA	Apr	2	Negative (1 granuloma examined)
Vesicular stomatitis	Cattle	Tas	Jan	3	Negative
	Cattle	Vic	Jul	3	Negative
	Deer	SA	Jun	3	Negative
	Goat	Vic	Aug	3	Negative
	Horse	WA	Jan	3	Negative
	Pig	SA	Jun	3	Negative
West Nile virus infection – clinical	Bird	SA	Feb	3	Negative
	Chicken	SA	Feb	3	Negative
	Chicken	SA	Jan	3	Negative
	Horse	NSW	Apr	2	Negative
	Horse	Qld	Jan	3	Negative
	Horse	Qld	Feb	2	Negative
	Horse	Qld	Apr	3	Negative

Table A3.1 Investigations of suspect emergency animal diseases listed on Australia's National List of Notifiable Animal Diseases, 2014 *continued*

Disease	Species	State	Month	Response code ^a	Finding
West Nile virus infection – clinical <i>continued</i>	Horse	Qld	May	3	Negative
	Horse	SA	Jan	3	Negative
	Horse	SA	Mar	3	Negative (4 unrelated investigations)
	Horse	SA	May	2	Negative
	Horse	SA	May	3	Negative (3 unrelated investigations)
	Horse	SA	Jun	2	Negative (2 unrelated investigations)
	Horse	SA	Jun	3	Negative (7 unrelated investigations)
	Horse	Tas	May	2	Negative
	Horse	Tas	Nov	3	Negative

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 currently 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.



Appendix 4

Export legislation

The *Export Control Act 1982* controls the export of all goods regulated by the Australian Government Department of Agriculture. Subordinate legislation to the Act provides specific commodity-based regulation and includes:

- Export Control (Orders) Regulations 1982
- Export Control (Animals) Order 2004
- Export Control (Eggs and Egg Products) Orders 2005
- Export Control (Fees) Orders 2001
- Export Control (Fish and Fish Products) Orders 2005
- Export Control (Meat and Meat Products) Orders 2005
- Export Control (Milk and Milk Products) Orders 2005
- Export Control (Organic Produce Certification) Orders 2005
- Export Control (Plants and Plant Products) Orders 2011
- Export Control (Poultry Meat and Poultry Meat Products) Orders 2010
- Export Control (Prescribed Goods – General) Orders 2005
- Export Control (Rabbit and Ratite) Orders 1985
- Export Control (Wild Game Meat and Wild Game Meat Products) Orders 2010.

Penalties for offences under export legislation are prescribed in the *Export Control (Orders) Regulations 1982*.

All exporters of red meat and livestock (cattle, sheep, goats, buffalo, deer and camelids) require an export licence under the *Australian Meat and Live-stock Industry Act 1997* and subordinate legislation, including:

- Australian Meat and Live-stock Industry Regulations 1998
- Australian Meat and Live-stock Industry (Export Licensing) Regulations 1998

- Australian Meat and Live-stock Industry (Standards) Order 2005
- Australian Meat and Live-stock Industry (Conditions on Live-stock Export Licences) Order 2012
- Australian Meat and Live-stock Industry (Live Cattle Exports to Republic of Korea) Order 2002
- Australian Meat and Live-stock Industry (Export of Live-stock to Saudi Arabia) Order 2005
- Australian Meat and Live-stock Industry (Export of Live-stock to Egypt) Order 2008.

Commonwealth legislation underpinning export inspection arrangements, and fees and charges, includes:

- *Export Inspection and Meat Charges Collection Act 1985*
 - Export Inspection and Meat Charges Collection Regulations 1985
- *Export Inspection (Establishment Registration Charges) Act 1985*
 - Export Inspection (Establishment Registration Charges) Regulations 1985
- *Export Inspection (Quantity Charge) Act 1985*
 - Export Inspection (Quantity Charge) Regulations 1985
- *Export Inspection (Service Charge) Act 1985*
 - Export Inspection (Service Charge) Regulations
- *Meat Export Charge Act 1984*
 - Meat Export Charge Regulations
- *Meat Export Charge Collection Act 1984*
 - Meat Export Charge Collection Regulations
- *Meat Inspection Act 1983*
 - Meat Inspection (Modification) Regulations
 - Meat Inspection (Orders) Regulations 1984
- *Meat Inspection Arrangements Act 1964.*



Appendix 5

Key Australian animal health websites

Accreditation Program for Australian Veterinarians	www.animalhealthaustralia.com.au/training-centre/accreditation-program-for-australian-veterinarians-apav
Animal Health Australia	www.animalhealthaustralia.com.au
<i>Animal Health Surveillance Quarterly</i>	www.animalhealthaustralia.com.au/elibrary
AQUAPLAN	www.agriculture.gov.au/animal-plant-health/aquatic/aquaplan
AQUAVETPLAN	www.agriculture.gov.au/animal-plant-health/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 Biosecurity Cooperative Research Centre for Emerging Infectious Disease	www.abcrc.org.au
Australian Centre for International Agricultural Research	www.aciar.gov.au
Australian Chicken Meat Federation	www.chicken.org.au
Australian Customs and Border Protection Service	www.customs.gov.au
Australian Dairy Farmers	www.australiandairyfarmers.com.au
Australian Egg Corporation	www.aecl.org
Australian Food and Grocery Council	www.afgc.org.au
Australian Government Department of Agriculture	www.agriculture.gov.au
Australian Government Department of Foreign Affairs and Trade Overseas Aid Program (Australian Aid)	www.dfat.gov.au/aid
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 Pesticides and Veterinary Medicines Authority	www.apvma.gov.au/contact-us
Australian Poultry Cooperative Research Centre	www.poultrycrc.com.au
Australian Q Fever Register	www.qfever.org
Australian Racing Board	www.australianracingboard.com.au
Australian Veterinary Association	www.ava.com.au
Australian Wool Innovation	www.wool.com
Australia's animal health laboratory network	www.agriculture.gov.au/animal-plant-health/animal/system/lab-network
AUSVETPLAN	www.animalhealthaustralia.com.au/programs/emergency-animal-disease-preparedness/ausvetplan
Biosecurity in Australia	www.agriculture.gov.au/biosecurity/australia/about
Biosecurity risk analysis	www.agriculture.gov.au/ba
Cattle Council of Australia	www.cattlecouncil.com.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/aahl
Deer Industry Association of Australia	www.deerfarming.com.au
Department of Agriculture and Food, Western Australia	www.agric.wa.gov.au
Department of Agriculture, Fisheries and Forestry, Queensland	www.daff.qld.gov.au
Department of Environment and Primary Industries, 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
Meat & Livestock Australia	www.mla.com.au
National Animal Health Information System	http://nahis.animalhealthaustralia.com.au
National Animal Health Performance Standards	www.animalhealthaustralia.com.au/programs/livestock-health/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 pest and disease outbreaks	www.outbreak.gov.au
National Transmissible Spongiform Encephalopathies Surveillance Program	www.animalhealthaustralia.com.au/programs/biosecurity/tse-freedom-assurance-program/national-tse-surveillance-program

Office of the Chief Veterinary Officer	www.agriculture.gov.au/animal-plant-health/animal/the_office_of_the_chief_veterinary_officer
Rural Industries Research and Development Corporation	www.rirdc.gov.au
SAFEMEAT	www.safemeat.com.au
School of Animal and 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/vbms
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.uq.edu.au/vetschool
Wildlife Health Australia	www.wildlifehealthaustralia.com.au



Acronyms and abbreviations

ABIAB	Animal and Biological Import Assessment Branch
ACIAR	Australian Centre for International Agricultural Research
AHA	Animal Health Australia
AHC	Animal Health Committee
ANQAP	Australian National Quality Assurance Program
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
DAFF	Department of Agriculture, Fisheries and Forestry
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
ESCAS	Exporter Supply Chain Assurance System
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

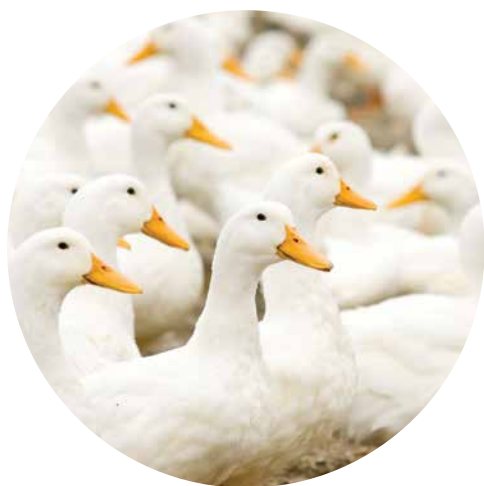
JAEP	Japan Australia Economic Partnership Agreement
MICoR	Manual of Importing Country Requirements
MPI	Ministry for Primary Industries
NACA	Network of Aquaculture Centres in Asia-Pacific
NAHIS	National Animal Health Information System
NAIWB	National Avian Influenza Wild Bird
NAMP	National Arbovirus Monitoring 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
OIE	World Organisation for Animal Health
OsHV-1	ostreid herpesvirus microvariant 1
PCR	polymerase chain reaction
PNG	Papua New Guinea
QA	quality assurance
R&D	research and development
RABQSA	Registrar Accreditation Board and the Quality Society of Australasia
RD&E	research, development and extension
RSPCA	Royal Society for the Prevention of Cruelty to Animals
SCAHLs	Sub-Committee on Animal Health Laboratory Standards
SEACFMD	South East Asia and China Foot and Mouth Disease program
SPS Agreement	World Trade Organization Agreement on the Application of Sanitary and Phytosanitary Measures
SWF	screw-worm fly
SWFFAP	Screw-worm Fly Freedom Assurance Program
TAFE	Technical and Further Education
TSE	transmissible spongiform encephalopathy
TSEFAP	Transmissible Spongiform Encephalopathy Freedom Assurance Program
WHA	Wildlife Health Australia
WHO	World Health Organization
WTO	World Trade Organization



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.
<i>Culicoides</i>	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 <i>Culicoides</i> species carry and spread bluetongue and Akabane viruses by taking blood meals from hosts such as cattle and sheep. The distribution and population of <i>Culicoides</i> 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 infection.
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.

pandemic disease	An epidemic disease that occurs over a widespread area (multiple countries or continents) and usually affects a substantial proportion of the population.
pathogen	A biological agent that causes disease or illness in its host.
pathogenic	Capable of causing disease.
phytosanitary	Relating to the health of plants; especially the freedom from pests and diseases requiring quarantine.
polymerase chain reaction (PCR)	A highly sensitive test that can detect DNA fragments of viruses or other organisms in blood or tissue. It works by repeatedly copying genetic material using heat cycling and enzymes.
precursor	A substance, or virus, from which another substance can form.
ratite	A large, flightless bird, such as an emu or an ostrich.
real-time polymerase chain reaction (RT-PCR)	A laboratory technique that is used to amplify and simultaneously quantify a targeted DNA molecule.
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.
stamping out	The strategy of eliminating infection from premises through the destruction of animals in accordance with the particular AUSVETPLAN manual, and in a manner that permits appropriate disposal of carcasses and decontamination of the site.
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 can infect humans. Plural: zoonoses.



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