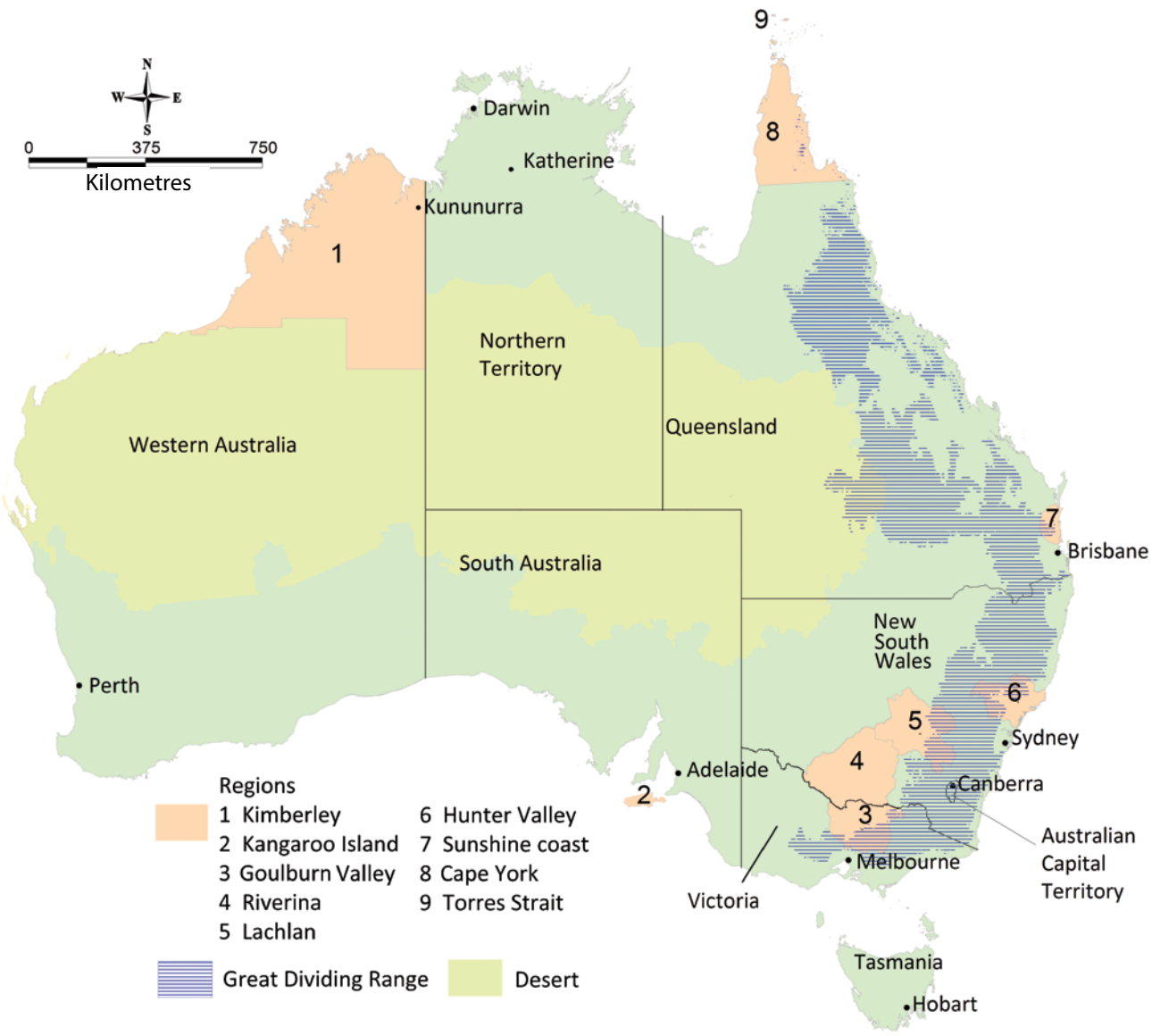
Animal health in Australia 2013



Jurisdictions and selected agricultural regions of Australia

Animal health in Australia 2013

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Feedback

Comments and suggestions regarding the *Animal health in Australia 2013* report are welcomed. Please forward all correspondence to the Manager, Corporate Communications, Animal Health Australia, via email at aha@animalhealthaustralia.com.au.

Foreword

This is the 17th volume in the *Animal health in Australia* series of annual reports. As a comprehensive summary of Australia's animal health status and system, it provides insights into ongoing programs, nationally significant terrestrial and aquatic animal diseases, and new initiatives during 2013. The summary supports trade and market access for Australian agriculture and provides information for livestock industries. It is also distributed to World Organisation for Animal Health (OIE) member countries and Australian agricultural counsellors.

In 2012, significant work was undertaken on foot-and-mouth disease (FMD) preparedness, and this work continued in 2013. The Australian Bureau of Agricultural and Resource Economics and Sciences released the report *Potential socio-economic impacts of an outbreak of foot-and-mouth disease in Australia*. This report is a timely reminder about the importance of maintaining an effective biosecurity system in Australia. Plans are in place for the unlikely event of FMD entering Australia. Ongoing FMD preparedness activities include standardising arrangements among state and territory governments for engaging private veterinarians during an emergency animal disease response, improving nationwide FMD testing capacity and developing an action plan to formalise Australian – New Zealand collaboration on FMD preparedness. We are also working in several forums with colleagues in other countries to help them strengthen their FMD preparedness and control.

As part of strengthening Australia's FMD preparedness, planning for Exercise Odysseus — a program that aims to enhance national capability to implement a national livestock standstill — commenced. The planning involves representatives from industry and government in the construction of a plausible national scenario for a livestock standstill. The program of Exercise Odysseus activities will be conducted throughout 2014.

As I mentioned above, Australia is working with its international colleagues on animal disease preparedness and control. One example is the Australia–Indonesia Partnership for Emerging Infectious Diseases. This project is helping to develop an enhanced national animal health disease information system for Indonesia. The partnership between Australia and Indonesia delivers improved biosecurity for both countries. In another example, Australia continues to support the OIE-managed South-East Asia and China Foot and Mouth Disease (SEACFMD) Campaign. I attended a meeting in March to discuss technical issues, advocacy and coordination of identified priorities (such as vaccination) in the region, and to

advance the implementation of the Global Foot and Mouth Disease Control Strategy (developed by the OIE and the Food and Agriculture Organization of the United Nations).

Antimicrobial resistance (AMR) has been of particular interest to animal and human health authorities this year. 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 emergence of anitmicrobial resistant bacteria and their transmission from animals — including poultry, pigs, cattle, dogs and horses — to humans has been documented in North America and Europe. I intend to do what I can to assist in ensuring that Australia has a robust risk-based approach for the prevention and containment of AMR. This will include improving data collection and information sharing across the human health, veterinary health and agriculture sectors. Having a better understanding of AMR is the cornerstone of any measures we need to take to develop an integrated management plan for tackling this pressing issue. In July, an AMR roundtable and colloquium brought together stakeholders to initiate the development of a national framework for future work on AMR. The Australian Chief Medical Officer and I were involved in producing a video for antimicrobial awareness week.[1] The video highlights the challenge of AMR and how Australia is addressing that challenge.

World Rabies Day took place on 28 September 2013. Although rabies does not occur in Australia, the Chief Medical Officer and I consider the day to be an opportunity for people around the world to focus on rabies prevention. Most victims of rabies are children, and dog bites are the most common way for people to contract the disease. The key to preventing rabies in humans is preventing it in dogs, primarily through vaccination and dog population control. Australia actively supports programs in the region to control rabies, such as providing vaccine and improving diagnostic testing capability for rabies.

Lastly, from 2 December 2013, permits to import cats and dogs into Australia have changed. Following a comprehensive assessment of the risks, such as rabies, the new import conditions require only a 10-day stay in quarantine, reducing the separation between owners and their pets.

I trust you find this report on Australia's animal health status informative.

Dr Mark Schipp
Australian Chief Veterinary Officer

1 www.youtube.com/watch?v=DHq0_uKyM-c

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Overview

Australia's animal health system comprises the organisations, government agencies, livestock industries, commercial companies, research institutions, laboratories and individuals that are involved in the livestock production chain. Together, these components maintain the high standard of animal health in Australia.

This report describes Australia's animal health system, the current status of animal health in Australia, and significant events in 2013. 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. The Australian Wildlife Health Network provides a link between livestock health and the health of wild native and feral animals.

To meet the challenges posed by increasing biosecurity risks, Australian governments are working together to develop a smarter national biosecurity system. This includes implementing the activities outlined in the Intergovernmental Agreement on Biosecurity. The agreement emphasises the need for national coordination in preparedness for entry of harmful pests and diseases into Australia, and in their early detection, eradication and containment, as well as in management of pests and diseases that are already widely established. The improved biosecurity system will benefit industry, government, the environment and international trading partners, with positive flow-on effects on the Australian economy.

In 2013, the socioeconomic impacts of a potential outbreak of foot-and-mouth disease (FMD) were examined in a report by the Australian Bureau of Agricultural and Resource Economics and Sciences. The report determined that a major FMD outbreak could cost the Australian economy up to $52 billion over 10 years, as well as having devastating social impacts. Preparedness has been enhanced by the commencement of a project to improve awareness of, compliance with and enforcement of national swill-feeding regulations.

The Livestock Biosecurity Network was established in 2013 by the Cattle Council of Australia, the Sheepmeat Council of Australia and WoolProducers Australia. This is a three-year pilot project that

is designed to promote greater awareness of biosecurity, animal health and animal welfare among livestock producers. It also aims to improve on-farm management practices and preparedness for exotic and endemic disease outbreaks.

The Fisheries Research and Development Corporation (FRDC) has been accredited by the Accreditation Board for Standards Development Organisations to develop Australian standards for the seafood industry. The FRDC now manages all the standards previously developed by Seafood Services Australia, including the *Australian fish names standard* (AS 5300), which specifies the nationally agreed standard name for all fish species in Australia.

Terrestrial animal health

Chapter 2 provides information about the National Animal Health Information System (NAHIS) — Australia's system to collate and report terrestrial animal health data of national significance. The collated data is used to support international reporting to the World Organisation for Animal Health (OIE) and elsewhere, and trade and market access negotiations.

The Australian Government has moved from eradication of Asian honey bee to management of this pest in Australia. In partnership with Biosecurity Queensland (a division of the Queensland Department of Agriculture, Fisheries and Forestry) and the Australian Honey Bee Industry Council, it established the Asian Honey Bee Transition to Management Program, which was administered by Plant Health Australia. The program focused on minimising the bee's spread, and providing a range of safe and effective tools to help the community to manage the pest. The program concluded on 30 June 2013.

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

The following notifications of endemic diseases of significance were made in 2013:

- Two anthrax incidents occurred in New South Wales. The affected properties were in the known anthrax endemic area, and the incidents were managed according to the anthrax policy of the New South Wales Department of Primary Industries.
- Abortion caused by equine herpesvirus 1 was diagnosed in three mares in New South Wales, four mares on four properties in Victoria and one mare in Western Australia.

Animal Health Australia

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, the Australian Wildlife Health Network, and the Australian, state and territory governments.

In 2012 and 2013, Australian governments developed a draft Surveillance and Diagnostic Framework under the Intergovernmental Agreement on Biosecurity. At a National Animal Health General Surveillance Forum in November 2013, industries and governments worked together to plan the next steps in enhancing a national integrated general surveillance system that targets early recognition and reporting of emergency animal diseases (EADs).

An independent five-year review of the objectives and future needs of the Transmissible Spongiform Encephalopathies Freedom Assurance Program was undertaken at the beginning of 2013. The program aims to provide market confidence that Australian animals and animal products are free from transmissible spongiform encephalopathies such as bovine spongiform encephalopathy and classical scrapie. The review found that stakeholders consider the program to be well managed and positively received, and that it continues to achieve its objectives.

During 2013, an external consultancy reviewed the risks of entry of screw-worm fly into Australia and Australia's surveillance requirements. The review included an assessment of Australia's entomology capability for surveillance and for responding to an incursion. The findings of the review and implications for the Screw-worm Fly Freedom Assurance Program will be addressed in 2014.

More than 900 wildlife disease investigation events were added to the national database of the Australian Wildlife Health Network in 2013. About half of these were bats submitted for exclusion testing for Australian bat lyssavirus. Wild bird mortalities accounted for approximately one-third of investigations. 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 pathogenic avian influenza viruses.

On 1 July 2013, the National Bee Pest Surveillance Program, which is managed by Plant Health Australia, became a cost-shared initiative between the Australian Honey Bee Industry Council, pollination-reliant industries represented through Horticulture Australia Limited and the Department of Agriculture. Plant Health Australia has since redesigned some components of the program to improve the ability to detect bee mite pests and pest bee species. As well, formalised surveillance for small hive beetle across Australia began in August 2013.

The Australian Veterinary Practitioner Surveillance Network — a web-based program that collects information about on-farm investigations by nongovernment veterinarians — was reviewed in 2013. An interim report from the review recommended improvements to the web-based user interface, a revision of the program's analysis and reporting system, and a more targeted approach to the collection of farm visit data.

Managing animal health emergencies

Chapter 4 describes Australia's arrangements for preparing for and responding to EADs, including planning, training and communication. The chapter also describes EAD responses during 2013.

The Department of Agriculture, states and territories, livestock industry groups and Animal Health Australia made significant progress during 2013 in strengthening Australia's preparedness for an outbreak of FMD. Working groups have addressed issues associated with the engagement of private veterinarians in a response to an EAD, and the risk of adverse consumer reaction reducing domestic demand for meat and dairy products during an FMD outbreak. As well, the network of laboratories able to test for FMD has been expanded. The Department of Agriculture and the New Zealand Ministry of Primary Industries have developed a Trans-Tasman Action Plan for Foot-and-Mouth Disease and an associated memorandum of understanding. Australia continues to collaborate with other countries on epidemiology and disease modelling, with a focus on FMD.

Updated Australian Veterinary Emergency Plan (AUSVETPLAN) manuals were published in 2013 for bluetongue virus (disease strategy), Rift Valley fever

(disease strategy), Hendra virus (response policy brief), laboratory preparedness (management manual), saleyards and transport (enterprise manual), and the poultry industry (enterprise manual). Stage 2 of a consultancy to improve the usability and functionality of AUSVETPLAN manuals has been completed, and manuals have been entered into the new system.

The national Rapid Response Team participated in Exercise Control Freak, a scenario-based discussion activity, in New South Wales in 2013. The aims were to develop team members' knowledge and application of coordination and control centre functions, develop teamwork and leadership skills, and contribute to the continuous improvement of the AUSVETPLAN *Control centres management manual*.

The Laboratories for Emergency Animal Disease Diagnosis and Response (LEADDR) network, which aims to standardise testing services for targeted EADs in member laboratories, has now been incorporated into the EAD response procedure.

EAD responses in 2013 involved incidents of Hendra virus infection in horses in Queensland and New South Wales, Australian bat lyssavirus in horses on a property in Queensland, low pathogenic avian influenza in domestic ducks from a property in Western Australia, and highly pathogenic avian influenza in two layer poultry farms near Young 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.

In 2013, a review of AQUAPLAN 2005–2010 — Australia's national strategic plan for aquatic animal health — was endorsed by Australia's aquatic animal industries and the Australian, state and territory governments. Aquatic animal industries and governments have agreed on priority objectives and activities for inclusion in a successor plan (AQUAPLAN 2014–2019), which was drafted during the year.

A review of the performance and value of the National Aquatic Animal Health Training Scheme was completed in 2013. Based on the positive findings of the review, the Department of Agriculture and the FRDC have agreed to fund the program for a further two years (financial years 2013–15).

Also reviewed during 2013 was the Australian Laboratory Proficiency Testing Program for Aquatic Animal Diseases. The review found that the program provided a range of benefits to participating laboratories, and the Department of Agriculture has funded renewal of the program from 2013 to 2015. Under the program, Australian laboratories can participate in proficiency testing for seven priority aquatic animal diseases.

An AQUAVETPLAN disease strategy manual for ostreid herpesvirus 1 (OsHV-1) microvariant, which causes Pacific oyster mortality syndrome, has been drafted. Development of the manual took into account outcomes from Exercise Sea Fox, which was held in 2012. Further risk assessments and workshops were held in 2013 to strengthen preparedness and mitigate threats from this disease. During 2013, OsHV-1 microvariant was detected in the Georges River and Hawkesbury River estuaries, New South Wales; in the Hawkesbury River, the virus was associated with significant mortalities of Pacific oysters. New South Wales authorities, with the close cooperation of industry, acted quickly to contain the disease to the affected areas.

A new version of Neptune, a web-based database of all known aquatic animal diseases and pathogens reported from Australia, was launched in 2013. Neptune now provides users with increased searching ability, supplementary reference material, access to microscope images of key pathogens and free webinars.

Imports and exports

Chapter 6 describes the Department of Agriculture's activities in managing pest and disease threats from imports, and providing technical input for the export of agricultural produce.

The Australian Government has allocated funding over seven years for the construction and operation of a new post-entry quarantine facility at Mickleham, Victoria. The new facility will replace the existing four post-entry quarantine facilities in Australia that are used to manage the biosecurity risks associated with live animal imports. The design of the facility is expected to be finalised in early 2014.

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In 2013, the Department of Agriculture continued to focus on management of the biosecurity risks associated with ornamental fish imports. The department began a trial of the on-arrival fish health surveillance program, using bags of fish that would otherwise have been destroyed because of noncompliance with Australian import requirements.

The Animal Biosecurity Branch released four draft policy reviews to stakeholders in 2013 on the importation of horses, the importation of zoo elephants, the importation of hatching eggs (with respect to avian paramyxovirus) and gamma-irradiation as a treatment to address pathogens of animal biosecurity concern. Two policy reviews were finalised: importation of laboratory mouse embryos, and importation of dogs and cats and their semen. The second edition of *Review of published tests to detect pathogens in veterinary vaccines intended for importation into Australia* was also released.

Consumer protection

Activities to ensure that locally produced foods are safe for consumers are described in Chapter 7. They include surveillance for communicable diseases and foodborne disease; monitoring of products for residues of agricultural and veterinary chemicals, other contaminants and pathogens; and inspection of meat. The Department of Agriculture also inspects and certifies meat, dairy products, seafood and eggs for export.

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. In 2013, Australia was an active participant in the finalisation of the *Proposed draft guidelines for control of zoonotic parasites in meat:* Trichinella *spp. and* Cysticercus bovis, at the Codex Committee on Food Hygiene. Australia was also involved in the work of the Codex Committee on Residues of Veterinary Drugs in Foods to develop risk management recommendations for veterinary drugs for which no acceptable daily intake or maximum residue limit has been recommended.

The Antimicrobial Resistance Prevention and Containment Steering Group was established in February 2013 to provide governance and leadership on antimicrobial resistance issues, and oversee the development and implementation of a coherent national strategy on antimicrobial resistance. Two stakeholder consultation events took place in 2013 to inform the work of the steering group. Work is in progress to develop options for effective surveillance of antimicrobial resistance across the human, animal and food sectors.

Animal welfare

Chapter 8 reports on Australia's animal welfare activities, including those under the Australian Animal Welfare Strategy (AAWS), a national framework for animal welfare.

Each state and territory government is responsible for its own animal welfare legislation. During 2013, 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 Committee focused on delivering nationally consistent animal welfare standards and guidelines for livestock production, based on the revision of the model codes of practice for the welfare of animals. In 2013, the committee reviewed the development process for animal welfare standards and guidelines, and made a number of recommendations to improve the current process.

The consultation period for Australian animal welfare standards and guidelines for cattle and sheep, and the associated regulatory impact statements, closed during 2013. It is expected that the draft standards and guidelines will be considered for endorsement by governments in 2014. Work is continuing on the development of Australian animal welfare standards and guidelines for exhibited animals (the zoo industry), and for livestock at saleyards and depots. Australian animal welfare standards and guidelines for the land transport of livestock have now been referenced in the legislation of all jurisdictions.

Under the AAWS, four areas of strategic work initiated in 2012 were delivered in 2013: development of a state-of-the-nation reporting framework, development of an AAWS monitoring and evaluation framework, a scoping study into improving collaboration among AAWS stakeholders and an assessment of AAWS communications to maximise impact. The redeveloped AAWS website was also launched in 2013. The AAWS and the World Society for the Protection of Animals advanced the issue of caring for animals in emergencies by co-sponsoring the third National Workshop on Plans for Animals in Disasters, which was held in Melbourne. National Planning Principles for Animals in Disasters were endorsed by the Animal Welfare Committee, and a National Advisory Committee for Animals in Emergencies was established.

The Department of Agriculture continues to implement the recommendations from the 2011 Farmer review of Australia's livestock export trade. Activities in 2013 included finalisation of a report proposing a revised set of livestock export standards, a review of the inspection regime at Fremantle Port, a review of breeder livestock exports, and a review of 'Mark IV-type' restraint boxes used for slaughter of Australian cattle in foreign markets.

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 2013, joint animal health surveys were conducted in several regions of these countries. The Department of Agriculture is also conducting pest and disease surveys of Norfolk Island.
- Overseas aid — Australia's aid program, which focuses on the Indo-Pacific region, is primarily resourced through the Australian Government Department of Foreign Affairs and Trade (DFAT). Under the Pandemics and Emerging Infectious Diseases Framework 2010–2015, 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 DFAT. 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 summarises Australian research in livestock health during 2013, and Appendix 4 lists some of the research projects. Research relating to livestock health is conducted by the Commonwealth Scientific and Industrial Research Organisation, cooperative research centres, university veterinary science faculties or schools, and industry-based research and development corporations.

Rosemary Grubits

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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 the 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, chemical residues in animal products, livestock identification and traceability, and animal welfare.

Australian governments have a close association with 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 who are involved in the livestock production chain. The Australian Wildlife Health Network (AWHN) complements livestock health activities by investigating, and managing reporting on, 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.

Table 1.1 Veterinarians and other animal health personnel in Australia, 2013

Registered veterinarians		Auxiliary personnel	
Government	642	Stock inspectors, meat inspectors, etc.	875
Laboratories, universities, etc.	826		
Private practitioners	9 892		
Other veterinarians	640		
Total	**12 000**	**Total**	**875**

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 40 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 animal[2] health system (described in this section and in Figure 1.1) work together to serve the interests of Australia. AHA links these components by providing information, networks, programs and training to its members.

Primary industries committees

The Standing Council on Primary Industries (SCoPI),[3] previously called the Primary Industries Ministerial Council, is the peak forum to:

- pursue and monitor priority issues of national significance affecting Australia's primary production sectors that require a sustained and collaborative effort across jurisdictions
- address key areas of shared responsibility between the Australian Government and state and territory governments, and funding for Australia's primary production sectors.

SCoPI comprises the Australian national, state and territory, and New Zealand ministers who are responsible for primary industries matters. The council develops and implements policies and strategies for agreed national approaches to biosecurity, food security, and productivity and sustainability of primary industries (including the fisheries and forestry industries). It encourages greater collaboration and promotes continuous improvement in the investment of Australia's research and development resources.

The Primary Industries Standing Committee (PISC) supports SCoPI. PISC comprises the heads of the Australian national, state and territory, and New Zealand agencies that are responsible for policy and technical issues that fall within the ambit of SCoPI.

Expert advisory committees develop and provide advice to PISC and SCoPI on a wide range of issues. Two advisory committees relate to animal health:

- The National Biosecurity Committee (NBC)[4] advises and supports PISC on all animal, plant, marine and environmental biosecurity issues. The NBC provides strategic leadership, across jurisdictions and sectors, to develop and oversee implementation of national approaches and policies for emerging and ongoing biosecurity issues.
- The Animal Welfare Committee (AWC) advises and supports PISC on national animal welfare policy issues. The AWC focuses on 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.

2 Animals include both terrestrial and aquatic animals.

3 www.mincos.gov.au

4 www.daff.gov.au/animal-plant-health/pihc

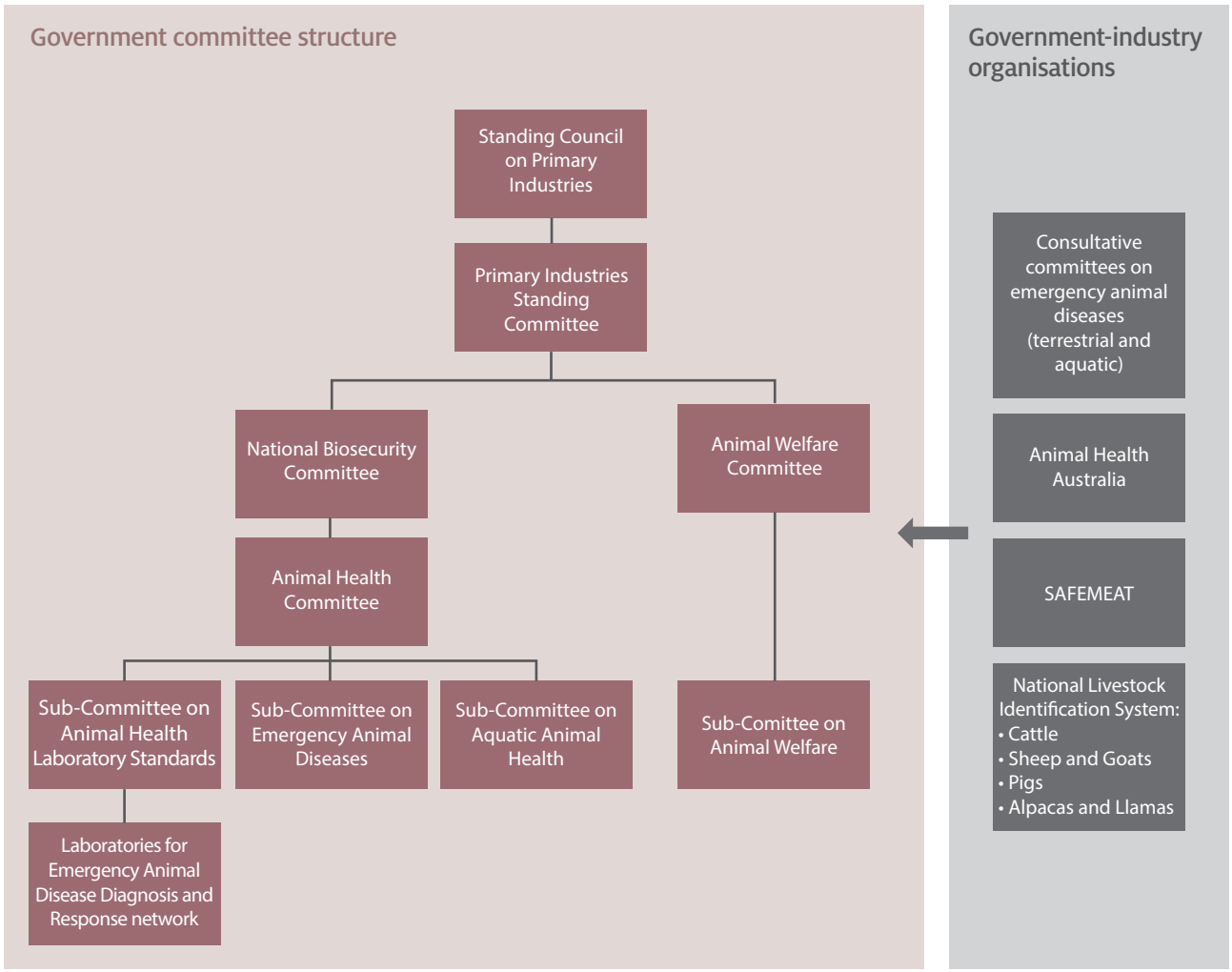

Figure 1.1 Structure of animal health and welfare management committees and organisations in Australia

For more information about SCoPI, PISC and its advisory committees, visit the SCoPI website.[5]

Animal Health Committee

The Animal Health Committee (AHC)[6] provides the Australian Government with scientific, strategic and nationally coordinated policy advice on animal biosecurity matters through the NBC, PISC and SCoPI. The AHC leads the development and implementation of government policy, programs, operational strategies and standards in the areas of national animal health, domestic quarantine and veterinary public health.

AHC membership comprises the national, state and territory chief veterinary officers, and representatives from:

- the Australian Animal Health Laboratory of the Commonwealth Scientific and Industrial Research Organisation (CSIRO-AAHL)
- the Australian Government Department of Agriculture
- AHA
- the Australian Government Department of the Environment
- New Zealand.

The AHC is advised by three subcommittees:

- Sub-Committee on Aquatic Animal Health (SCAAH)
- Sub-Committee on Animal Health Laboratory Standards (SCAHLS)
- Sub-Committee on Emergency Animal Diseases (SCEAD).

5 www.mincos.gov.au

6 www.daff.gov.au/animal-plant-health/animal/committees/ahc

Specialist ad hoc working groups advise the AHC on technical or policy issues, as required.

The AHC consults with the animal industries through their membership of AHA and industry participation in AHC meetings. Aquatic industries are consulted through the National Aquatic Animal Health Industry Reference Group and the Australian Fisheries Managers Forum. Those with an interest in zoo, wild or feral animals are consulted through the AWHN.

Sub-Committee on Aquatic Animal Health

SCAAH provides high-level scientific and technical advice to the 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. 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

SCAHLS is the national network for animal and public health laboratories in Australia and New Zealand that are managed by governments, universities and the private sector. SCAHLS establishes, implements and monitors professional and technical standards for laboratory services within member laboratories. In addition to dealing with quality assurance (QA), skills, biosecurity, and development and validation of new tests, the subcommittee provides policy and technical support to the AHC, oversees the Australian National Quality Assurance Program (ANQAP),[7] and manages the Australian and New Zealand Standard Diagnostic Procedures (ANZSDPs).[8] It also monitors and facilitates preparedness for exotic and other emergency animal diseases through the Laboratories for Emergency Animal Disease Diagnosis and Response (LEADDR) network (see Section 1.3.4 and Chapter 4), which ensures a nationally coordinated and harmonised approach to laboratory services.

Sub-Committee on Emergency Animal Diseases

SCEAD maintains communications between agencies that manage responses to emergency animal diseases (EADs). The subcommittee addresses operational aspects of EAD prevention and preparedness. SCEAD has representation from the Australian Government, the governments of each state and the Northern Territory, the LEADDR network and AHA (as an observer), and is chaired by a member of the AHC. Among other responsibilities, SCEAD develops nationally agreed standard operating procedures for use by states and territories in the response to EAD incidents and emergencies (see Section 4.1.4).

1.1.2 Government–industry committees and organisations

Consultative Committee on Emergency Animal Diseases

The Consultative Committee on Emergency Animal Diseases (CCEAD)[9] is convened when an EAD outbreak occurs. CCEAD comprises AHC members and technical representatives from relevant industries. Further information about CCEAD's membership and role is in Chapter 4.

Aquatic Consultative Committee on Emergency Animal Diseases

Chapter 5 provides information on the Aquatic CCEAD.

Animal Health Australia

AHA is the coordinating body for national animal health programs in Australia. With a national focus on animal health and welfare issues, the company facilitates sustainable partnerships among 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

7 www.anqap.com

8 www.scahls.org.au/procedures

9 www.daff.gov.au/animal-plant-health/animal/committees/ccead

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	Australian Racing Board Ltd
	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)	Council of Veterinary Deans of Australia and New Zealand
	Dairy Australia Ltd
	National Aquaculture Council Inc.
	Zoo and Aquarium Association Inc.

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.

One of AHA's strengths is its comprehensive consultative approach, based on consensus, to identifying priorities and resolving issues. The company has established a number of formal and informal consultative mechanisms involving either all members or groups of members, depending on the scope of the particular issues to be addressed. 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.

Specific national projects and programs are also strongly based on a collaborative approach, leading to consensus and successful outcomes. Consultations can involve a specific company or be more broadly focused. Stakeholders other than members are also extensively involved in various projects. By working across a complex network of stakeholders, AHA delivers results that benefit the national animal health system as a whole.

For more information about AHA, visit the website.[10]

10 www.animalhealthaustralia.com.au

SAFEMEAT

SAFEMEAT[11] is a partnership between the peak meat industry bodies,[12] the Australian Government, and the state and territory governments. Reporting to PISC, 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 eight key programs of industry priority:

- standards and regulations
- emergency disease management
- animal diseases
- residues
- pathogens
- systems development and management
- communication and education
- emerging issues.

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 1.4.4)
- a system of National Vendor Declarations (NVDs) about the health of cattle, sheep, goats and pigs that are being traded
- strategies for animal disease issues affecting food safety, including the implications of transmissible spongiform encephalopathies, such as bovine spongiform encephalopathy.

Major activities during 2013 included the following:

- The SAFEMEAT Initiatives Review was finalised. The review has the agreed vision that it be '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)', and is supported by a range of principles and initiatives to form a roadmap for the future.

  The key principles for the SAFEMEAT initiatives are:
  - a strengthened on-farm risk management system
  - a whole-of-chain risk management approach, encompassing producers, saleyards, feedlots, transporters, live exporters and processors
  - strengthened industry assurance programs and improved integration throughout the supply chain
  - a revised role for the states and territories in compliance monitoring to reflect the new compliance model — monitor, support, enforce
  - an effective 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, SAFEMEAT:
  - worked with the Australian and state and territory governments on the inclusion and verification of the NLIS in abattoir-approved programs (i.e. individual government-approved programs that define the scope and operating criteria for each abattoir)
  - implemented a Training Advisory Council initiative — involving collaboration between SAFEMEAT, the Australian Meat Industry Council and national meat industry — to create NLIS training materials for processors
  - assisted with monitoring by the states and territories to identify significant documentation problems with the mob-based NLIS for sheep and goats, which are being addressed
  - conducted independent assessments in saleyards of producer and agent compliance with the NLIS requirements; this confirmed state and territory findings that improvements in compliance were required and which are being addressed
  - developed strategies to ensure national consistency in interpreting and applying NLIS rules by the states and territories
  - progressed with 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.

11 www.safemeat.com.au

12 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

1.2 National biosecurity reforms

Australia's biosecurity system has been reviewed several times. Recommendations for improvements to its operation started with the Nairn review in 1995. The 2008 Beale review was an independent review of Australia's quarantine and biosecurity arrangements, which produced the report *One biosecurity: a working partnership*. The Beale review found that Australia's biosecurity system operated well, but could be improved. It proposed significant reforms to strengthen the system — specifically by:

- revising legislation
- targeting resources to the areas of greatest return, from a risk management perspective
- sharing responsibility between government, businesses and the community
- improving transparency, timeliness and operations across the biosecurity continuum — offshore, at the border and onshore.

Biosecurity risk is growing. Reasons for this include changing global demands, increasing passenger and trade volumes, increasing imports from a growing number of countries, an expanding population and a changing climate. International trading partners are also increasingly demanding greater levels of assurance about Australia's exports.

To meet the increasing demand, Australian governments have committed to a range of initiatives to build a smarter national biosecurity system, focusing on reducing the likelihood of harmful pests and diseases entering Australia, minimising the impact should this occur, and managing significant pests and diseases that are already in Australia. The Intergovernmental Agreement on Biosecurity (IGAB), which came into effect in January 2012, reflects this commitment. The IGAB sets the foundation for improved partnerships between the Australian, state and territory governments, and for governments to work with industry, environment groups and the community to manage biosecurity threats. All jurisdictions except Tasmania have signed the IGAB; Tasmania has agreed to abide by its provisions.

The schedules to the IGAB outline the activities that are essential for effective biosecurity management. Prevention, preparedness, early detection, containment, eradication, and management of widely established pests and diseases are particular areas for improved national coordination and integration. Other areas identified for attention include communication and engagement, information sharing, research and development, investment, and decision making.

The Department of Agriculture is working with state and territory governments and other stakeholders to implement the IGAB. The department is also progressing internal reforms so that it continues to be modern, responsive and targeted in a changing global trading environment. Both the IGAB and the department's improvement programs are underpinned by the following principles:

- implementing a risk-based approach to biosecurity management
- managing biosecurity risk across the continuum
- strengthening partnerships with all stakeholders
- being intelligence led and evidence based
- being supported by modern legislation, technology, funding and business systems.

The reformed biosecurity system will benefit industry, government, the environment and international trading partners, with positive flow-through effects on the economy more generally. This will occur through improved trade, streamlined business processes, improved productivity and reduced regulatory burden in a seamless, lower-cost business environment. The system emphasises risk-based decision making, the use of intelligence, a single point of regulatory contact and robust partnerships.


Animal Health Australia

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. Although new regulatory processes have been developed and rolled out, their implementation is still in progress. Policy development also continues. A priority for the Department of Agriculture is to give effect to the balance of the recommendations from the Farmer review.[13]

In 2013, the Department of Agriculture had the following divisions and branches responsible for animal health and welfare:

- Office of the Chief Veterinary Officer
- Biosecurity Animal Division
  - Animal Health Policy
  - Animal Welfare
  - Animal Biosecurity
  - Animal Import Operations
  - Biological Import Operations and Marine Pests
- Live Animal Exports Division
  - Animal Export Operations
  - Animal Export Reform.

Office of the Chief Veterinary Officer

The Office of the Chief Veterinary Officer[14] provides national leadership and direction on priority policy issues relating to animal health and welfare in Australia. As the international reference point on animal health, it coordinates animal health intelligence gathering, Australia's commitments to the OIE, and communication with other international agencies involved with animal health and welfare.

The office contributes to the ongoing development of national standards on Johne's disease through the National Johne's Disease Control Program. Key components of this program are the national standard definitions, rules and guidelines for zoning; interzone movement controls; and official disease control programs in the respective states. The office also contributed to the *Standard definitions and rules for eradication of enzootic bovine leucosis*, and development of the document declaring freedom from enzootic bovine leucosis in the Australian dairy herd.

The office provides technical, executive and administrative support to national animal health committees, and their working groups and programs. The office also works collaboratively with the Food and Agriculture Organization of the United Nations (FAO) to reduce the global incidence of foot-and-mouth disease (FMD) and improve Australia's readiness for an outbreak of the disease. A major component of the alliance includes the FMD real-time training program — a unique opportunity for Australian veterinarians and stock handlers to gain first-hand experience in the recognition and management of FMD.

Biosecurity Animal Division

Animal Health Policy Branch

The Animal Health Policy Branch leads Department of Agriculture activities on national terrestrial and

13 Australian Government Department of Agriculture, Fisheries and Forestry (2011). *Independent review of Australia's livestock export trade* (Farmer review), DAFF, Canberra, www.livestockexportreview.gov.au/Documents/independent-review.pdf

14 www.daff.gov.au/animal-plant-health/animal

aquatic animal health policies and programs. The branch coordinates:

- surveillance, disease prevention and preparedness activities
- EAD planning, training and awareness programs
- animal health laboratory strategies.

Through its One Health Section, the Animal Health Policy Branch supports animal and human health, biodiversity and trade by collaborating with human health authorities, and managing programs in wildlife health, aquatic animal health and veterinary public health.

The Animal Health Policy Branch also has a role in international standard development. During the year, the branch provided comments on OIE animal health standards that were under development.

Through the Aquatic Animal Health Program (AAHP), the Animal Health Policy Branch leads and coordinates the national management of aquatic animal health (finfish, crustaceans and molluscs). The AAHP supports the implementation of AQUAPLAN — Australia's national strategic plan for aquatic animal health. It provides technical, executive and administrative support to aquatic animal health committees, and their working groups and programs. It also contributes to other Australian Government activities relating to aquatic animal health.

The AAHP coordinates domestic surveillance and reporting of aquatic animal diseases, to support a comprehensive, consistent and informed approach to preparedness and response activities. The program coordinates the national response to aquatic animal disease emergencies, based on the Australian Aquatic Veterinary Emergency Plan (AQUAVETPLAN). It is involved in developing EAD response mechanisms to protect Australia's aquatic animal industries, including through improvements and changes to AQUAVETPLAN.

The AAHP manages Australia's international reporting commitments to the OIE and other international agencies on aquatic animal diseases, and coordinates Australian input on draft standards developed by the OIE Aquatic Animal Health Standards Commission. It also engages in the Asia–Pacific region in aquatic animal health preparedness, response and related activities, particularly capacity building.

Animal Welfare Branch

The Animal Welfare Branch works with government, industry and community stakeholders to lead, coordinate and implement Australian Government policies and programs on animal welfare for industries that fall within the agriculture portfolio. Responsibilities include delivering administered funding programs, coordinating the Australian Animal Welfare Strategy, providing advocacy and leadership for international animal welfare policy, and supporting the implementation of the Regional Animal Welfare Strategy — Asia, the Far East and Oceania. In collaboration with states and territories, and industry and animal welfare groups, the Animal Welfare Branch participates in the development of nationally consistent animal welfare standards and guidelines.

Animal Biosecurity Branch

The Animal Biosecurity Branch develops biosecurity policy for international trade. It also provides technical and scientific advice for the safe importation of animals and animal products (including aquatic animals and their products), 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 Import Operations Branch

The Animal Import Operations Branch manages the importation of live animals and animal reproductive material to minimise the risk of entry into Australia of exotic animal pests and diseases. The branch provides import inspection and clearance for live animals and animal reproductive material, and manages the government-operated, post-entry animal quarantine stations. It is one of several branches in the Department of Agriculture that deliver biosecurity field services and manage biosecurity controls at Australia's border.

Biological Import Operations and Marine Pests Branch

The Biological Import Operations and Marine Pests Branch helps to maintain Australia's favourable status for animal diseases and marine pests by establishing and implementing import conditions for biological products, and overseeing national measures to prevent and manage marine pest incursions.

The branch is divided into two programs that reflect its major functions: the Biological Imports Program and the Invasive Marine Species Program.

The Biological Imports Program manages the biosecurity risks of imported biological products by assessing and granting import permits, advising clients and regulatory staff, and auditing and verifying systems and producers that import biological products into Australia. Imported products that may require a permit include skins and hides, veterinary and human therapeutic products, veterinary vaccines, laboratory materials, soil and water samples, pet foods, stockfeed supplements, and foods containing animal products (such as fish, seafood, egg, dairy and meat).

The Invasive Marine Species Program is currently developing Australia's biofouling management requirements, as well as managing the Australian Government's marine pest responsibilities. The program also coordinates national emergency responses to marine pest incursions detected in Australian waters.

Live Animal Exports Division

Animal Export Operations Branch

The Animal Export Operations 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.

The branch contributes to market access assurance for live animals and animal genetic material, and is responsible for ongoing regulation of the Exporter Supply Chain Assurance System (ESCAS).[15]

Animal Export Reform Branch

The Animal Export Reform Branch implements the Australian Government's regulatory and policy framework for the export of feeder and slaughter livestock under ESCAS. The branch develops operational policy and detailed business processes to put the regulatory framework into practice, assists with the development of legislative amendments, and liaises with licensed exporters and industry peak bodies. It also oversees compliance management and reporting, and provides technical advice. The branch engages with a wide range of internal and external stakeholders.

1.3.2 Australian Government animal welfare programs

The Animal Welfare Branch aims to improve animal welfare outcomes nationally and internationally to meet, at a minimum, international standards, taking into consideration market and community expectations.

Through collaborative relationships with government, industry and community stakeholders, the branch:

- develops animal welfare policy
- encourages nationally consistent approaches to animal welfare by assisting with the development of standards and guidelines
- supports adoption of OIE animal welfare guidelines
- seeks to improve understanding and communication of best-practice animal welfare through the Australian Animal Welfare Strategy.

Responsibilities of the Animal Welfare Branch include implementing the recommendations from the Farmer review that are associated with standards for livestock export, including livestock export inspection processes.

The branch coordinates the implementation of the Australian Animal Welfare Strategy, and provides leadership and support for the implementation of the Regional Animal Welfare Strategy — Asia, the Far East and Oceania. Other international activities include regular dialogue on animal welfare with international organisations (OIE, FAO), key trading partners (Canada, New Zealand, the United States and the European Union) and nongovernment organisations.

More information about animal welfare in Australia is available in Chapter 8.

1.3.3 Other Australian Government services and programs

A number of other Department of Agriculture programs support animal health outcomes. Food safety and product integrity fall within the Food Division, which has the following branches:

- Export Standards
- Food Exports
- Residues, Dairy, Fish and Eggs.

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

The Trade and Market Access Division of the department provides policy and strategic support for the department's international activities.

The Biosecurity Policy Division of the department undertakes policy and strategic work to improve emergency preparedness and response arrangements, and legislative reform.

1.3.4 Other national animal health services and programs

Australian Wildlife Health Network

The AWHN is a not-for-profit organisation initiated by the Australian Government, with funding from the Department of Agriculture. It is managed by the Department of Agriculture's Animal Health Policy Branch. The AWHN was established to promote and facilitate collaborative links in the investigation and management of wildlife health, to support human and animal health, biodiversity and trade. The network actively encourages collaboration between organisations.

The AWHN has a major focus on human and animal health issues associated with free-ranging populations of wild animals, and works closely with environment agencies, zoos and wildlife parks. Its activities are underpinned by one health principles — it actively fosters interdisciplinary work on wild animal health issues.

The organisation manages a network of more than 500 wildlife health professionals and carers around Australia. These include individual subscribers and institutional representatives from national, state and territory departments of conservation, agriculture and human health; universities; zoos; hunting groups; wildlife and other industries; diagnostic pathology services; private practitioners; and wildlife carers. The chair of the AWHN is Australia's OIE Wildlife Focal Point.

The AWHN coordinates national wildlife health surveillance, wildlife health expertise and resources, and research needs and priorities. It collates national data on wild fauna mass mortalities, and manages specific datasets, such as those from avian influenza surveillance in wild birds and Australian bat lyssavirus monitoring. The network also monitors for new and emerging diseases in wildlife, particularly those that could affect humans and production animals.

Specific activities of the AWHN 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 wildlife and its role in diseases of national importance
- providing information about wildlife health to the community.

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Animal health laboratories

Australia's animal health laboratories provide diagnostic and research services for endemic and exotic animal diseases, including transboundary animal diseases and emerging zoonoses (diseases of animals that are transmissible to humans). The Australian Government, state and territory governments, CSIRO-AAHL, veterinary schools and the private laboratory sector maintain a network of world-class animal health laboratories.[16] Laboratory services, policies and standards relevant to EADs are coordinated nationally through SCAHLS.[17] SCAHLS also provides stakeholders with advice on issues relevant to international animal health laboratory standards and policies through the Department of Agriculture. National laboratory response to EAD incursions is primarily led by the LEADDR network (see Chapter 4).

For professional development and scientific exchanges between laboratory staff, SCAHLS supports the activities of the Australian Association of Veterinary Laboratory Diagnosticians and other networks for laboratory specialty areas. SCAHLS also facilitates the development, evaluation and adoption of new tests for EADs, and the production of a comprehensive series of ANZSDPs. The ANZSDPs reflect the relevant international standards prescribed by the OIE.[18] SCAHLS and LEADDR support the maintenance of the Australian Veterinary Emergency Plan (AUSVETPLAN) *Laboratory preparedness manual*,[19] a key operational and resources manual for laboratory diagnosticians.

CSIRO-AAHL[20] is Australia's national animal health laboratory and an OIE reference laboratory for a number of transboundary animal diseases. It develops and improves diagnostic technologies, provides laboratory services for exotic and other major EADs, and provides independent scientific advice. The high-level biocontainment facility at CSIRO-AAHL is vital to maintaining Australia's capability to quickly and securely diagnose and study EADs that could threaten Australia's livestock, aquaculture species, wildlife or humans. CSIRO-AAHL also plays a key role in transferring testing capabilities for major EADs to the LEADDR network and, if appropriate, other laboratories under controlled QA conditions.

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*),[21] 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.

Under the SCAHLS umbrella, the ANZSDPs ensure that national standard testing procedures are used for specific EADs in Australia, and ANQAP[22] 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. More than 30 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 QA in diagnostic pathology.

1.3.5 State and territory animal health services

Under the Australian constitution, state and territory governments are responsible for animal health services within their respective borders

16 www.daff.gov.au/animal-plant-health/animal/system/lab-network

17 www.scahls.org.au

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

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

20 www.csiro.au/aahl

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

22 www.anqap.com

(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, the 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; 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 Diseases[23] lists exotic, emergency and endemic diseases of national significance. Notifiable diseases for each state and territory include those on the national list and additional diseases that are of significance in each jurisdiction. Government-appointed veterinarians and biosecurity officers monitor notifiable diseases and implement regulatory control programs, where necessary. They are authorised, in defined circumstances, to inspect, quarantine, test, treat and destroy affected livestock as part of regulated disease response or control.

For the past 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 contagious bovine pleuropneumonia, bovine tuberculosis, bovine brucellosis, classical swine fever, equine influenza, highly pathogenic avian influenza and virulent Newcastle disease. During 2013, avian influenza (high and low pathogenic) was eradicated from properties in a number of jurisdictions (see Section 4.6).

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
- lead from discarded batteries
- veterinary drugs, such as anthelmintics, antibiotics and acaricides.

The NLIS database provides traceability and appropriate notification alerts to authorities of suspect or contaminated animals when animal movements occur. This supports the objective of maintaining a contamination-free food chain for both the domestic and export markets.

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

Livestock identification and tracing

State and territory animal health services monitor and enforce compliance with the NLIS, which is described in Section 1.4.

Surveillance and other collaborative activities

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

State and territory animal health personnel provide disease diagnostic services, particularly for cases that are not routinely managed by private veterinarians, such as detailed investigations for exotic and emerging diseases. Field staff are supported by government or government-contracted veterinary diagnostic laboratories, which provide reports to government. Many of the advances in Australia in understanding and managing livestock diseases during the past 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, chlamydophilosis, avian influenza and Hendra virus infection.

In 2013, collaboration between the Department of Agriculture, state and territory governments,

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and the livestock industry delivered the following animal health and welfare objectives:

- A recent report by the Australian Bureau of Agricultural and Resource Economics and Sciences (*Potential socio-economic impacts of an outbreak of foot-and-mouth disease in Australia*[24]) examined the socioeconomic impacts of an outbreak of FMD. The report determined that a major FMD outbreak could cost the Australian economy up to $52 billion over 10 years, as well as having devastating social impacts. Preparedness has been enhanced by the commencement of an AHC-supported project to improve awareness of, compliance with and enforcement of national swill-feeding regulations.
- A new high-throughput polymerase chain reaction (PCR) test for bovine Johne's disease was introduced following a significant incident involving a stud herd in Queensland's Protected Zone. This incident is being managed at the state level, but monitored nationally through the national bovine Johne's disease standard definitions, rules and guidelines. The objective is to maintain Queensland's Protected Zone status.
- A joint government–industry forum sponsored by the AHC and AHA agreed to the development of a National General Surveillance Business Plan. The parties agreed to governance arrangements, and oversight and strategic direction will be provided by a steering committee chaired by AHA, with representatives from the Australian Government, the state and territory governments, the intensive industries and the extensive industries. The steering committee is establishing a working group with broader representation, to develop the business plan and implement the work program arising from it.
- Australia's dairy herd has met the requirements of Australia's standard definitions and rules for freedom from enzootic bovine leucosis.
- The General Surveillance Epidemiology Working Group, comprising representatives of the Australian Government and state and territory governments, developed the General Surveillance Assessment Tool, which can be used to estimate the number of days from introduction to detection of an outbreak of FMD under certain assumptions.
- Establishment of the LEADDR network was completed (see Section 4.2.6).
- A national workshop was held on the role of industry in an EAD response. The outcomes of the workshop will guide further training of industry personnel and industry liaison officers. National policy and arrangements for the engagement of private veterinary practitioners in an EAD response were also developed to facilitate national consistency.
- Agreement was reached across Australia to review and update software databases for surveillance and emergency response. A number of software options were identified and will be implemented during 2014.
- Australian animal welfare standards and guidelines for the land transport of livestock were legislated in all jurisdictions. These are the first in a series of nationally agreed and consistent policies to improve animal welfare arrangements in all Australian states and territories.
- The CCEAD, jurisdictional animal health personnel and industry collaboratively responded to and controlled a number of EAD outbreaks in Australia (see Section 4.6). The effective control and eradication of these outbreaks illustrates the strength of a collaborative national approach to EAD responses in maintaining Australia's favourable animal health status.

1.3.6 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

24 http://data.daff.gov.au/data/warehouse/research_reports/9aab/2013/RR13.11PotSocEcoImpctOfFMD/RR13.11PotSocEcoImpctOfFMD_v1.0.0.pdf

notifiable and exotic livestock diseases for private veterinarians, particularly those involved in livestock industries.

The national Accreditation Program for Australian Veterinarians[25] 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 (see Section 3.6.1) and the National Significant Disease Investigation Program (see Section 3.2.4).

Australia has seven veterinary schools — at the University of Queensland, the University of Sydney, the University of Melbourne, Murdoch University, Charles Sturt University, James Cook University and the University of Adelaide. The University of Adelaide veterinary school, the most recent to open in 2008, graduated its first students in 2013. 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 conducts a site visit to 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).[26] AVBC accreditation is recognised in the United Kingdom, and 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, Murdoch and Sydney universities. 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.

1.3.7 Agricultural colleges and other registered training organisations

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.

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.

1.3.8 Livestock Biosecurity Network Inc.

The Livestock Biosecurity Network (LBN) is an independent industry initiative funded by the Cattle Council of Australia, the Sheepmeat Council of Australia and WoolProducers Australia. It is a three-year pilot project that promotes greater awareness of biosecurity, animal health and welfare issues among livestock producers. In addition,

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

26 www.avbc.asn.au

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, which encompasses all the 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 will be given access to effective tools and useful information to manage disease (endemic and exotic) and pest events on their farms. The LBN will develop mechanisms for public consultation on animal health, welfare and biosecurity issues.

The LBN is working in collaboration with government, university and industry agencies to increase the capacity to respond 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 assist with the delivery of information about biosecurity risks to animal health and welfare
- support jurisdictions to improve industry capability in the event of an EAD incursion
- 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. Together, they are canvassing a range of public and private agencies to determine the best available information and the optimal ways to disseminate this information so that it reaches and informs as many livestock producers as possible

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 for cattle, sheep, goats, pigs and alpacas

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, such as an NVD or a waybill, 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 then 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 Australian Government Minister for Agriculture announced the release of a Council of Australian Governments Consultation Regulatory Impact Statement (RIS) on proposals for improving NLIS (Sheep and Goats) to ensure NLTPS compliance. Following the consultation period in December 2013, SCoPI will consider feedback on the RIS before determining the next steps on the proposals.

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 presented to PISC in November 2013 for noting. The business rules include movement reporting throughout the supply chain. The Office of Best Practice Regulation is currently considering whether a RIS is needed before the business rules can be endorsed. Pending the outcome of this determination, Australian Pork Ltd is working towards full implementation of the rules in all jurisdictions by 1 July 2014.

1.4.4 NLIS for alpacas and llamas

The NLIS (Alpaca and Llama) tracing system is under development. The alpaca 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. 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 began on 1 March 2004, is an on-farm food safety certification program for cattle, sheep and goats. It was developed by Meat & Livestock Australia, in conjunction with industry peak councils and stakeholders. The LPA program (including LPA QA) is managed on behalf of the red meat industry by AUS-MEAT through the LPA Advisory Committee. This committee includes representatives from industry sectors, including cattle, sheep, goat and dairy producers, processors and livestock agents. The Australian Government participates through representation from the Department of Agriculture.

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)[27] principles and comprise five elements:

- property risk assessment — ensures that livestock are not exposed to areas on a property that are contaminated with organochlorides or other persistent chemicals
- safe and responsible animal treatments — ensures that livestock intended for human consumption do not contain unacceptable chemical residues or physical hazards

27 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.

Shutterstock: Catherine311

- 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.

As at 31 October 2013, 204 331 property identification codes are accredited in the LPA program. For the year ending 30 June 2013, approximately 6900 on-farm audits were completed as part of the random audit program, including the targeted audit program conducted on behalf of the National Residue Survey. To 31 October 2013, more than 36 000 audits have been completed since commencement of the program.

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 1995. 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 accredited lot feeders adhere to legislation and the scheme's standards.

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 for breaching the scheme's standards and losing accreditation.

Relevant technical information on animal welfare, environment, biosecurity and disease issues is compiled by Meat & Livestock Australia, the Australian Lot Feeders Association (ALFA) and AHA. This information is used to develop and continually update standards and awareness materials, which are incorporated into the scheme, ensuring that feedlot managers operate in accordance with the requirements and expectations of consumers, markets, regulatory authorities 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 animal health and welfare. 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 industry case studies, have been used to deliver information on animal health, welfare, biosecurity and other matters.

ALFA has recently undertaken a broad review of its animal welfare requirements, involving a thorough assessment of:

- 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.

ALFA is also currently instigating a strategic review of the NFAS. The review, which will be completed in 2014, 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 developed, validated and approved by the competent government authority to national and international standards.
- Individual programs must be verified under legislation from farm through to retail or export.
- Each business (farm or manufacturing company) must be licensed, and compliance against the food safety program is 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 and cover the following core areas, which are relevant to both milk and meat production on dairy farms:

- 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. As at 30 November 2013, APIQ✓® covered 89% of the Australian breeding herd and 588 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 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) administers the Egg Corp Assured (ECA) national QA program. The program is a 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 the industry's 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 registering 164 farms in 2013. The program covers more than 12.4 million laying hens, which represents 76% of the national flock.

To ensure that ECA remains relevant and continues to improve, the program is reviewed and improved to meet stakeholder, consumer and industry demands.

The AECL, the ECA certification trademark owner and program administrator, has contracted the audit management of ECA to global certification bodies whose auditing staff must have Exemplar Global (formerly RABQSA) accreditation in food safety, at a minimum, and must have attended the ECA auditor training program. All auditors must retain current Exemplar Global accreditation and attend egg-related auditor training sessions conducted each year at the discretion of the AECL.

The AECL has appointed two senior auditors to review every audit, and a program of spot audits is implemented. A verification audit program was implemented in 2013 as a means of verifying audit evidence. A verification audit consists of a selection of audit points from the scheme, rather than being a full ECA audit.

Other features of the ECA program are unique identification master logos for egg businesses with multiple farm sites, and an Egg Labelling Integrity Panel, which will review and offer comments on label designs and critical market information to help ensure market transparency.

A series of QA training workshops are usually held annually in most states and territories for egg producers, ECA-licensed 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 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,*[28] 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 new Primary Production and Processing Standard for Poultry Meat, issued by Food Standards Australia New Zealand (FSANZ). The new standard came into effect on 20 May 2012, and has been incorporated into state and territory legislative frameworks.

Under the FSANZ 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, and regular audits of the food safety management system may be undertaken by the relevant state authority and/or the processor to whom the farmer is contracted.

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.[29] Processors are encouraged to integrate these industry standards into their in-house QA systems.

Implementation of these 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.

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

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

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*.[30] This manual, which supersedes individual duck producers' operation manuals, contains an auditable checklist. The manual was produced to complement the requirements of the new Primary Production and Processing Standard for Poultry Meat (see Section 1.5.6).

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*[31] to ensure that water sanitation systems used on commercial duck farms meet national biosecurity standards.

The *Model code of practice for the welfare of animals — domestic poultry* (4th edition)[32] 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 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:

- To encourage development and adoption of relatively straightforward strategies to diagnose, monitor and manage known diseases.
- To reduce the risk of an EAD affecting a herd in the event of such a disease outbreak.
- To reduce the risk of introducing certain preventable infections and infestations, or transferring them to another alpaca herd.
- To monitor closely the health of participating alpaca herds. 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. The program requires necropsies 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 postmortem examination 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.

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 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 AUSQUAL Pty Ltd.

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 FSANZ — 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.

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

31 www.daff.gov.au/animal-plant-health/pests-diseases-weeds/biosecurity/animal_biosecurity/bird-owners/water_biosecurity

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

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, which is a certification body accredited by the Joint Accreditation System of Australia and New Zealand. 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 each of the following areas:

- 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 QA program

The Stock Feed Manufacturers' Council of Australia (SFMCA) operates FeedSafe® as the QA accreditation 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. This document was developed in consultation with the chief veterinary officers of each state and territory, and has been endorsed by SCoPI. FeedSafe® requires feed manufacturers to meet minimum standards and undergo annual site audits by independent third-party auditors. Feed manufacturers are required to implement HACCP as part of their FeedSafe® accreditation.

Australian Renderers Association rendering quality standards and accreditation

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) *Code of practice for hygienic rendering of animal products*. 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
- labelling requirements consistent with state and territory legislation on labelling stockfeed with a restricted animal material statement.

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)[33] 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 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 consider public and consumer confidence in seafood safety to be of paramount importance. Many of the larger sectors have developed their own QA programs, based on HACCP principles and tailored to their own operations.

In 2003, Seafood Services Australia (SSA) revised the Australian standard for the production of seafood that is safe and suitable for human consumption. 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 now manages all the standards previously developed by SSA. This includes the ongoing maintenance and development of the *Australian fish names standard* (AS 5300),[34] which specifies the nationally agreed standard name 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 product
- retrieving the potentially unsafe food
- informing the public and the relevant authorities about the problem.

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


FRDCDEC Creative

33 www.ava.com.au/petfast

34 www.fishnames.com.au

NLIS Ltd

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 quarantine 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, the 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 Diseases[35] facilitates disease reporting and control for terrestrial animals. 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 the Animal Health Committee, and 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.

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

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 2013.

Table 2.1 Australia's status for OIE-listed diseases of terrestrial animals, 2013

Disease	Status	Date of last occurrence and notes
Multiple-species diseases		
Anthrax	Present	Limited distribution
Aujeszky's disease	Free	Never occurred
Bluetongue	Viruses present	Restricted to specific northern areas of Australia; sentinel herd and vector monitoring program
Brucellosis (*Brucella abortus*)	Free	Australia declared freedom in 1989
Brucellosis (*B. melitensis*)	Free	
Brucellosis (*B. suis*)	Serological evidence	Maintained in feral pigs in northern Australia; rare occurrence in domestic pigs[a]
Crimean Congo haemorrhagic fever	Free	Never occurred
Echinococcosis/hydatidosis	Present	
Epizootic haemorrhagic disease	Virus present	Disease has not been reported
Equine encephalomyelitis (eastern)	Free	Never occurred
Foot-and-mouth disease	Free	1872; 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 (*Cochliomyia hominivorax*)	Free	Never occurred
Old World screw-worm fly (*Chrysomya bezziana*)	Free	Never occurred
Paratuberculosis	Present	National control/management programs
Q fever	Present	
Rabies	Free	1867
Rift Valley fever	Free	Never occurred
Rinderpest	Free	1923; with the global eradication of rinderpest finalised in 2011, all countries are free
Surra (*Trypanosoma evansi*)	Free	Never occurred
Trichinellosis	Not reported	*Trichinella spiralis* not present; *T. pseudospiralis* 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 2013

Table 2.1 *continued*

Disease	Status	Date of last occurrence and notes
Cattle diseases		
Bovine anaplasmosis	Present	Restricted to northern areas of Australia
Bovine babesiosis	Present	Restricted to northern areas of Australia
Bovine genital campylobacteriosis	Present	
Bovine spongiform encephalopathy	Free	Never occurred; National Transmissible Spongiform Encephalopathies Freedom Assurance Program includes surveillance; official OIE 'negligible risk' status
Bovine tuberculosis	Free	Australia declared freedom in 1997; last case in any species (including free-living) reported in 2002
Bovine viral diarrhoea	Present	Bovine viral diarrhoea virus (BVDV) 1 — present; BVDV-2 — never occurred
Contagious bovine pleuropneumonia	Free	1967; Australia declared freedom in 1973; officially recognised by the OIE as free
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 *Pasteurella multocida* 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
Theileriosis	Free	*Theileria parva* and *T. annulata* not present
Trichomonosis	Present	
Trypanosomosis (tsetse borne)	Free	Never occurred
Sheep and goat diseases		
Caprine arthritis–encephalitis	Present	Voluntary accreditation schemes exist
Contagious agalactia	Not reported	*Mycoplasma agalactiae* has been isolated, but Australian strains do not produce agalactia in sheep
Contagious caprine pleuropneumonia	Free	Never occurred
Enzootic abortion of ewes (ovine chlamydiosis)	Not reported	Never occurred
Maedi–visna	Free	Never occurred
Nairobi sheep disease	Free	Never occurred
Ovine epididymitis (*Brucella ovis*)	Present	Voluntary accreditation schemes in all states
Peste des petits ruminants	Free	Never occurred
Salmonellosis (*Salmonella* Abortusovis)	Free	Never occurred; surveillance has shown no evidence of infection in sheep
Scrapie	Free	1952
Sheep pox and goat pox	Free	Never occurred

Table 2.1 *continued*

Disease	Status	Date of last occurrence and notes
Equine diseases		
African horse sickness	Free	Never occurred
Contagious equine metritis	Free	1980
Dourine	Free	Never occurred
Equine encephalomyelitis (western)	Free	Never occurred
Equine infectious anaemia	Present	Limited distribution/sporadic occurrence
Equine influenza	Free	Australia's first outbreak of equine influenza occurred from August to December 2007; Australia declared freedom according to OIE standards in December 2008
Equine piroplasmosis	Free	1976
Equine rhinopneumonitis	Present	
Equine viral arteritis	Serological evidence	
Glanders	Free	1891
Venezuelan equine encephalomyelitis	Free	Never occurred
Swine diseases		
African swine fever	Free	Never occurred
Classical swine fever	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 (*Mycoplasma gallisepticum*)	Present	
Avian mycoplasmosis (*M. synoviae*)	Present	
Duck virus hepatitis	Free	Never occurred
Fowl typhoid	Free	1952
Highly pathogenic avian influenza	Free as of 21 February 2014	Australia achieved freedom from HPAI on 20 March 2013, following an outbreak in November 2012. Two outbreaks were reported to the OIE on 16 and 25 October 2013. Destruction, decontamination and disinfection were completed on 21 November 2013

Table 2.1 *continued*

Disease	Status	Date of last occurrence and notes
Avian diseases *continued*		
Infectious bursal disease (Gumboro disease)	Present	Infectious bursal disease occurs in a mild form; very virulent strains not present
Low pathogenic notifiable avian influenza (poultry)	Occasional reports	An outbreak was reported to the OIE on 8 March 2013; the outbreak was resolved on 27 June 2013
Newcastle disease in poultry	Lentogenic viruses present	Virulent Newcastle disease last occurred in poultry 2002[b]
Pullorum disease	Not reported	Last reported in 1992. *Salmonella* Pullorum has been eradicated from commercial chicken flocks
Turkey rhinotracheitis	Free	Never occurred
Lagomorph diseases		
Myxomatosis	Present	Used as a biological control agent for wild rabbits
Rabbit haemorrhagic disease	Present	Used as a biological control agent for wild rabbits
Bee diseases		
Acarapisosis of honey bees	Free	Never occurred
American foulbrood of honey bees	Present	
European foulbrood of honey bees	Present	
Small hive beetle	Present	Restricted distribution
Tropilaelaps of honey bees	Free	Never occurred
Varroosis of honey bees	Free	*Varroa destructor* has never occurred in Australia
Other diseases		
Camel pox	Free	Never occurred
Leishmaniasis	Australian variant present	Rarely, an Australian *Leishmania* variant has been isolated from skin lesions of macropods. In 2013, a case was reported in an imported dog

OIE = World Organisation for Animal Health

a *B. suis* has also, rarely, been isolated in dogs.

b In August 2011, a paramyxovirus not previously reported in Australia was detected in hobby pigeons in Victoria. Disease caused by this avian paramyxovirus has not spread to poultry.

Table 2.2 Australia's status for other diseases of terrestrial animals that are reported to the OIE each year, 2013

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	
Filariosis	Present	
Footrot	Present	Restricted distribution
Infectious coryza	Present	
Intestinal *Salmonella* infections	Present	
Listeriosis	Present	
Melioidosis	Present	Restricted distribution
Nosemosis of bees	Present	
Salmonellosis (*Salmonella* Abortusequi)	Free	Never reported
Sheep mange	Free	1896
Strangles	Present	
Swine erysipelas	Present	
Toxoplasmosis	Present	
Ulcerative lymphangitis	Free	Never reported
Vibrionic dysentery	Present	
Warble fly infestation	Free	Never reported
Other clostridial infections	Present	
Other pasteurelloses	Present	

OIE = World Organisation for Animal Health

2.3 National reporting system for animal diseases in Australia

Australia's National Animal Health Information System (NAHIS), redeveloped and launched in January 2006, 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.

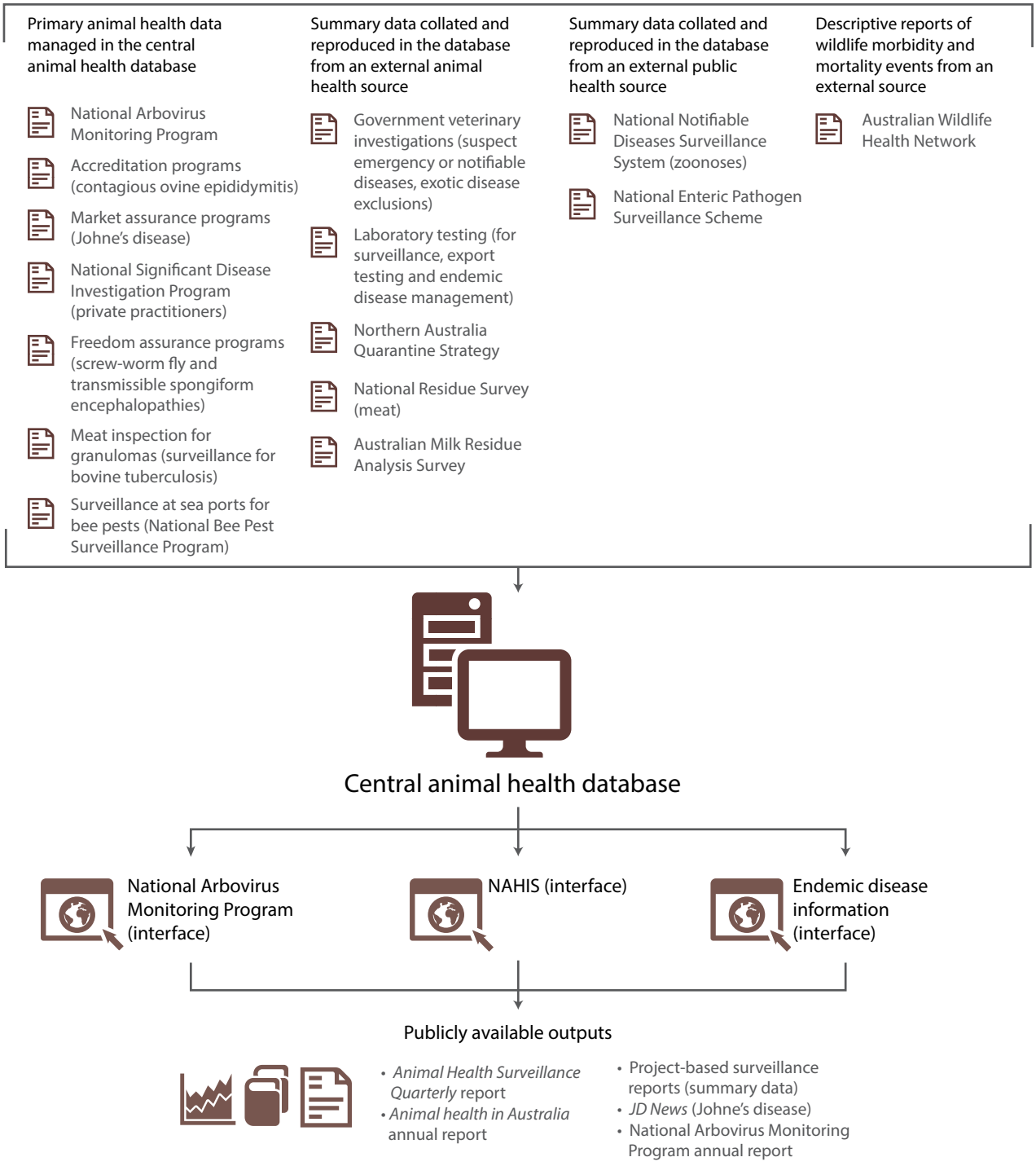


Figure 2.1 National Animal Health Information System data sources, interfaces and reports

In 2009, NAHIS was expanded to house data that are accessed by two other surveillance program applications — NAMPInfo (information system for the National Arbovirus Monitoring Program) and EDIS (Endemic Disease Information System). All applications managed by NAHIS use the same underlying Central Animal Health Database, but maintain separate and distinct web interfaces. NAHIS provides selected summaries of national animal health data and disease summary tables; NAMPInfo provides the official interactive bluetongue virus zone map; and 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.[36]

Arthur Mostead

36 www.animalhealthaustralia.com.au/programs/disease-surveillance/%20national-animal-health-information-system

2.4 Endemic diseases of national significance

This section describes the status of, and programs for, endemic animal diseases of national significance in 2013. 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.

A National American Foulbrood Future Management Workshop was held in Canberra in March 2013 to discuss a possible national AFB management strategy. 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.

New South Wales

In New South Wales, from December 2012 to November 2013, 74 beekeepers had an outbreak of AFB, with 533 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) has conducted special apiary compliance operations. These aim to raise awareness of the apiary industry's responsibilities under the New South Wales *Apiaries Act 1985*, to detect breaches of the Act and to allow 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.

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. Ninety-four submissions, most of them consisting of multiple samples, were made to Queensland DAFF's Biosecurity Science Laboratory for a foulbrood disease diagnosis during 2013. Seventy-five of these contained one or more samples, which 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.

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 2013 remains low (6–10%).

2.4.2 European foulbrood

European foulbrood (EFB) is a disease of bee larvae caused by the bacterium *Melissococcus pluton*. 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, except Western Australia. Western Australia maintains stringent control measures to minimise the risk of introduction of the disease. The Northern Territory has a small beekeeping industry that is thought to be free from EFB; disease freedom is supported by geographic isolation from affected states, well-informed beekeepers and health import regulations.

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 2013.

2.4.3 Asian Honey Bee Transition to Management program

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 the 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 also 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 are 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 will continue 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

The 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), which has been approved by the Australian Pesticides and Veterinary Medicines Authority, to minimise the impact of SHB.

New South Wales

SHB is widespread in New South Wales beehives. Researchers at the NSW DPI Elizabeth Macarthur Agricultural Institute have invented a fipronil-impregnated cardboard trap (APITHOR) that 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 were introduced. Beekeepers and the apiary officer from the Department of Primary Industry and Fisheries conduct the surveillance; no detections were reported in 2013.

Queensland

SHB is identified as a major pest species and is endemic in most coastal regions of Queensland. 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 2013.

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 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 more than 80 years ago. 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

Two anthrax incidents occurred in New South Wales in 2013. The first, in February 2013, involved two neighbouring properties in the Moree watercourse area. One of these properties (possibly both) had experienced anthrax during the large outbreak that occurred in the district in 1973. About 30 out of 570 cattle died on each property, although some of these deaths might have been from other causes. Samples from cattle on both properties tested positive with an immunochromatographic test (ICT; see 'Victoria' in the following section for further information about this test) and were confirmed positive at the laboratory. A horse also died on one property but was not tested for anthrax. NSW DPI set up an emergency response because of the possibility of more properties becoming infected; however, no further properties in the district were affected. No movements occurred off either of the properties in the month before diagnosis.

In the second incident, in August–September 2013, nine beef cattle and five sheep died on a property near Parkes. The district veterinarian had obtained a positive result from two animals (one bovine and one ovine) using an ICT on 6 September, and control measures were applied immediately. Anthrax was confirmed at the State Diagnostic Veterinary Laboratory, Menangle, on 11 September. The National Livestock Identification System database showed that there had been no movements on or off the Parkes property in the 21 days before or after the first death on 23 August.

All of these properties are in the known anthrax endemic area of New South Wales. The incidents were managed according to NSW DPI anthrax policy — properties were placed in quarantine, all at-risk stock were vaccinated and carcasses were disposed of by burning.

There were 63 negative investigations for anthrax during 2013: 39 involved cattle, 16 involved sheep, 3 involved horses, 1 involved an alpaca and 1 involved a cat. Alternative diagnoses in cattle included lactic acidosis, bovine ephemeral fever, clostridial infection, monensin toxicity, nitrate/nitrite toxicity and plant poisonings (including cestrum and oleander). Alternative diagnoses in sheep included bowel torsion, pneumonia, clostridial infection, hypocalcaemia and urea toxicity. The alternative diagnosis for the alpaca was parasitic hepatitis (caused by *Fasciola* liver flukes).

Victoria

There were no reports of anthrax in Victoria during 2013. A total of 57 anthrax exclusion investigations were undertaken — 50 on cattle, 5 on sheep and 2 on horses. These investigations represent events

involving 180 deaths and more than 15 303 at-risk animals. The last recorded case of anthrax in Victoria was in September 2009.

An 'animal-side' ICT, developed by the Victorian Department of Environment and 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, apart from 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. 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 2013, 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. One clinical event was reported during 2013.

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

No incursions of cattle ticks or cases of tick fever were reported in South Australia, Tasmania or Victoria during 2013.

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 is also undertaken at North Coast abattoirs. Infested and at-risk properties are quarantined, and eradication programs and movement controls are implemented.

Surveillance cameras at seven 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.

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–infected 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 2013 surveillance. Two properties were declared free from cattle tick in 2013 following extensive surveillance. A Parkhurst-infected 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 a different acaricide, are used to minimise the risk of further spread of these ticks outside the declared area.

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: infected, 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 persons to provide cattle tick–inspection services. Approved persons inspect and supervise treatments of stock at official clearing facilities. Currently, 56 approved providers are available to provide services at 27 clearing dips and two livestock inspection centres (spray stations). They undertake the clearance procedures for more than 95% of stock clearances from the infested zone. Approved persons 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 person. Queensland DAFF provides laboratory services for the analysis of dip fluids, and for testing and identification of acaricide-resistant strains of cattle tick.

At the end of June 2013, when the Queensland cattle tick season ended, 61 infected properties in the free zone and 159 infected properties in the control zone were under movement restrictions. An additional 1521 properties in the free and control zones had a cattle tick status of either at risk (high) or at risk (low).

During 2013, 50 incidents of babesiosis — with an average mortality rate of 3% (range 0–50%) of at-risk animals — and 7 incidents of anaplasmosis — with an average mortality rate of 2% of at-risk animals — were confirmed through Queensland DAFF veterinary laboratories.

Live vaccines produced by Queensland DAFF's Tick Fever Centre are used to control babesiosis

and anaplasmosis. During 2013, the centre sold 896 940 doses of trivalent vaccine (90% chilled and 10% frozen). The use of tick fever vaccines is controlled in non-infested areas.

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 (PCR) or virus isolation. Virus detection and categorisation are essential when EHV-1 is suspected, as 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 2013, no cases of EHV-1 abortion or neurological disease were reported in the Northern Territory, Queensland, South Australia or Tasmania.

Abortion due to EHV-1 was diagnosed in three mares in New South Wales, four mares on four horse properties in Victoria and one mare in Western Australia.

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 mean that disease due to infectious bovine rhinotracheitis is rare in Australia.

2.4.10 Johne's disease

Johne's disease (or 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. 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 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.[37]

Regulatory programs for Johne's disease operate in the north of Australia. In 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.

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

In 2013, 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 2013.

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. Control procedures and tracing continued during 2013 to determine the extent of spread from the index herd.

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 396 producers, about 252 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.

Rachel Gordon

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 for 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 2013, the sheep industry continued working with AHA and the meat-processing industry to support abattoir surveillance at several sites across southern Australia. In the 2012–13 financial year, approximately 9640 consignments, comprising 1 946 752 adult sheep, were inspected for evidence of OJD. The data from this project are used each year to assess the regional flock prevalence of OJD.

Goats

The goat industry has established a risk-based trading approach that 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. Australia has been free from outbreaks of virulent ND since 2002, when two incidents of 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 2008–12*[38] was to minimise 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.

In 2012, the steering committee developed a successor plan, the *National Newcastle Disease Management Plan 2013–16*.[39] As in the previous plan, the goal is a vaccination program that mitigates the risk of an outbreak of Australian-origin virulent ND. The new plan does not propose any changes to the vaccination requirements for long-lived birds. However, consistent with the relaxation of the rules for short-lived birds in Tasmania and Western Australia in the 2008–12 plan, the new plan provides for relaxed rules in such birds in Queensland and South Australia. The new plan was implemented from early 2013.

New South Wales

The standard operating procedures for vaccination in New South Wales poultry remained unchanged under the new management plan from the previous year. Results from surveillance in

38 www.animalhealthaustralia.com.au/wp-content/uploads/2011/04/National-Newcastle-Disease-Management-Plan-2008-2012-v1.3-27-Oct-2011.pdf

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

Queensland and South Australia will guide the steering committee's decision about when, and under what conditions, vaccination requirements for short-lived birds in Victoria and New South Wales can be relaxed; the default is two years into the new plan (2015).

The ND Management Plan 2013–16 requires flocks to meet adequate antibody titres within four weeks of completing the vaccination course. Monitoring of vaccinated pullet flocks in New South Wales has found that 90% of the flocks meet these requirements. A survey of broilers originating from hatcheries vaccinating one-day-old chickens against ND by coarse spray — or from companies vaccinating at 7–14 days in the field via drinking water — found that the required titres were mostly achieved, regardless of the maternal antibodies of the donor flocks. Overall, the technique was capable of delivering the haemagglutination inhibition titres required by the management plan.

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 ND Management Plan 2008–12 for a medium-risk state, as agreed by the national steering committee.

The ND Management Plan 2013–16 has reduced compulsory vaccination requirements for broilers, based on the assessed risk of an outbreak of virulent ND in Australia. As in Tasmania and Western Australia, vaccination of broilers is no longer compulsory in Queensland. However, producers can still voluntarily choose to vaccinate their broilers. The Queensland broiler industry has indicated to Biosecurity Queensland that it is keen to adopt this reduced vaccination requirement for the Queensland broiler flock. However, an amendment will be required to the Queensland Stock Regulation 1988 to enable nonvaccination of broilers with surveillance before this change can be implemented.

During 2013, no virulent ND or precursor ND viruses were detected in Queensland. All detections of ND virus have been categorised as a vaccine-like strain.

South Australia

In South Australia, all commercial poultry farms, except for broiler farms with chickens less than 24 weeks of age, are required by law to vaccinate their poultry against ND. Vaccination is in accordance with the ND Management Plan 2008–12 for a medium-risk state, as agreed by the national steering committee.

As in Queensland, the ND Management Plan 2013–16 has reduced compulsory vaccination requirements for broilers in South Australia, and the South Australian poultry industry has indicated its desire to remove ND vaccination for the broiler flock. Biosecurity South Australia has published an amendment through a Ministerial Notice under the *Livestock Act 1997* to the effect that all egg-laying and breeding chickens, and chickens older than 24 weeks in commercial poultry flocks must be vaccinated with an ND vaccine and be serologically monitored to demonstrate vaccination efficacy, in accordance with the Newcastle Disease Vaccination Program Standard Operating Procedures, 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 older than 24 weeks within the commercial poultry industry unless the birds have been vaccinated against ND, in accordance with the standard operating procedures.

During 2013, no ND viruses were detected in poultry in South Australia.

Tasmania

In Tasmania, meat chickens are exempt from the requirement to vaccinate flocks with more than 1000 birds, provided that they comply with surveillance requirements. Meat chicken breeders are not included in this exemption. Vaccine is obtained from the supplier under licence from the Chief Veterinary Officer and it 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.

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. The most recent survey, in 2013, focused on long-lived chickens (layers and breeders).

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 2013 are shown in Table 2.3.

Table 2.3 Ovine brucellois accredited-free flocks, at 31 December 2013

State	Accredited-free
New South Wales	842
Queensland	84
South Australia	583
Tasmania	77
Victoria	497
Western Australia	189
Australia	**2272**

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 2013, the scheme covered 842 flocks, predominantly stud flocks.

Northern Territory

There are no commercial sheep flocks in the Northern Territory.

Queensland

Queensland has a voluntary ovine brucellosis accreditation scheme for stud flocks. In December 2013, there were 66 accredited flocks. The historically low incidence of ovine brucellosis reported in the state's flocks did not change significantly during 2013.

South Australia

A voluntary ovine brucellosis accreditation scheme operates in South Australia. There are currently 459 accredited producers and 583 accredited flocks. There was no change in the low incidence of ovine brucellosis reported in South Australia's flocks in 2013.

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. There are around 90 accredited ovine brucellosis–free flocks at any one time in Tasmania. 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 2013, infection was detected in three 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. At December 2013, 497 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 2013, the scheme had 189 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 has maintained protected area status in 2013. 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 2013.

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.

In 2013, no cases of *B. suis* infection in pigs were reported from the Northern Territory, South Australia, Tasmania, Victoria or Western Australia. The latter four states have specific import controls for breeding pigs from areas where *B. suis* is known to occur.

New South Wales

During 2012 and 2013, surveillance of feral pigs in the north of the state showed antibodies to *Brucella* sp. This is the first time that brucellosis has been confirmed in feral pigs in New South Wales. Swine brucellosis has not been detected in commercial 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 11 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.

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.

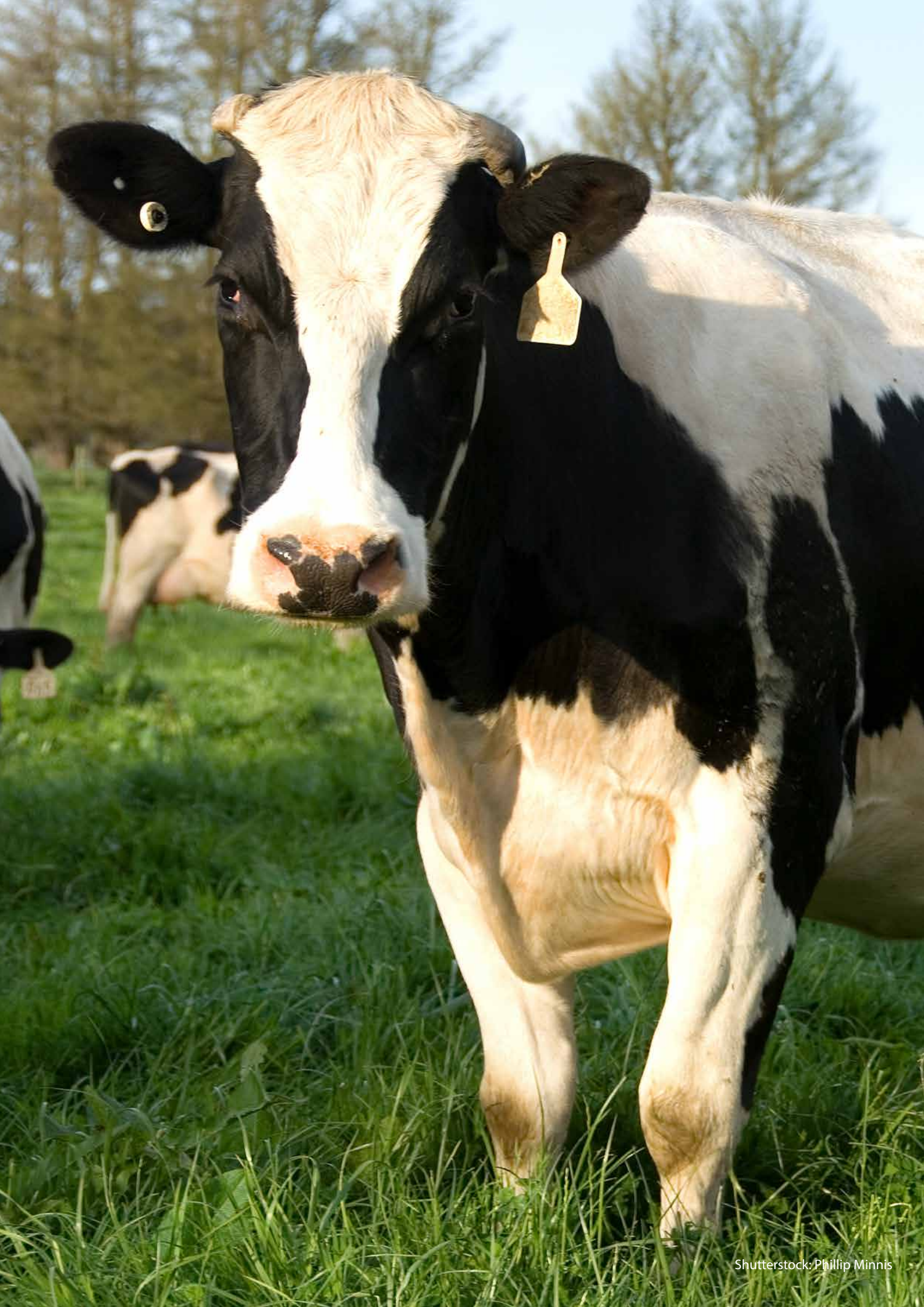
The clinical signs seen in horses infected with $WNV_{NSW2011}$ were consistent with those described for West Nile fever (WNF). The OIE provides the following criteria to define the occurrence of WNF:[40]

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. No positive laboratory results for WNF were reported in 2013.

40 www.oie.int/index.php?id=169&L=0&htmfile=chapitre_1.8.17.htm



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Chapter 3

Terrestrial animal disease surveillance and monitoring

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

This network implements surveillance plans to identify and treat risks from notifiable, emerging and exotic diseases. It is supported by the National Livestock Identification System (see Chapter 1), 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 government and nongovernment programs that contribute to disease surveillance and monitoring capability at a national level. These programs are listed in Box 3.1.

3.1 Towards an improved national animal health general surveillance program

General surveillance — the observation and reporting of diseased animals by farmers, abattoir workers, veterinarians and others in contact with the animals — remains the most common method of disease detection in Australia and is a cornerstone of our animal health system. General surveillance is an important risk mitigation strategy to provide early notification of an emergency animal disease (EAD) outbreak. The 2011 Matthews review[41] acknowledged that the Australian biosecurity system is generally considered to be strong. The review team also identified a need for improvements to the system, including in the ability to detect a foot-and-mouth disease (FMD) incursion.

41 www.daff.gov.au/__data/assets/pdf_file/0003/2035065/footandmouth.pdf

Box 3.1 National surveillance and monitoring activities

Managed by Animal Health Australia

- National Arbovirus Monitoring Program
- Transmissible Spongiform Encephalopathies Freedom Assurance Program
- Screw-worm Fly Freedom Assurance Program
- National Significant Disease Investigation Program
- National Sheep Health Monitoring Project

Managed by state and territory governments

- Field and laboratory diagnosis of significant livestock diseases
- Targeted surveillance for priority diseases
- Identification, research and reporting of emerging diseases
- Collection, collation and analysis of data on, and reporting of, notifiable diseases
- Investigation of the epidemiology, distribution and prevalence of animal diseases
- Investigations of suspected emergency animal diseases

Managed by the Australian Wildlife Health Network

- Wildlife Health Information System and intelligence on diseases emerging from wildlife
- Avian influenza surveillance in wild birds
- Surveillance of diseases in bats

Managed by other organisations

- Bovine tuberculosis surveillance
- Bovine brucellosis surveillance
- Surveillance at sea ports and elsewhere
  - National Bee Pest Surveillance Program

Participation by private veterinarians

- Australian Veterinary Practitioner Surveillance Network
- State and territory surveillance programs
  - Initial field investigations of suspect notifiable diseases
  - Field surveillance of animal diseases
  - Endemic disease management programs (if contracted)

Surveillance programs in Northern Australia

- Northern Australia Quarantine Strategy
  - Targeted surveillance, including Japanese encephalitis surveillance
  - General surveillance
- Animal biosecurity in the northern tropics

Public health surveillance for zoonotic diseases

- National Notifiable Diseases Surveillance System
- National Enteric Pathogen Surveillance Scheme

The review identified the following opportunities for improvement:

- an improved exclusion testing scheme
- establishment of better connections between governments and producers
- training programs for those who observe animals as part of their daily work
- ongoing training of private and government veterinarians.

In 2012, the Animal Health Committee (AHC) formed a working group to provide a technical analysis of Australia's general surveillance system. The working group reviewed disease threats and developed tools for analysis of surveillance capability that are applicable to many EADs. Key focus areas to improve the current general surveillance system included:

- opportunities for producers to observe disease (in extensive systems)
- recognition of disease by producers
- reporting by producers to veterinarians or government
- recognition of disease by veterinarians
- reporting by veterinarians to government.

In 2012 and 2013, Australian governments developed a draft Surveillance and Diagnostic Framework of the Intergovernmental Agreement on Biosecurity. Since a collaborative, cooperative approach towards nationally agreed surveillance objectives is needed, industries and governments came together at the National Animal Health General Surveillance Forum in November 2013 to plan a way forward. The forum established a steering committee that will draft terms of reference for improving Australia's general animal health surveillance system. A working group will then use these terms of reference to draft a business plan to present to industry and government. The plan is for all elements of the general surveillance system to be linked as part of a national system targeting early recognition and reporting of EADs in support of Australia's international trade objectives.

3.2 Surveillance programs managed by Animal Health Australia

Animal Health Australia (AHA)[42] responds to members' needs for general and targeted national surveillance programs, and supports the AHC in developing and implementing national surveillance policy.

Surveillance programs managed by AHA are listed in Box 3.1. NAHIS receives surveillance data from a number of sources, collates the information, and reports it to AHA members and the public. NAHIS is integral to validating reports on livestock disease status across jurisdictions and production sectors.

AHA has been working with the AHC to develop a national approach to general surveillance and its evaluation, and will continue to do so as the AHC refines its approach. AHA continues to foster the National Significant Disease Investigation Program (NSDIP) (see Section 3.2.4). This program aims to strengthen the general surveillance network involving private veterinary practitioners and government officers, and thereby increase Australia's capacity for the early detection of EADs.

3.2.1 National Arbovirus Monitoring Program

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

The export of ruminants and their genetic material (semen and embryos) is an important part of Australia's livestock industry. 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 obtains credible data on the nature and distribution of important arboviral infections in Australia. The data are used by the Australian Government and by livestock exporters to certify to trading partners

42 www.animalhealthaustralia.com.au

that ruminants and their genetic material are sourced from areas that are free from important arboviruses. In addition, overseas agencies use NAMP data to help them to develop animal health certification requirements for the importation of Australian livestock (ruminants) and ruminant genetic material.

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

Objectives of NAMP

NAMP has three specific objectives:

- market access — to support the export of live sheep, cattle and goats, and ruminant genetic material to countries with concerns about bluetongue, Akabane and BEF viruses
- bluetongue early warning — to detect incursions into Australia of exotic strains of bluetongue virus (BTV) and *Culicoides* midge species (the vectors of BTV in Australia) by surveillance of the northern BTV endemic area
- risk management — to detect changes in the seasonal distribution of endemic bluetongue, Akabane and BEF viruses and their vectors in Australia, 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 important 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 2012–13 are shown in Figure 3.1.

To detect incursions of arboviruses from overseas, virus isolation is routinely undertaken on blood samples from one herd in the Northern Territory. 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.

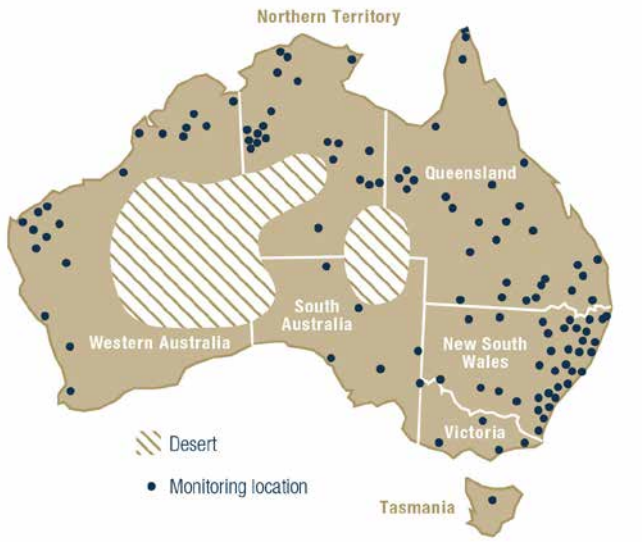

Figure 3.1 Locations of NAMP monitoring sites in Australia, 2012–13

Monitoring data for 2012–13

This report describes the limits of vector and virus distribution, and the areas free from bluetongue, Akabane and BEF viruses in the 2012–13 arbovirus transmission season.

Vector distribution and climate

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 originally all 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. There is a close relationship 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.

In Western Australia, temperatures were slightly above average across the state in the 2012–13 arboviral transmission season. The Pilbara region experienced above-average rainfall, especially in the second half of the year, but the rest of the state had average to below-average rainfall. *Culicoides* trapping occurred across the state, but vectors were only found in the Kimberley region, within their normal range. *C. brevitarsis* was trapped as far south-west as Broome, *C. actoni* only in the central Kimberley, and *C. fulvus* and *C. wadai* only at Kalumburu. All vector species were collected in lower numbers than usual.

In the Northern Territory, there was a very late start to the wet season, with rainfall average or below average over most regions. Temperatures were above average during the wet season. *C. brevitarsis* was widespread in the north, being found at all monitoring sites and as far south as the Barkly Tableland. Numbers were about three times higher than in 2011–12. *C. actoni* was found only in low numbers at the four most northerly sites; *C. fulvus* and *C. wadai* were present at three of these sites. No exotic species of *Culicoides* were found.

In Queensland, the summer was warm, with heavy rainfall in some areas. It was wetter than average in the south-east corner of the state, extending north up to the Central Coast and west into the Maranoa and Warrego districts. Rainfall was below average across the remainder of the state and well below average in the far north, and parts of the interior and western districts. The distribution of *C. brevitarsis* was again extensive, spreading across north, central and southern Queensland, and the eastern and western interior. Other collections included *C. actoni* at Weipa and Seisia; *C. wadai* at Cooktown, Weipa and Townsville; *C. oxystoma* on Cape York Peninsula; and *C. fulvus* at Kuranda, north Queensland. *C. fulvus* was collected on two occasions, providing evidence that there is an established population. Kuranda represents a southern extension of the previously known range of *C. fulvus*, and new monitoring sites established at Cairns and Innisfail for the 2013–14 arbovirus season will help to determine the extent of its distribution. *C. flavipunctatus* (a single specimen of which was collected in 2010–11 in Torres Strait) and *C. dumdumi* (last collected at Cooktown in 2010–11) were not detected.

New South Wales experienced higher than average rainfall over the North and Central coasts, Northern and Central tablelands and North West Slopes during January to March, which was associated with flooding in the coastal regions in late January and February. These rainfall conditions provided optimal environmental conditions for mosquito breeding and BEF virus transmission. Coastal vector populations were suppressed by localised flooding, whereas inland, west of the Great Dividing Range, vector populations were higher than in recent seasons. The annual southerly expansion of the *C. brevitarsis* population extended into the Hunter Valley and onto the upper South Coast region. Exceptionally large numbers of midges were collected at Cattai (west of Sydney). In north-west New South Wales, *C. brevitarsis* (usually limited to

the Inverell and Wallangra districts) was detected for the first time at Lightning Ridge in February, and at Moree in April and May. Inland, *C. brevitarsis* numbers remained low compared with the coastal populations. *C. wadai* was detected at Bellingen in May 2013.

Victoria experienced a slightly warmer than average start to the monitoring season, followed by a warmer, much drier summer than usual, and a dry autumn. Much of South Australia experienced below-average rainfall for 2012–13, while temperatures were generally above average. No vectors of BTV were detected in South Australia, Victoria or Tasmania.

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,[43] which defines areas in which no viral transmission[44] has been detected for the past two years.

Monitoring data showed that BTV continued to be endemic in far northern Australia, including the Kimberley region of Western Australia, where serotype BTV-1 was detected. BTV also occurred within its usual limits in the Northern Territory, Queensland and New South Wales (Figure 3.2).

In the Northern Territory, activity was detected in all northern sentinel sites except Garrithiya and Victoria River. At Beatrice Hill, new seroconversions began in October 2012 and continued through to May 2013. Serotyping and virus isolation showed that BTV-1 was active from October to January, BTV-20 from November to February, and BTV-7 in April and May. BTV-1, BTV-20 and BTV-7 were also detected at Douglas Daly, BTV-1 and BTV-20 at Berrimah, and BTV-1 at Katherine. Serosurvey data showed BTV-1 activity in the Victoria River district and the Barkly Tableland.

Queensland sites showed evidence of BTV transmission, mainly from March to June 2013. Most activity was in the northern and central regions, and around Jandowae and Chinchilla in the south. In central regions, serology detected only BTV-1 and BTV-21. In both the northern and southern regions, serology detected BTV-1, BTV-15, BTV-16 and BTV-21; BTV-1 and BTV-21 were the most active. In the south, serology detected BTV-15 and BTV-16 at Hughenden and Weipa, respectively. BTV-15 was reported in Queensland for the first time in 2011–12.

In New South Wales, BTV transmission was first detected at Lismore on the far North Coast in February. By June, BTV transmission had reached as far south as Camden and extended to Singleton in the Hunter Valley. On the North West Slopes (Coolatai, Warialda and Moree) and Northern Tablelands (Tenterfield) regions, BTV seroconversions were detected between April and July. Widespread transmission this season has resulted in an expansion of the zone of possible BTV activity over the Northern Tablelands and along the coastal plain south of Camden to the Shoalhaven. BTV-1 was detected throughout the area of BTV activity, and BTV-21 was detected on the far North Coast and at Moree. There was no evidence of disease.

All regions in southern Australia and most pastoral regions in eastern Australia remain BTV-free.

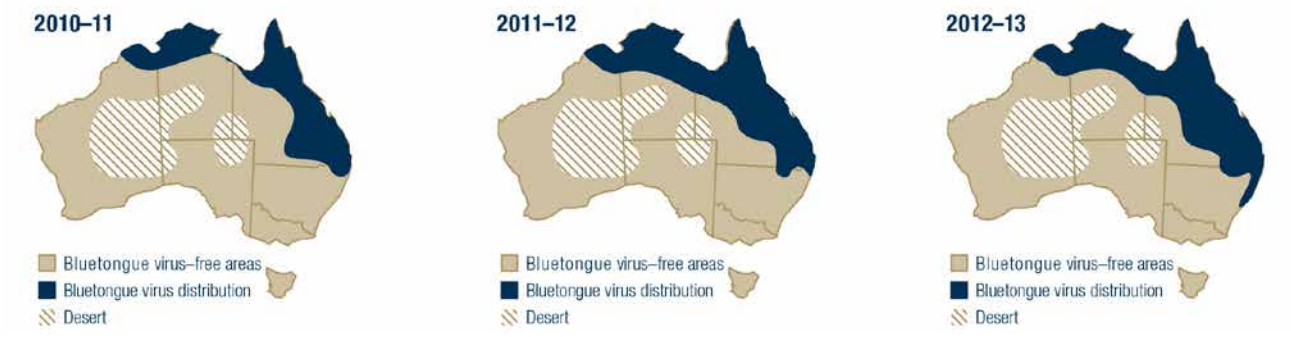

Figure 3.2 Distribution of bluetongue virus in Australia, 2010–11 to 2012–13

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

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

Akabane virus distribution

Monitoring data continued to show Akabane virus transmission in the Kimberley region of Western Australia, throughout the north of the Northern Territory and throughout Queensland.

In New South Wales, Akabane virus was detected over a greater area than in 2011–12. Within the known endemic range, transmission was detected on the coastal plain south to Camden and extending into the Hunter Valley. There was also transmission on the eastern ranges (Armidale and Yarrowitch), and across the North West Slopes (Tamworth, Coolatai, Moree and Pilliga) and Northern Tablelands (Tenterfield and Glen Innes) regions, and extension along the Hunter Valley as far west as Merriwa and south along the coastal plain to Nowra. Transmission was detected from December 2012, commencing on the far North Coast, through to July in the south. Cases of Akabane disease in calves were reported in the Merriwa area, and further cases were expected in areas bordering the endemic zone.

Akabane virus was not detected in the southern states of South Australia, Victoria or Tasmania (Figure 3.3).

Bovine ephemeral fever virus distribution

In the Northern Territory, BEF virus activity was very widespread, with seroconversions beginning in September 2012 in the most northerly sites and continuing through to April–May 2013. Serosurvey data showed activity in the Victoria River district and Barkly Tableland. BEF virus was widespread throughout Queensland (as in previous years).

In New South Wales, BEF virus was widespread, extending along the coastal plain from the far North Coast south to Berry in the Shoalhaven, on to the eastern ranges at Yarrowitch and to Scone in the Hunter Valley. Activity was also detected in the Tenterfield sentinel herd on the Northern Tablelands and in the North West Slopes region west to Moree and south to Tamworth. Activity was detected from late November 2012 through to June 2013, at the end of season collections.

BEF virus was not detected in the southern states of South Australia, Victoria or Tasmania (Figure 3.4).

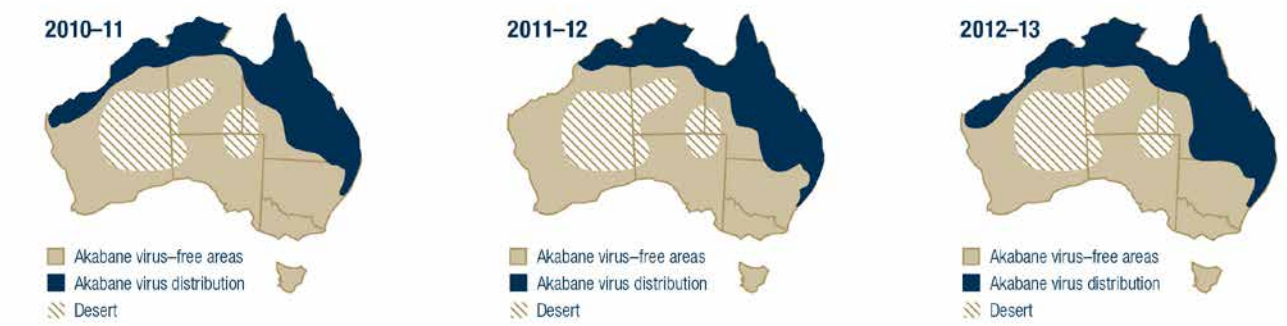

Figure 3.3 Distribution of Akabane virus in Australia, 2010–11 to 2012–13

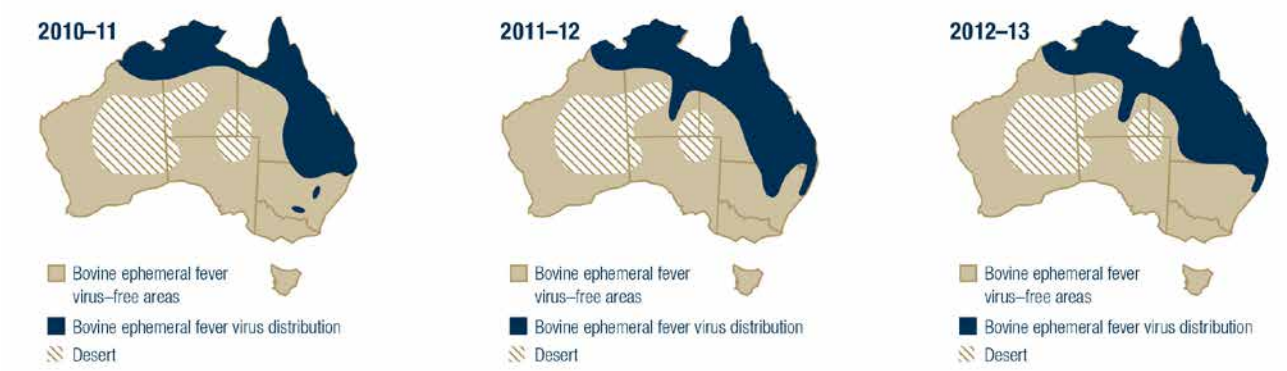

Figure 3.4 Distribution of bovine ephemeral fever virus in Australia, 2010–11 to 2012–13

3.2.2 Transmissible Spongiform Encephalopathies Freedom Assurance Program

In 2013, 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 TSE 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 National Transmissible Spongiform Encephalopathies Surveillance Program (NTSESP)
- the Australian ruminant feed-ban scheme, including inspections and testing
- imported animal surveillance, including buyback schemes for certain imported cattle
- communications.

A five-year review of the objectives and future needs of the TSEFAP was undertaken at the beginning of 2013, to ensure that Australia continues to be recognised as a country of negligible risk for BSE and free from classical scrapie. The independent review found that stakeholders consider the TSEFAP to be a well-managed and positively received program, which is continuing to achieve its objectives.

National Transmissible Spongiform Encephalopathies Surveillance Program

The NTSESP aims to demonstrate Australia's continuing 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,'[45] 'fallen'[46] and 'casualty slaughter'[47] cattle. Details of the sampling program for sheep and cattle are provided in the NTSESP *National guidelines for field operations*.[48]

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 World Organisation for Animal Health (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. Table 3.1 shows the results from the NTSESP for the 2012–13 financial year. Data for other periods are available from the NAHIS database.[49]

45 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 11.5, on surveillance for BSE.

46 Fallen cattle are defined by the OIE *Terrestrial animal health code*, Chapter 11.5, as 'cattle over 30 months of age which are found dead or killed on farm, during transport or at an abattoir'.

47 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'.

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

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

Table 3.1 Summary of results from the National Transmissible Spongiform Encephalopathies Surveillance Program, 2012–13

State or territory	Cattle			Sheep	
	Number examined	Points[a]	Number positive	Number examined	Number positive
New South Wales	158	43 560.4	0	145	0
Northern Territory[b]	23	12 720	0	0	0
Queensland	213	65 227.3	0	20	0
South Australia	33	12 376.3	0	83	0
Tasmania	15	3 514.3	0	7	0
Victoria	205	62 441.7	0	169	0
Western Australia	53	22 733.9	0	192	0
Total	**700**	**222 573.9**	**0**	**616**	**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.

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, and animal oils and rendered fats.

In the 2012–13 financial year, 503 operations were inspected, from renderers to end users. This revealed 22 instances of noncompliance, none of which required prosecution. During the same period, 11 697 audits were completed through industry quality assurance programs. Five required referral to the relevant central agency.

Imported animal tracing

All cattle imported between 1996 and 2002 from countries that have experienced a native-born case of BSE are placed under lifetime quarantine, electronically tagged as part of the National Livestock Identification System for cattle and 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 2012–13, 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 series of pamphlets for stockfeed manufacturers and users, promoting awareness of their responsibilities under the ruminant feed-ban legislation.

3.2.3 Screw-worm Fly Freedom Assurance Program

Old World screw-worm fly (SWF; *Chrysomya bezziana*) is a threat facing Australia's livestock industries. Old World SWF is an obligate parasite of warm-blooded animals in the tropics and is endemic throughout much of Africa, parts of the Middle East, the Indian subcontinent and Southeast Asia, including countries immediately 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 from 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, 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 3.5 provides a summary of the data from adult fly trapping. The locations of SWF traps in 2013 are shown in Figure 3.6.

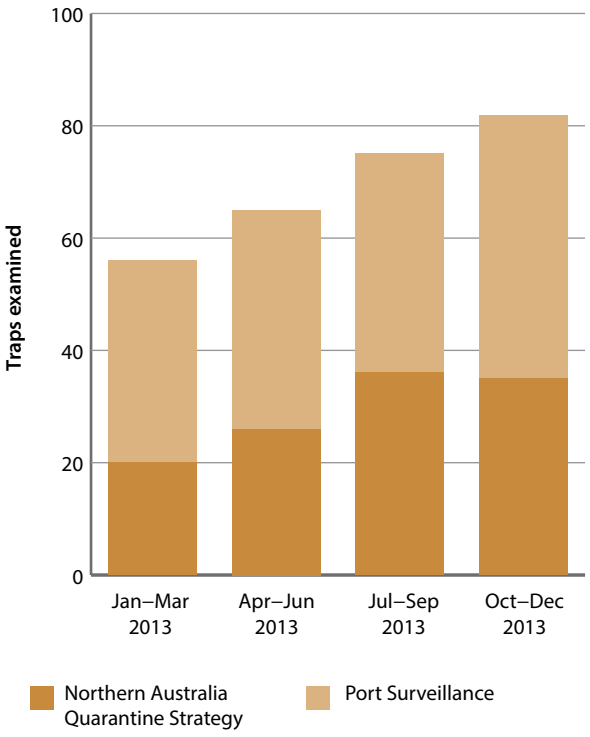

Figure 3.5 Summary of adult screw-worm fly trapping in 2013

Figure 3.6 Locations of screw-worm fly traps in 2013

Communications

A communications program focuses on producers in northern Australia, live export yards and abattoirs. In addition, NAQS provides awareness material through its engagement with local communities and visitors to the Torres Strait region.

Review

During 2013, an external consultancy reviewed the risks of entry of SWF into Australia and surveillance requirements. The review included an assessment of Australia's entomology capability (including identification resources) for surveillance and response to an incursion. The findings of the review and implications for the Screw-worm Fly Freedom Assurance Program will be addressed in 2014.

3.2.4 National Significant Disease Investigation Program

Ongoing general surveillance (see Section 3.1) is important in maintaining Australia's favourable animal health status and ensuring early detection of animal disease emergencies. Its value has been demonstrated by the early detection of outbreaks of EADs in Australia — for example, Menangle virus in a New South Wales piggery in 1997, sporadic Hendra virus infection in New South Wales and

Queensland horses since 1994, and sporadic anthrax in New South Wales and Victoria.

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. The NSDIP was initiated to encourage 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 AHA and funded from livestock industry and government subscriptions,[50] the NSDIP began in July 2009. The program aims to boost Australia's capacity for the early detection of emerging diseases by increasing the participation of veterinary practitioners in disease investigations. Registered nongovernment veterinarians who are engaged in clinical veterinary medicine — including all veterinary practitioners in university clinics, zoos and wildlife parks — are eligible to participate in the program. Significant diseases 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 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 a legal responsibility to notify their relevant animal health authority.[51]

During 2012–13, private veterinary practitioners reported 381 significant disease investigations under the NSDIP. The program funded approximately 277 investigations, including 5 in wildlife, and the remainder were independently funded by some jurisdictions (see Section 3.6). On average, private veterinary practitioners received approximately $330 per investigation. Summary data of investigations by species and financial year are shown in Figure 3.7, and by syndrome and species in Figure 3.8.

During 2013–14, there is a budget for investigating approximately 320 cases across Australia.

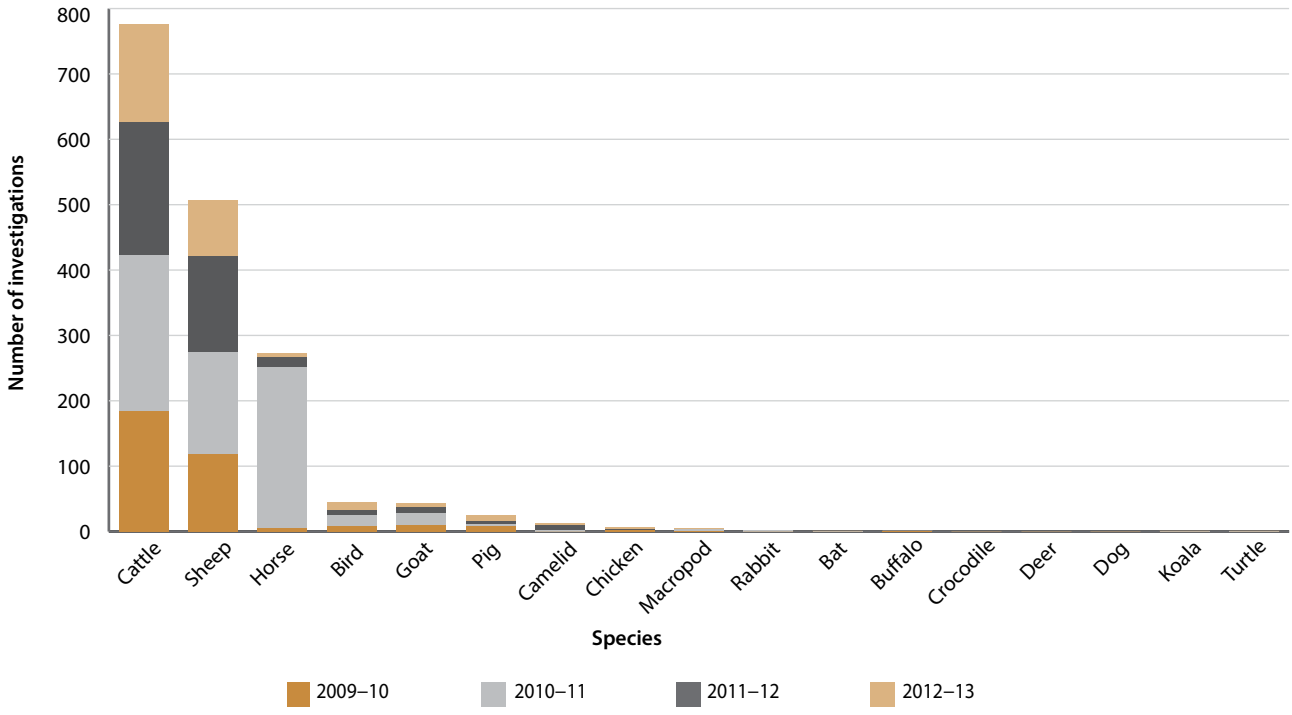

Figure 3.7 Number of investigations reported, by species, under the National Significant Disease Investigation Program, July 2009 to June 2013

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

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

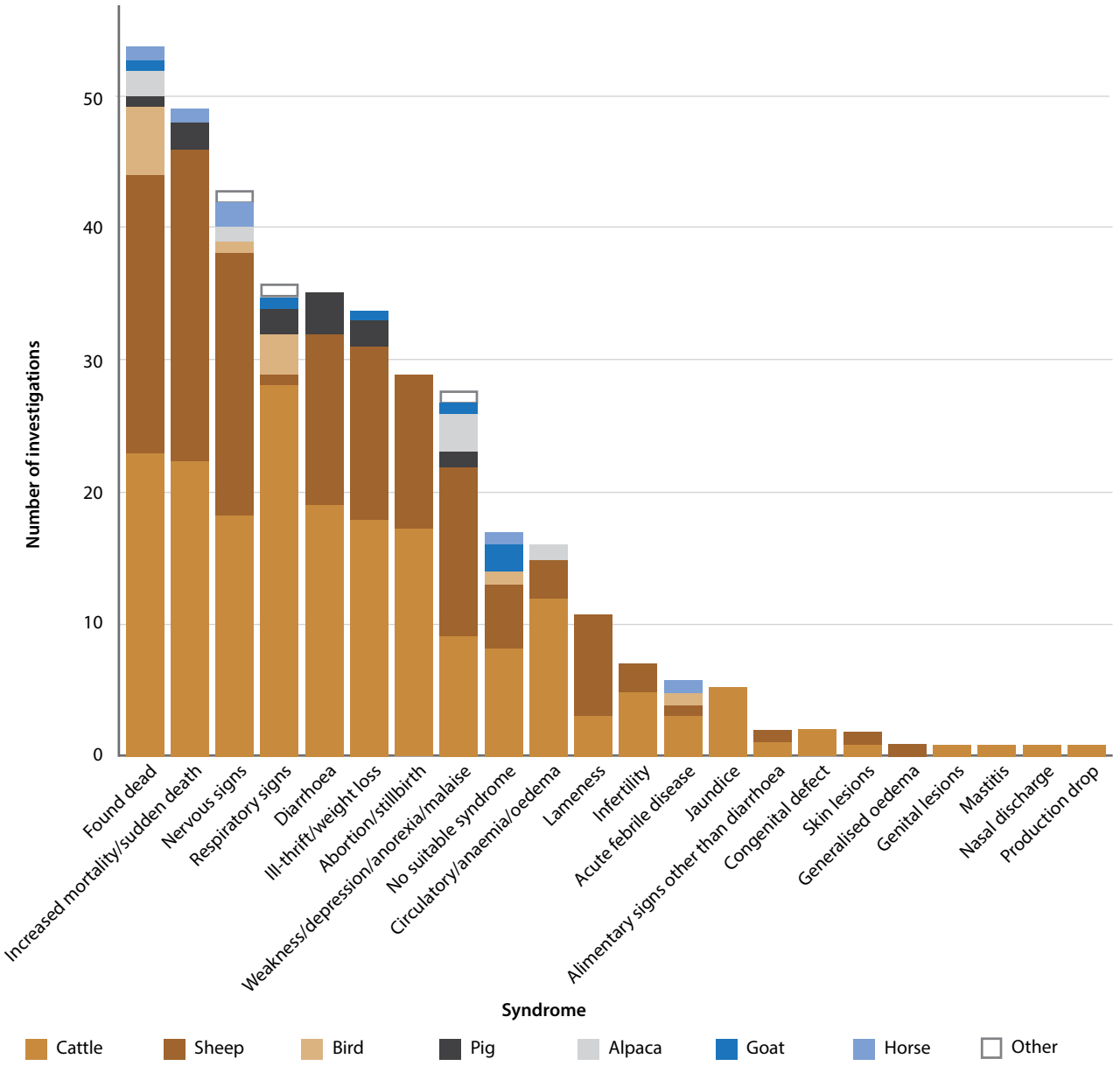

Figure 3.8 Number of investigations reported, by syndrome and species, under the National Significant Disease Investigation Program, July 2012 to June 2013

Section 3.6 provides further information on the role of private veterinary practitioners in disease surveillance and management.

3.2.5 National Sheep Health Monitoring Project

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

In the 2012–13 financial year, 3 098 872 sheep were monitored across 18 domestic and export abattoirs; some of these abattoirs were monitored on a part-time basis.

The NSHMP is currently limited to the detection of significant endemic diseases that can be identified by inspecting viscera or at the adjoining carcase-inspection stage. Lines of adult sheep are monitored by qualified meat inspectors and company-based personnel. Attention is focused on diseases that are considered 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, the AHC and the Australian Meat Industry Council have agreed that monitoring will be conducted 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. Access to the data is controlled by business rules that determine the level of access 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 plant.

As well as focusing on conditions that could cause production losses, monitoring of livestock in abattoirs enables public health risk management for diseases such as hydatid disease. It also provides the opportunity to collect concurrent surveillance data that can be used to inform domestic animal health management decisions, and to confirm Australia's freedom from specified diseases. Information provided to individual producers can assist them to improve their flocks' productiveness and fine-tune animal health programs. For processors, there is the opportunity to reduce product noncompliance, lifting productivity and reducing costs.

The animal health conditions identified through monitoring occur nationally, but there is regional variation. Information analysed to date shows that the proportion of affected lines for some conditions is high, but the average number of sheep infected 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.

Rob Power

3.3 Surveillance programs managed by state and territory governments

Australian governments have developed a National Surveillance and Diagnostics Framework to ensure that disease surveillance activities by all governments address the priorities identified in national business plans.

State and territory governments provide and coordinate most of the infrastructure for general animal health surveillance and disease control. It is a legal requirement in all states and territories that animal owners, veterinarians and laboratories report to animal health authorities any suspicion of notifiable diseases — that is, diseases that might require government intervention and management. The identification of serious zoonotic diseases such as Australian bat lyssavirus (ABLV) and Hendra virus disease of horses is part of the surveillance role of the states and territories.

Networks of official state and territory field veterinarians, and diagnostic veterinary laboratory pathologists gather intelligence about notifiable diseases. In some cases, private veterinary practitioners are contracted to the government for this work. Governments also contract and liaise with the private sector to ensure that surveillance for these diseases is effective. 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.

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.

Government veterinarians attend disease outbreaks in regions of the state or territory that a private practitioner cannot attend, or that involve a suspected endemic notifiable disease or exotic animal disease. Incursions or outbreaks of diseases such as avian influenza, anthrax, equine influenza and Newcastle disease have been detected in this way. A government veterinarian's work may involve confirmation of a notifiable endemic or exotic disease following the initial investigation by a private practitioner. When high levels of mortality are beyond the investigative and resource capacity of owners and private veterinarians, the disease investigation might require the services of government veterinarians. Most investigations are not emergencies, but government veterinarians have ready access to equipment that minimises the risk that they will spread any diseases from farm to farm. Government veterinarians are also skilled in necropsy examination and diagnosis. Another role of government veterinarians is to provide private practitioners with training in disease investigation, biosecurity and the use of personal protective equipment.

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 with access to specialist diagnostic pathologists, or to contracted private laboratories that meet prescribed standards. In all cases of suspected exotic diseases and some emergency diseases, 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. Property-of-origin health certificates and official reports to various authorities (including the 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.

Targeted disease surveillance projects conducted by state and territory veterinarians help to develop and maintain their epidemiological skills, and enable use of the most recent surveillance tools for analysing existing and emerging diseases.

3.4 Programs and activities managed by the Australian Wildlife Health Network

The Australian Wildlife Health Network (AWHN) administers Australia's general wildlife health surveillance system. Key elements of the system include a network of wildlife coordinators who are appointed by chief veterinary officers, zoo-based veterinarians (zoo coordinators), a web-enabled national database of wildlife health surveillance information (eWHIS) that is accessible through a website,[52] targeted projects, and a number of focus or working groups. Wildlife coordinators represent each of Australia's states and territories, including the Australian Antarctic Territory, and zoo coordinators represent 10 zoos across Australia. The 10 zoos are part of the Zoo Based Wildlife Disease Surveillance Program, which is a collaborative project between the AWHN and the Zoo and Aquarium Association, the peak representative body for zoos and aquaria in Australia.

The network promotes and facilitates collaboration around Australia in the investigation and management of wildlife health, focusing on potential risks to human and animal health, trade and biodiversity. In addition to surveillance, the AWHN 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. 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.

The AWHN administers a 'first alert system', which allows email alerts to be sent to more than 550 individuals and agencies around Australia with an interest in wildlife health issues. The network 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 2013, the AWHN 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 impact on 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
- assisting the AHC by providing information on wildlife health events to a working group examining the development of a national animal health general surveillance plan (see Section 3.1) that includes wildlife.

More than 900 wildlife disease investigation events were added to the national database in 2013. Around half of these events were bats submitted for exclusion testing for ABLV. Wild bird mortalities

52 www.wildlifehealthaustralia.com.au

accounted for approximately one-third of investigations; where appropriate, diagnostic tests in wild bird mortality events included exclusion of avian influenza, avian paramyxovirus and West Nile virus. No wild bird mortality events were attributed to avian influenza or West Nile virus.

Findings in bird mortality events included aspergillosis, avian pasteurellosis, avian mycobacteriosis, avian chlamydophilosis, avian paramyxovirus, avian pox, botulism, coccidosis, *Macrorhabdus ornithogaster*, salmonellosis, spironucleosis, poisoning, psittacine beak and feather disease, trichomoniasis and trauma. Some of these events are summarised in the following paragraphs.

Pasteurella multocida was diagnosed in two waterbird mortality events in Victoria in 2013 — one in March and the second in June. Histopathology was characteristic of a severe, acute septicaemia, and *P. multocida* was isolated from liver samples. In both events, avian influenza and avian paramyxovirus were excluded by PCR. In Australia, *P. multocida* in free-living waterbirds is usually only associated with disease in individual birds; it is known to cause mass mortalities in free-ranging waterbirds in North America.

Spironucleosis was diagnosed based on characteristic histopathology and/or faecal wet preparations in 18 wild bird mortality events, all involving Australian king parrots (*Alisterus scapularis*), reported in June and July in Victoria. *Spironucleus* is a pear-shaped protozoan that is associated with a syndrome of emaciation, depression, diarrhoea and mortality, and mainly affects Australian king parrots. Anecdotally, cases may occur in juvenile birds during the onset of cold weather. It is often detected in birds with concurrent disease, and the protozoan is therefore considered a secondary opportunist following immunosuppression.

In July, a member of the public reported a number of dead sparrows (*Passer domesticus*) near Launceston, Tasmania. *Salmonella* Typhimurium DT160 was isolated from lesions in birds submitted for investigation. Avian influenza and Newcastle disease were both excluded by PCR. This bacterium has previously been associated with a high number of sparrow deaths in southern Tasmania.

In July, dead and sick free-living black kites (*Milvus migrans*) were found at several sites in far north Queensland, with estimates of up to 200 affected birds. Three subadults submitted for necropsy all had caseous plaques in the oropharynx, proximal oesophagus and/or cervical soft tissues, and *Trichomonas* sp. was observed in wet mounts or impression smears stained with Wright's type stains. Avian influenza and Newcastle disease were both excluded by PCR, and kidney samples were negative for lead and arsenic in all three birds. Trichomoniasis is well known as a sporadic disease of free-living raptors, and is usually attributed to consumption of infected columbids.

During October and November 2013, thousands of shearwaters (*Puffinus* spp.) washed up dead along coastlines of Queensland, New South Wales, Victoria, South Australia, Tasmania and Western Australia. Investigations suggested that the majority of the events were deaths from exhaustion and starvation as birds returned to their nesting areas in Australia after their long annual migration from the Northern Hemisphere.

In addition to these bird mortality events, white-nose syndrome, caused by the fungus *Pseudogymnoascus* (*Geomyces*) *destructans*, was excluded in a southern or large-footed myotis (*Myotis macropus*) microbat in New South Wales in September 2013. The southern myotis is listed as vulnerable under the New South Wales *Threatened Species Conservation Act 1995*. Because of its significant impacts in North America,[53] white-nose syndrome is investigated as a possible cause of disease in relevant cases in Australian bats. To date, it has not been identified in Australia.

3.4.1 Avian influenza surveillance in wild birds

The National Avian Influenza Wild Bird (NAIWB) Surveillance Program activities are conducted Australia-wide. Surveillance for avian influenza in wild birds is comprised of 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. 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.

53 US Fish and Wildlife Service (August 2012). *White-nose syndrome: the devastating disease of hibernating bats in North America*, www.whitenosesyndrome.org/sites/default/files/resource/white-nose_fact_sheet_9-2012.pdf.

In 2013, targeted wild bird surveillance occurred in New South Wales, the Northern Territory, South Australia, Queensland, Victoria, Tasmania and Western Australia. A total of 6458 birds were sampled. The majority of samples were collected from waterbirds (ducks and waders). No highly pathogenic avian influenza (HPAI) viruses were identified. However, surveillance activities continue to find evidence of a wide range of subtypes of low pathogenic avian influenza (LPAI) viruses; H1, H2, H4, H6, H7, H8 and H9–H12 were detected in 2013. As part of routine targeted surveillance, three wild bird faecal environmental samples tested positive for LPAI H7N9; neither the HA nor the NA genes from these samples were closely related to the recently emerged influenza A (H7N9) strain in China, which has caused human mortalities.

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 HPAI H5 or H7 in the event of an equivalent outbreak in chickens. The program also continues to ensure that laboratory capacity for high-throughput molecular testing is available for Australia. The multi-agency and cross-jurisdictional approach of this project continues to provide a forum for collaboration on technical aspects of influenza in humans, animals and wildlife, exemplifying the One Health concept.

3.4.2 Surveillance of diseases in bats

Surveillance of bats in Australia provides a better understanding of the ecology of diseases of Australian bats, with a particular focus on pathogens with the potential to affect livestock health, public health or biodiversity. Spillover of diseases 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.[54] The AWHN 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. The AWHN collates and publishes national ABLV test results as part of NAHIS.[55] A total of 455 bats were tested for ABLV in 2013. Of these, 14 tested positive: 5 black flying foxes (*Pteropus alecto*), 5 little red flying foxes (*P. scapulatus*), 2 grey-headed flying foxes (*P. poliocephalus*), an unidentified flying fox (*Pteropus* sp.) and a yellow-bellied sheathtail bat (*Saccolaimus flaviventris*). Although ABLV is most commonly identified in flying foxes, the virus has previously been isolated from the microbat species *S. flaviventris*, in which it was found to be a variant from that found in flying foxes.[56] The number of bat submissions for ABLV testing in 2013 was considerably higher than usual. This may have been due to an increased awareness arising from ABLV incidents in Queensland during the year. A number of heat stress events in flying foxes early in the year also resulted in submissions.

Biosecurity Queensland's Queensland Centre for Emerging Infectious Diseases (QCEID) screens Australian flying foxes to increase understanding of the disease ecology and epidemiology of Hendra virus. Research projects focus on virus strain diversity; the bat–horse transmission pathway; horse owner knowledge, risk perception and actions; and spatial and temporal patterns of infection.[57] The current QCEID research program is supported by additional funding from the Queensland, New South Wales and Australian governments under the National Hendra Virus Research Program.[58] Research partners include CSIRO-AAHL, the New South Wales Department of Primary Industries, the University of Queensland and the University of Western Sydney. Research outcomes are communicated to industry and the public via fact sheets produced by the Queensland Department of Agriculture, Fisheries and Forestry (DAFF)[59] and to the broader scientific community in peer-reviewed publications.[60] An extensive compendium of Hendra virus information is available on the Queensland DAFF website.[61]

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

55 *ABLV Bat Stats*, www.wildlifehealthaustralia.com.au/ProgramsProjects/BatHealthFocusGroup.aspx

56 K Guyatt, J Twin, P Davis, E Holmes, G Smith, I Smith, J Mackenzie and P Young (2003). A molecular epidemiological study of Australian bat lyssavirus. *Journal of General Virology* 84:485–496.

57 www.daff.qld.gov.au/4791_18617.htm

58 www.daff.qld.gov.au/4790_21026.htm

59 www.daff.qld.gov.au/animal-industries/animal-health-and-diseases/a-z-list/hendra-virus/horse-industries-owners

60 www.daff.qld.gov.au/4791_22076.htm

61 www.daff.qld.gov.au/animal-industries/animal-health-and-diseases/a-z-list/hendra-virus

3.5 Programs and activities managed by other organisations

3.5.1 Bovine tuberculosis surveillance

Australia conducted a bovine Brucellosis and Tuberculosis Eradication Campaign from 1970 to 1997, achieving freedom from bovine tuberculosis (TB) in accordance with OIE standards several years before the end of that campaign. Australia was officially declared free from TB caused by *Mycobacterium bovis* on 31 December 1997. The last cases of bovine TB were reported in December 2000 in cattle and in January 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.[62] This showed a very high level of confidence (approaching 100%) that Australia is free from bovine TB and that, if the disease were present, it would have been detected.

In the unlikely event of a case of bovine TB, eradication activities will be guided by the current *Bovine tuberculosis case response manual — managing an incident of bovine tuberculosis.*[63] 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.[64]

Because bovine TB is considered an exotic animal disease in Australia, suspicious granulomas identified in cattle carcases at slaughter establishments continue to be submitted for testing. On-plant veterinarians are advised to submit any suspicious granulomas to exclude *M. bovis* as a cause.

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

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

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

3.5.2 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.

Table 3.2 shows the number of serological tests for *B. abortus* carried out at state and territory veterinary laboratories as part of abortion investigations. Table 3.3 shows the number of tests performed for other reasons, such as export requirements. Sampling is conducted on other species, as shown in the tables, on an ad hoc basis.

3.5.3 Surveillance at seaports and elsewhere

Surveillance is conducted at seaports for exotic bee mites and bees under the National Bee Pest Surveillance Program. With regard to *Culicoides* midges, the risk of incursions of new *Culicoides* species into Australia at seaports was reassessed in 2013 as relatively low, and trapping for *Culicoides* midges at seaports was therefore discontinued. Detection of new *Culicoides* species in Australia by monitoring other sites remains an objective of NAMP (see Section 3.2.1).

National Bee Pest Surveillance Program

The National Bee Pest Surveillance Program (NBPSP) follows on from the previous National Sentinel Hive Program, which was established in 2000 to improve post-border monitoring around Australia for exotic pests of honey bees, including varroa mites (*Varroa destructor* and *V. jacobsoni*), tropilaelaps mites (*Tropilaelaps clareae* and *T. mercedesae*) and tracheal mites (*Acarapis woodi*). Early detection of these exotic pests is critical to eradicating an incursion, and to limiting the size and cost of an eradication program. 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.

In January 2012, the NBPSP was transferred from AHA, which managed the National Sentinel Hive Program, to Plant Health Australia (PHA). This followed the transfer of responsibility for bees from the Biosecurity Animal Division to the

Table 3.2 Serological tests for *Brucella abortus* in Australia, abortion serology, 2007–13

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

a All test results were negative for *Brucella abortus*.
Note: *Animal health in Australia 2008* was the first report to present data for cattle and sheep; before this, aggregated totals were provided for brucellosis surveillance.

Table 3.3 Serological tests for *Brucella abortus* in Australia, other serology, 2007–13

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

a All test results were negative for *Brucella abortus*.
b Previously reported as 33 tests (data updated by New South Wales)
Note: *Animal health in Australia 2008* was the first report to present data for cattle, horses and sheep; before this, aggregated totals were provided for brucellosis surveillance.

Biosecurity Plant Division of the Department of Agriculture. These transfers have not significantly changed the national implementation of the program, which is delivered through the expertise of state and territory apiary officers.

On 1 July 2013, the NBPSP became a cost-shared initiative between the Australian Honey Bee Industry Council, pollination-reliant industries represented through Horticulture Australia Limited, and the Department of Agriculture. Since then, PHA has redesigned components of the NBPSP to include recommendations from the CSIRO port risk assessment for bee pests and pest bees, the BeeForce project[65] and hobby beekeeper involvement at high-risk locations, as well as the ongoing trial of remote surveillance hives (catch boxes with cameras). Pest bee surveillance techniques, such as a floral sweep netting methodology, were also developed between NAQS and PHA during the Asian Honey Bee Transition to Management Program (AHB T2M) for inclusion in the NBPSP at high-risk bee pest locations.

The redesign of the NBPSP and the incorporation of additional surveillance techniques, with a focus on high-risk port areas, reflect an ongoing transition to a more broadly based surveillance program for bee pests and pest bees. The revised NBPSP will improve the ability to detect internal and exotic mites, as well as the exotic strains of Asian honey bee (*Apis cerana*) and other honey bees that live in Asia — such as the red dwarf honey bee (*A. florea*) and the giant honey bee (*A. dorsata*).

PHA is negotiating with the states and territories to formally implement these changes, which will be incorporated into the program by 1 July 2014.

65 BeeForce was a two-year project funded by the Rural Industries Research and Development Corporation and Horticulture Australia Limited. It was a coordinated community engagement project in Victoria to complement state and national biosecurity surveillance activities. PHA is attempting to apply the principles of BeeForce at high-risk locations around Australia.

During 2013, 128 sentinel hives for bee parasites were maintained at seaports and airports across Australia that receive significant volumes of imported cargo or regular berthing of vessels from international locations where exotic pests of honey bees are known to occur. This is an increase from the 26 sentinel hives that were managed throughout Australia in 2011, and 92 sentinel hives that were managed throughout Australia in 2012. During 2013, 54 catch boxes (empty hives) were deployed at many southern ports as an additional surveillance measure for detecting swarms of exotic bees. Throughout 2013, trials of remote surveillance hives were conducted in Cairns and Brisbane. Trials will continue at additional locations, for inclusion in the NBPSP in 2014–15.

Formalised surveillance for small hive beetle (SHB; *Aethina tumida*) across Australia began in August 2013. Surveillance consisting of hive inspection and oil traps began in the Northern Territory and Tasmania, where SHB is currently not present, as well as in southern Western Australia (SHB is confined to Karratha in northern Western Australia). The insecticide APITHOR harbourage (fipronil) was registered for use throughout Australia in December 2013, and will be incorporated into the NBPSP as the formal method of surveillance for SHB from 2014 onwards. Tables 3.4 and 3.5 show sample data from sentinel hives located at Australian ports in 2013 and other surveillance activities.

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Table 3.4 Samples examined for pests of bees, by state or territory, 2013

State or territory	Specimens examined
New South Wales	102
Northern Territory	112
Queensland[a]	166
South Australia	32
Tasmania	24
Victoria	77
Western Australia	28
Total	**541**

a The Asian Honey Bee Transition to Management Program ran from 1 July 2011 to 30 June 2013. During 2013, 34 nests and swarms of Asian honey bee (*Apis cerana* Java genotype) were examined for external mites (*Varroa* spp. and *Tropilaelaps* spp.), internal mites (*Acarapis* spp.) and microsporidian parasites (*Nosema* spp.) by Biosecurity Queensland.

Table 3.5 Samples examined for pests of bees, by agent, 2013

Agent	Specimens examined
Apis cerana[a]	34[b]
Tracheal mite	100[c]
Small hive beetle[d]	39[e]
Varroa and tropilaelaps mites[f]	368[g]
Total	**541**

a In 2013, 34 samples of Asian honey bee (*Apis cerana* Java genotype) were examined for external mites (*Varroa* spp. and *Tropilaelaps* spp.), internal mites (*Acarapis* spp.) and microsporidian parasites (*Nosema* spp.) by Biosecurity Queensland in the Cairns region, as part of its commitment to the Asian Honey Bee Transition to Management Program.

b Specimens of *A. cerana* were examined from known samples (nests and swarms) in the Cairns region during the Asian Honey Bee Transition to Management Program until 30 June 2013.

c Tracheal mite specimens examined included 30–50 bees from sentinel hives that were randomly selected and morphologically dissected.

d Surveillance was only conducted in the Northern Territory, Tasmania and Western Australia.

e Small hive beetle samples included specimens from oil traps and inspection of sentinel hives.

f An additional 129 sugar-shaking and alcohol-washing samples were collected from hives across Australia during 2013.

g Number of specimens examined is the number of sentinel hives tested with an acaricide and examination of a sticky mat.

3.6 Participation by private veterinarians in disease surveillance and management

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 NTSESP (see Section 3.2.2). Australia's states and territories have legislation that requires all farmers, private veterinary practitioners and laboratories to report suspicion or confirmation of a notifiable disease (see Section 3.3).

3.6.1 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 some quantitative evidence of the amount of farm-level general surveillance, and raises awareness of EADs among participating practitioners.

In 2013, a consultant was commissioned to review the current scope of the AVPSN and the opportunity for improving program outcomes. The review also assessed the potential for use of new technology to improve the efficiency and consistency of reporting. An interim report was produced in October 2013. Its recommendations included improvements to the web-based user interface, a revision of the AVPSN analysis and reporting system, and a more targeted approach to the collection of farm visit data to improve their value.

The AVPSN, along with all the other elements of Australia's general surveillance system, was reviewed holistically by governments and industry as part of the development of a new business plan for a national general surveillance plan for Australia at the National Animal Health General Surveillance Forum in November 2013 (see Section 3.1).

3.6.2 Participation by private veterinarians in state and territory surveillance

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 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 Queensland 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.

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, 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 South Australia 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 also subsidises contracted private veterinary practitioners for costs incurred investigating unusual disease events.

Biosecurity South Australia offers training and refresher courses in EAD detection and necropsy technique to practitioners, as well as providing ongoing technical support, when required.

Tasmania

In Tasmania, private veterinary practices provide general surveillance information via personal contacts with department animal health staff. They also participate in the NSDIP and various targeted disease surveillance programs, such as the NTSESP. During 2013, practitioner liaison included brain removal workshops, continued promotion of overseas training opportunities on FMD for private practitioners, 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 Animal Health Laboratory data, and promotes relevant surveillance programs. A dedicated web page for Tasmanian practitioners on the department's website enables easy access to resources for various 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 2013, private veterinary practitioners in Victoria investigated and reported 197 significant disease events.

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 2013, the department offered three short courses in livestock disease investigation methods. Twenty-four private veterinary practitioners and six department staff completed this training. The department commenced a series of one-day courses in field-based gross pathology techniques in 2013. More than 90 private veterinary practitioners and departmental staff attended; approximately half the attendees were private veterinary practitioners. The department intends to continue offering this training on a regular basis in subsequent years.

Western Australia

Western Australia promotes surveillance and reporting of significant livestock disease events by private practitioners. This is mainly done through personal networking by departmental veterinary officers, regional training workshops in disease investigation and the production of a monthly surveillance newsletter.

During 2013, the Department of Agriculture and Food Western Australia and the NSDIP sponsored approximately 69 investigations of significant disease in livestock by private veterinarians. This included payment of travel costs, waiving of laboratory fees and assistance with collecting and dispatching samples. Practitioners, district veterinary officers and pathologists liaise closely under the program.

Laboratory diagnostic work on cases of suspect notifiable diseases, or cases that are considered to be of public benefit, is exempt from laboratory

charges. During 2013, submissions from private veterinarians resulted in the investigation of approximately 950 cases of livestock disease. Of these cases, approximately 240 included exotic disease exclusions.

3.7 Surveillance programs in northern Australia

3.7.1 Northern Australia Quarantine Strategy

The Department of Agriculture undertakes surveillance activities across northern Australia through NAQS.

Northern Australia has a unique biosecurity risk profile because of its proximity to neighbouring countries, its expansive and remote coastline, and an abundance of animals that have the potential to act as reservoirs for pests and diseases should they be introduced into the north. In support of national biosecurity objectives, NAQS assists in ensuring that Australia's favourable animal pest and disease status is maintained by undertaking targeted surveillance for the early detection of pests and diseases of significance to agriculture, wildlife and human health, and providing evidence of disease freedom to support market access.

These objectives are achieved through an integrated program of surveillance and border management activities, including:

- identifying and evaluating the unique biosecurity risks facing northern Australia
- applying scientific expertise to design a risk-based surveillance strategy in response to identified biosecurity risks
- undertaking targeted surveillance for exotic pests and diseases through active surveys of domestic and feral animal populations, sentinel animal monitoring, insect and vector trapping, and fee-for-service programs delivered by Indigenous ranger groups
- conducting a general surveillance strategy that educates residents and visitors to northern Australia about pests and diseases of concern, and encourages the reporting of signs of pests and diseases through the program's Biosecurity TopWatch! campaign
- managing the quarantine aspects of border movements through Torres Strait.

In 2013, key priorities for NAQS were:

- risk-based domestic surveillance for the detection of exotic pests and diseases, including FMD, classical swine fever, rabies, SWF and HPAI
- contributing to national surveillance programs including NAMP, the Screw-worm Fly Freedom Assurance Program and the NAIWB Surveillance Program
- collaborating with state and territory agencies, and industry groups to identify surveillance priorities and emerging challenges for biosecurity in northern Australia
- reporting on surveillance outcomes through NAHIS
- strengthening rabies surveillance in recognition of the changing distribution of rabies virus in Indonesia; this includes reviewing awareness messages, collecting data relating to dog-bite incidence and dog behaviour from northern communities, and supporting the AHC on a working group focused on rabies preparedness in Australia
- enhancing national diagnostic capability through refinement and implementation of an assay for bulk screening of adult fly trap catches for SWF
- participating in offshore surveillance and capacity building activities in Timor-Leste and Papua New Guinea (coordinated by the Department of Agriculture's Animal Health Policy Branch).

Targeted surveillance

During 2013, NAQS conducted seven feral animal health surveys across northern Australia and two domestic animal health surveys of the Torres Strait islands and the Northern Peninsula area. A total of 524 samples from wild and domestic animals — including pigs, horses, cattle, buffalo, donkeys, goats, dogs, ducks and chickens — were tested for exposure to NAQS target diseases during these activities.

Other monitoring activities involved regular testing of sentinel cattle herds for diseases, including exotic strains of BTV; and trapping for adult SWF and insect vectors, including *Culicoides* biting midge species. In 2013, NAQS monitored four sentinel cattle herds located in Queensland, the Northern Territory and Western Australia. Insect traps were located on the islands of Saibai, Boigu, Dauan and Horn in Torres Strait, and at each of the sentinel cattle sites.

No exotic diseases were confirmed through NAQS surveillance activities in 2013.

Specific disease surveillance strategies of interest in 2013 included the following:

- Avian influenza surveillance investigates mortality events in domestic and wild avian species. Serum, faecal environmental samples, and opportunistically collected cloacal and tracheal swabs are tested from domestic poultry, wild waterbirds (ducks and waders) and shorebirds. Data relating to wild birds are contributed to the NAIWB Surveillance Program managed by the AWHN. One mortality investigation was conducted in domestic poultry in the outer Darwin rural area in collaboration with the Northern Territory Department of Primary Industry and Fisheries; avian influenza and Newcastle disease were excluded. In total in 2013, more than 1000 samples were tested as part of this surveillance program. No HPAI viruses were detected.
- Japanese encephalitis (JE) surveillance aims to detect JE virus during the wet season in northern Queensland. JE virus is exotic to mainland Australia but is considered to be seasonally present in Torres Strait. Testing for JE virus and related arboviruses was conducted on monthly samples from the Northern Peninsula area sentinel herd, in combination with a novel method of surveillance that allows molecular testing of excreted saliva from mosquitoes, the primary vectors of the virus. No evidence of JE virus was found. There has been no evidence of circulation of JE virus on the mainland since early 2004.
- Canine monocytic ehrlichiosis surveillance detected serological evidence consistent with exposure to *Ehrlichia canis* (or a cross-reacting organism) in dogs in the Torres Strait islands adjacent to Papua New Guinea. The organism has not been identified. Investigation of these test results in this population of dogs is ongoing, and restrictions on removal of animals from the island have been implemented to manage potential biosecurity risks. *E. canis* is exotic to mainland Australia.

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General surveillance

In late 2012, NAQS initiated a pilot program of syndromic reporting in Indigenous communities to improve collection of animal health data from these areas. This continued in 2013, and community animal health questionnaires were received from 17 communities during the period. Reports are collated by Indigenous ranger groups on a fee-for-service basis. They involve data collection from a range of sources within each community, including health workers, law enforcement officers, animal management workers and private veterinarians. Information provided includes data on dog-bite incidence, myiasis reports and information on general syndromes, which allows monitoring and investigation of changes in animal health status. The program provides a tool to promote ongoing awareness about pests and diseases of animals, and reporting of changes in the health status of animals.

Public awareness visits were made to more than 35 communities. These visits included education campaigns in schools, in health clinics, and with Indigenous ranger groups and pastoralists.

3.7.2 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 the Department of Agriculture and Food Western Australia, 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 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 national Screw-worm Fly Freedom Assurance Program (Section 3.2.3)
- the NBPSP (Section 3.5.3).

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 sector on:

- managing the risk of exposure to zoonotic disease
- managing emergency pest and disease incidents, including decontamination procedures and movement controls
- 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.

During 2013, there were two confirmed EAD detections in northern Australia:[66] a case of Hendra virus on the Atherton Tablelands and another case at Mackay, Queensland (see Section 4.6.1). Responses to these incidents included placing affected properties under quarantine and testing of in-contact horses until it was demonstrated that they were not infected.

Numerous exclusions of Hendra virus were conducted across the north, particularly in Queensland. Typical cases for exclusion involved neurological symptoms and fever. Other EAD exclusions included examination of maggots collected from myiasis cases. In Western Australia, SWF was excluded from two separate maggot submissions collected from cattle and a dog.

Extension programs conducted in northern Australia during 2013 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
- awareness seminars for horse owner groups and private veterinarians about Hendra virus
- promotions at agricultural shows and field days, focusing on biosecurity programs

66 Northern Australia is defined as the parts of Australia north of the Tropic of Capricorn that span Western Australia, the Northern Territory and Queensland.

- 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.

3.8 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.

3.8.1 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 website[67] and quarterly in the journal *Communicable Diseases Intelligence*,[68] which is an online, quarterly, peer-reviewed journal that also

Table 3.6 Incidence of selected zoonotic diseases in humans, 2013

Zoonotic disease	Number of cases[a]		
	2012	2013	5-year mean (2009–13)
Anthrax	0	0	0.2
Barmah Forest virus infection	1723	4108	2127.2
Brucellosis[b]	29	13	26.6
Kunjin virus infection	0	0	1.2
Leptospirosis	116	88	144.4
Murray Valley encephalitis virus infection	1	1	4.4
Ornithosis	75	33	64.8
Q fever[c]	360	380	347.6
Ross River virus infection	4682	3830	4703

a Data accessed on 3 December 2013 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.

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

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

disseminates information on the epidemiology of these diseases in Australia, including surveillance, prevention and control. Data on five important zoonoses are replicated in *Animal Health Surveillance Quarterly*.

Table 3.6 reports the incidence of selected zoonotic diseases in 2013 and compares these data with those for 2012 and the five-year mean.

3.8.2 National Enteric Pathogen Surveillance Scheme

The National Enteric Pathogen 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 2013 were campylobacteriosis[69] (12 726 cases) and salmonellosis (11 333 cases).

Mark Gardner

69 This disease is not notifiable in New South Wales.

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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 that occurred during 2013. Information on management of aquatic animal health emergencies and aquatic animal disease incidents during 2013 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*,[70] 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, states and territories, livestock industry groups and AHA, significant progress has been made in strengthening Australia's preparedness for an outbreak of FMD.

In 2013, a working group was formed to address issues associated with the engagement of private veterinarians in an EAD response. The working group developed a set of national guidelines (including agreed employment conditions and standard contract elements) to assist states and territories to engage private veterinarians in emergencies. Following consultation with private veterinarians, the guidelines were endorsed by the Animal Health Committee (AHC) in late 2013.

Another working group addressed the risk of adverse consumer reaction, which would reduce domestic demand for meat and dairy products during an FMD outbreak. The working group, comprising Food Standards Australia New Zealand, AHA, the Department of Agriculture, and livestock and retail industry members, developed ready-to-use communications material on food safety for use by retailers, livestock industries, and veterinary and public health authorities during an outbreak to reduce the food safety concerns of consumers and encourage consumer support of affected industries.

The Department of Agriculture and the New Zealand Ministry of Primary Industries developed a Trans-Tasman FMD Action Plan and an associated memorandum of understanding. This agreement formalises the ongoing relationship between the two countries on FMD preparedness. Australia is now also better placed to respond to an outbreak of FMD as a result of arrangements negotiated with state and territory laboratories to help them develop high-quality FMD testing capacity. The expanded network of laboratories able to test for FMD will improve national capability to respond effectively to a large-scale FMD outbreak and carry out proof-of-freedom testing following an outbreak.

4.1.2 Emergency Animal Disease Response Agreement

The EADRA[71] 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 a 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 2013, only minor and administrative updates were made. The latest version of the EADRA can be found on the AHA website.

Parties to the EADRA endorsed two EADRA guidance documents, which were published on the

70 www.daff.gov.au/animal-plant-health/pests-diseases-weeds/animal/fmd/review-foot-and-mouth-disease

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

AHA website:[72] *Interpretation of containment in the Emergency Animal Disease Response Agreement* and *Consistency in the calculation of proportional cost shares in the EADRA*.

Cost sharing under the EADRA was invoked for an outbreak of highly pathogenic avian influenza (H7N2) in a layer farm in New South Wales (see Section 4.6.4).

4.1.3 Australian Veterinary Emergency Plan

AUSVETPLAN[73] is a comprehensive series of manuals that sets out the suggested starting policy and guidelines for agencies and organisations involved in a response to an EAD outbreak.

AHA manages the continued improvement of AUSVETPLAN on behalf of its government and industry members. 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. State and territory ministers endorse AUSVETPLAN disease strategies through the Standing Council on Primary Industries.

The availability of agreed AUSVETPLAN disease strategies or response policy briefs[74] 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*[75] describes the components of AUSVETPLAN and outlines their functional relationships.

Updating prioritised AUSVETPLAN manuals

In 2013, AHA worked with the AUSVETPLAN Technical Review Group, industry and government experts, the AHC and scientific editors to revise and publish updated prioritised AUSVETPLAN manuals.

The updated manuals published were:

- bluetongue (disease strategy) — a major revision that incorporates new scientific knowledge about the disease and its control (e.g. the capacity for bluetongue to cause clinical disease in ruminants other than sheep and the potential for vertical transmission), updated information relating to recent amendments to the World Organisation for Animal Health (OIE) standards, case definitions, and movement control matrixes that take into consideration the concept of a transmission area
- Rift Valley fever (disease strategy) — a major revision that incorporates new scientific knowledge about the disease and its control, updated information relating to amendments to the OIE standards, case definitions, and movement control matrixes that take into consideration the concept of a transmission area. Because Rift Valley fever is a zoonosis, the revision also included input from human health authorities via the Communicable Diseases Network Australia
- Hendra virus (response policy brief) — a major revision that incorporates new scientific knowledge about the disease; updated distribution maps for pteropid bats in Australia; an updated case definition; revised information on sampling, laboratory testing and diagnosis; updated information on the incubation period and persistence of the virus in the environment; and information on vaccination of horses
- laboratory preparedness (management manual) — a major revision that updates the format of this manual to edition 4 (see below) and incorporates the Laboratories for Emergency Animal Disease Diagnosis and Response (LEADDR) network within the framework of a laboratory response to an EAD. It contains updated information on communication, including the creation of the Laboratory Subcommittee-CCEAD; training in EAD recognition and preparedness; handling and transport of specimens,

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

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

74 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.

75 www.animalhealthaustralia.com.au/wp-content/uploads/2011/04/AUSVETPLAN-Summary-Document.pdf

including the categorisation of specimens to be sent to the CSIRO Australian Animal Health Laboratory (CSIRO-AAHL); microbiological security; laboratory decontamination; and an example EAD contingency plan for diagnostic laboratories

- enterprise manuals for the saleyards and transport, and poultry industries — major revisions to update the format of the manuals, update the information relating to national requirements and international guidelines, and include elements of controlling a major EAD outbreak in Australia (e.g. quarantine, movement controls).

Updating of these manuals took into account relevant outcomes of Exercise Phantom Fox (a functional exercise based on a simulated bluetongue outbreak, conducted in 2012), the FMD response policy review (see Section 4.1.1), the development of a guidance document on declared areas and premises definitions, and the ongoing development of a standardised format for AUSVETPLAN edition 4 documents.

Revisions were also made in 2013 to the AUSVETPLAN manuals for African swine fever, Australian bat lyssavirus, avian influenza, porcine reproductive and respiratory syndrome, scrapie and screw-worm fly. Further revisions were made to the *Control centres management manual*, the *Disposal* operational manual, the *Valuation and compensation* manual, and enterprise manuals for the zoo, wool and artificial breeding centres industries. These revisions are undergoing formal development and approvals processes.

The Biosecurity Incident National Communication Network (see Section 4.3.1) has developed a *Biosecurity incident public information manual*. Once approved, it will be published on the AUSVETPLAN website, replacing the AUSVETPLAN *Public relations* manual.

Improved usability

Stage 2 of the consultancy to improve the usability and functionality of AUSVETPLAN manuals has been completed. Priority manuals are now being entered into the online system, with a view to republishing them in the new edition 4 format. This will allow manuals to be revised more efficiently, and will also allow those involved in outbreaks to download or print documents that are tailored to their particular operational needs.

4.1.4 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 are prepared by the AHC's Sub-Committee on Emergency Animal Diseases and are reviewed, as necessary, to ensure that they remain up to date.

NASOPs currently published on the AHA website[76] 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 2013, the AHC agreed that a NASOP should only be developed where the lack of national consistency in operational procedures would significantly jeopardise either:

- nationally agreed operational outcomes of the response to an outbreak of a high-priority EAD

  or

- market access for Australia's trade in animals and/or animal products.

A review of the existing NASOPs was undertaken in accordance with these criteria. A number of existing NASOPs were either recommended for deletion or to be redrafted as standard operating procedures for use by individual jurisdictions.

4.1.5 What happens in an EAD response?

Operational responsibility for the response to an EAD lies with the relevant state or territory,

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

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 whole-of-government arrangements allow agriculture or primary industries departments to draw upon 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 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. The CCEAD also includes representatives from health and environment, if relevant.

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*.[77]

77 www.animalhealthaustralia.com.au/wp-content/uploads/2011/04/AUSVETPLAN-Summary-Document.pdf

Industry involvement in an EAD response

AHA convened a joint government–industry peak body roundtable on 27 September 2013 to discuss the role of industry personnel in an EAD response.

The meeting objectives were to:

- agree on key functions to which industry can contribute during an EAD response
- agree on where and when these functions fit within the EAD response structure
- provide guidance on methods of engagement of industry personnel in an EAD response.

The roundtable acknowledged three broad types of involvement of industry in EAD responses:

- representational functions — operating at the level of the NMG and CCEAD
- liaison and advisory functions, where personnel remain independent of government — operating at the levels of the CVO unit, the state coordination centre and the local control centre
- assistance-type functions, where personnel are directly employed within the response — operating at the level of control centres or field operations.

Different industry personnel may function at multiple levels within a response and contribute to a range of key areas, including advocacy and decision making, knowledge and intelligence, communications, personnel, skills and recovery. The functions of industry personnel range in nature from strategic to operational.

The roundtable also agreed that a scalable and flexible approach is essential; the approach taken will depend on the nature, size and complexity of the response.

4.1.6 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 Program

When EAD outbreaks occur, preparedness to manage and respond to EADs 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 EAD Preparedness and Response Program, which is managed by AHA. The main objective of the program is to ensure that Australia is well prepared for EAD incidents through a range of activities, including public awareness, training, simulation exercises and surveillance. The program is funded through a tripartite arrangement between the Australian Government, state and territory governments, and livestock industry organisations.

Part of Australia's preparedness to manage an FMD outbreak is the setting up and maintenance of an FMD vaccine bank. The bank allows rapid production and delivery of FMD vaccine, should it be required. AHA also has a contract in place for cold storage and distribution of vaccine. The current vaccine bank is due to expire at the end of 2014, and the process for renewing the vaccine bank contractual arrangements for 2015–20 is under way.

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 national EAD training program is provided by the National Animal Health Training Steering Committee (NAHTSC). Members of the NAHTSC include the training coordinators from AHA; representatives from the Australian, state and territory governments; and representatives from peak livestock industry bodies, registered training organisations, CSIRO-AAHL and the Australian Veterinary Association. The NAHTSC coordinates the various elements of the national EAD training program, ensures national consistency in delivery of training and assists in prioritising AHA's training work program.

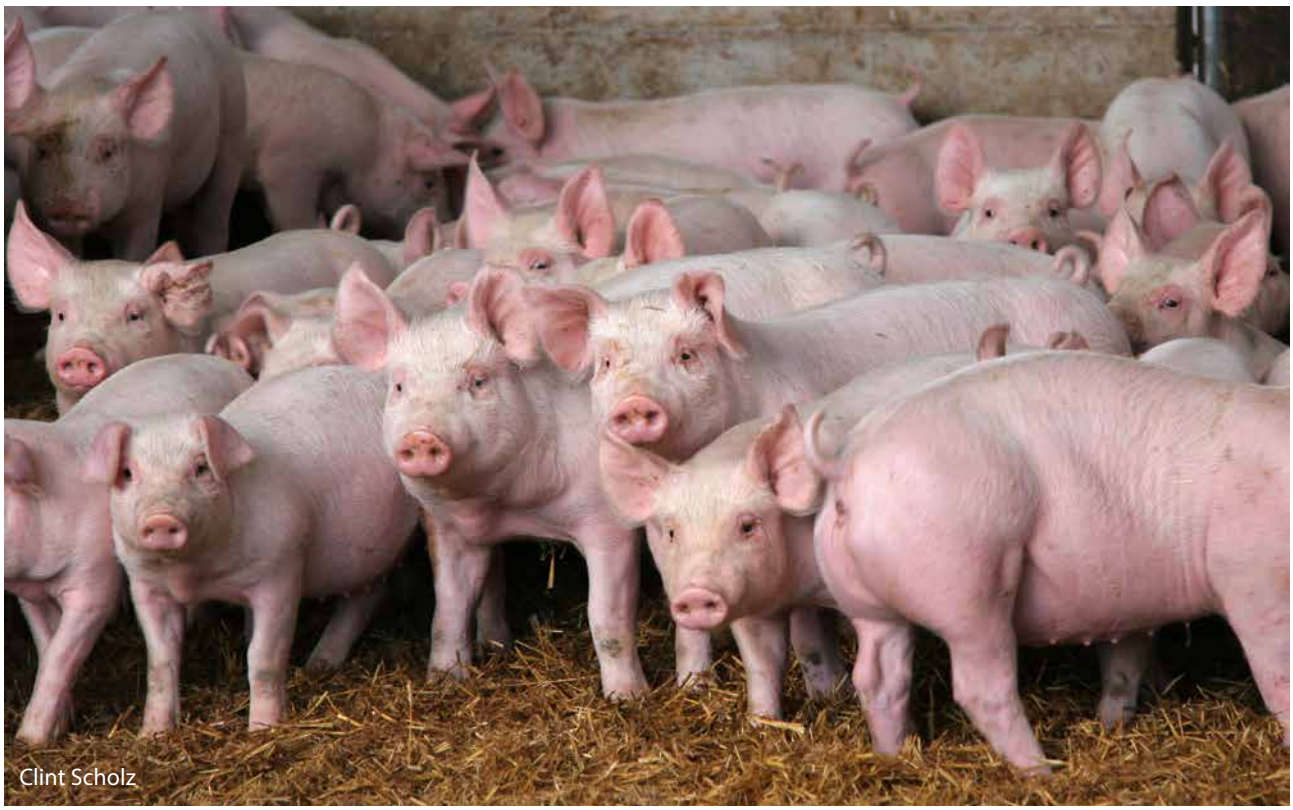
The elements of the national EAD training program are delivered by different organisations, as described in the following subsections.

First-response team training

Each state and territory maintains a 'first-response team'. The 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 a professional development program for jurisdictional and industry biosecurity response trainers. A short workshop on training and assessment is held each year at the NAHTSC's annual meeting. In addition, AHA sponsors an annual workshop to promote continued professional development for trainers, and to provide personnel with an opportunity to undertake training and assessment qualifications. This ensures that biosecurity response trainers are qualified to deliver accredited training under


Clint Scholz

the Australian Qualifications Framework. In 2013, 20 personnel were sponsored to attain or update their training and assessment qualifications through this program.

Development and sharing of training materials

AHA facilitates the development of training resources that can be shared nationally, and are delivered by qualified and experienced trainers to government and industry response staff. Training resources include online modules, induction training modules and face-to-face workshops. AHA's online Emergency Animal Disease Foundation course is a generic introduction to emergency response arrangements in Australia. It provides information on the basic principles of an EAD response, AUSVETPLAN, the responsibilities of people involved in a response, and the importance of communications and information management during a response. The course was updated extensively in 2013.

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 4.1.5) — during an EAD response.

Rapid Response Team

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

In 2013, the RRT participated in Exercise Control Freak, a scenario-based discussion activity in New South Wales. The objectives of this activity were to develop the RRT members' knowledge and application of contemporary coordination and control centre functions, develop their teamwork and leadership skills, and contribute to the continuous improvement of the AUSVETPLAN *Control centres management manual*.

Private veterinary practitioner engagement

The states and territories hold regular EAD awareness workshops for private veterinary

practitioners, to assist them to recognise EADs and to remind them of their reporting obligations (see Section 4.3.3). CSIRO-AAHL contributes to these training workshops.

Industry training

In 2013, AHA conducted training workshops for industry personnel in the beef cattle feedlot and horse industries. Industry personnel play an important role in local control centres and state coordination centres during an emergency response, assisting with response planning, and liaising between government and the affected industries and communities. Two industry personnel achieved their training and assessment qualifications through an AHA-sponsored course in 2013.

4.2.3 Nepal real-time FMD training

The Department of Agriculture continued its relationship with the European Commission for the Control of FMD (EuFMD), a commission of the Food and Agriculture Organization of the United Nations (FAO). Under this arrangement, the Department of Agriculture engaged EuFMD to conduct a further six real-time FMD training courses in 2013. This provided 65 Australian private veterinarians, government veterinarians and stock handlers with the opportunity to identify and investigate a real outbreak of FMD in Nepal, where the disease is present. In 2012, 20 Australians were trained. The training aims to improve awareness of the signs of FMD and increase the likelihood of early detection of an outbreak in Australia (see Section 4.3.3). The Department of Agriculture is discussing prospects for further training courses in 2014 and 2015 with state and territory governments and peak industry bodies.

4.2.4 International collaboration on modelling for preparedness

To strengthen EAD preparedness, Australia collaborates with other countries on epidemiology and disease modelling. During 2013, Australia assisted the Republic of Ireland with modelling of FMD windborne spread and participated in a United States–funded model study under the Research and Policy for Infectious Disease Dynamics program.

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.[78] In 2013, the EpiTeam — in conjunction with the United Kingdom and the Netherlands — completed a modelling study that evaluated different vaccination strategies to identify conditions under which vaccination may be beneficial in managing an FMD outbreak. The study used five modelling programs from the countries to compare a range of vaccination strategies with standard control measures where vaccination was not used. Data from the 2010 FMD exercise in the United Kingdom, Exercise Silver Birch, was used as the basis for the study.

All models found that vaccination would be more effective than stamping out alone in reducing outbreak size and duration. Vaccination was also more effective when commenced earlier in the outbreak. Most models found that vaccinating cattle only, rather than vaccinating all susceptible species, had minimal impact on control of the outbreak and resulted in significantly fewer vaccinated animals. All models found that vaccination was likely to be most effective when resource shortages were expected.

The study also provided important information on operational issues associated with using vaccines for FMD control, as well as adding credibility to the use of simulation models to support decision making in FMD responses. The findings will be used to develop and support more robust and acceptable policies for FMD control.

4.2.5 National livestock standstill exercise 2013–15 (Exercise Odysseus)

If an FMD incursion 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

78 Under Article 8.5.9 of the OIE *Terrestrial animal health code*, it will take six months before a country can regain its FMD-free status when a stamping-out policy, emergency vaccination and serological surveillance are applied.

and extent of the outbreak. To be effective, the standstill must be implemented rapidly.

Testing response arrangements is an important part of preparedness for an EAD such as FMD. As part of Australia's EAD preparedness, Exercise Odysseus is to be conducted throughout 2014. This will involve a series of discussion exercises and field-based activities that aim to strengthen government and industry arrangements for the implementation of a national livestock standstill. Exercise Odysseus will be based on the scenario of an FMD outbreak and the first week of the disease response. It will consider the roles of government and industry, disease response plans and arrangements, livestock already in transit, and the rapid provision of public information. The issues associated with extending the standstill beyond 72 hours and the containment of risk products such as wool may also be examined.

In addition to assessing response arrangements, Exercise Odysseus provides 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 quick response to FMD
- what people need to do when a national livestock standstill is implemented
- the importance of biosecurity practices and surveillance activities for early disease detection.

Exercise Odysseus is being planned and conducted by government biosecurity agencies, livestock and associated industries, and AHA.

Evaluation is an essential element of Exercise Odysseus, to identify potential improvements in existing plans and arrangements, so that a national livestock standstill can be implemented effectively.[79]

4.2.6 Animal health laboratories

Australia's animal health laboratories collectively 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 Program[80] and the Australian Animal Pathology Standards Program (AAPSP).[81] These national programs are designed to meet anticipated future requirements for disease surveillance, in-depth case investigations, testing during emergencies, quality assurance and training. The AUSVETPLAN *Laboratory preparedness* management manual (see Section 4.1.3) 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 production, companion, wildlife and aquatic species, for training and education of AAPSP members. The archive, which includes images from 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), has been steadily growing in 2013. It currently holds more than 5000 slides.

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 2013, the AAPSP successfully maintained the standards for histopathology proficiency testing.

79 For more information about Exercise Odysseus, email the National Exercise and Evaluation Program in the Department of Agriculture: neep@daff.gov.au.

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

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

Laboratories for Emergency Animal Disease Diagnosis and Response network

The 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, aims to standardise or harmonise testing services for targeted EADs in 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. LEADDR continues to expand its involvement in EAD responses and is gaining national recognition. The review of the AUSVETPLAN *Laboratory preparedness* manual (see Section 4.1.3) has resulted in LEADDR becoming incorporated into the EAD response procedure.

Since its inauguration in early 2009, the LEADDR network has embarked on standardising testing services for a number of targeted EADs, including avian influenza, Newcastle disease, bluetongue, infection with Hendra virus, white spot syndrome and infection with ostreid herpesvirus 1 microvariant.

In 2013, a project funded by the Department of Agriculture enabled deployment of screening tests for FMD, using methods (serology and real-time polymerase chain reaction) that do not involve live FMD virus or viral proliferation, to six member laboratories as part of the national FMD preparedness program. This represents the first in-principle consideration of ongoing support for LEADDR activities. Phase 1 of the FMD project involved constructing a roadmap for developing a long-term strategy for network capability and capacity for testing within LEADDR, establishing FMD serology for proof-of-freedom testing, and purchasing reagents to establish a stockpile for use in the event of an FMD outbreak.

LEADDR also completed phase 2 of the FMD project in 2013, and has positioned the network to provide quality-assured testing for FMD. The objectives for phase 2 included transferring screening tests for FMD not involving live culture from CSIRO-AAHL to the six participating LEADDR laboratories, thereby speeding up diagnosis and response.

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.

With regard to quality assurance, LEADDR is likely to pursue further production of multispecies ELISA test kits for influenzavirus A for distribution through the network. The network will continue to participate in quality assurance activities with the objective of harmonising or standardising network tests.

Distributed reagents were used in the conduct of a quality assurance program for FMD.

4.2.7 Swill-feeding activities

In 2013, revised national standard definitions of prohibited pig feed (swill) and the feeding of prohibited pig feed (swill feeding) were developed by the Sub-Committee on Emergency Animal Diseases and endorsed by the AHC. Work is progressing to reflect these definitions in legislation. A swill-feeding awareness, compliance and enforcement project has been jointly commissioned by government and industry, and is expected to be operational in 2014.

4.3 Increasing awareness and understanding

4.3.1 National communication arrangements for biosecurity incidents

The Biosecurity Incident National Communication Network produces nationally consistent public information in response to pest and disease outbreaks, and animal welfare incidents. It consists of communication managers from the Australian, state and territory government agencies responsible for biosecurity, and from agricultural health organisations.

The network's activities for 2013 included:

- finalising a generic *Biosecurity incident public information manual*, which describes how public information will be delivered during biosecurity incidents affecting animal, plant and aquatic animal industries

- supporting activities under the National FMD Action Plan — in particular, reviewing current communication materials and developing a communication strategy to raise awareness of the disease in stock, and swill-feeding prohibitions
- raising awareness of its role with industry stakeholders.

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 the media, educational materials and stakeholder engagement to deliver its messages. It promotes the Emergency Animal Disease Watch Hotline[82] and the Exotic Plant Pest Hotline[83] to report unusual signs of diseases or pests. In March 2013, the new Farm Biosecurity website[84] was launched. The website includes increased functionality and dynamic content, such as tailored views customised to a user's farm type and two Farm Biosecurity instructional videos.[85]

4.3.3 Practitioner awareness

The Australian Government supported a number of awareness initiatives for veterinary practitioners in 2013.

In his report *A review of Australia's preparedness for the threat of foot-and-mouth disease*,[86] Mr Ken Matthews AO noted that there was a strong possibility that an incursion of FMD would not be readily detected in Australia. This is partly because relatively few veterinarians or stock handlers have had first-hand experience dealing with FMD-infected animals and identifying the disease.

The Australian Government provides funding to assist the states and territories in training veterinary practitioners in EAD recognition and response. These funds are used to conduct workshops that provide technical updates and specialist material relating to EADs, with some coverage of basic emergency structures and policy (e.g. AUSVETPLAN, hotline numbers, and state or territory response arrangements). Material covered in the workshops is based on key EADs that are topical or changing in their epidemiology. Workshops are part of continuous professional development for field veterinarians and may be used by individual jurisdictions to deliver some EAD competency training. During 2013, workshops were held in Victoria, New South Wales, Queensland, South Australia and Western Australia. Some of the funding was used to assist private veterinarians to travel to FMD courses in Nepal (see Section 4.2.3).

A two-day workshop on EADs for wild animal veterinary practitioners was organised by Biosecurity South Australia and the Australian Wildlife Health Network (AWHN). The workshop targeted key groups of individuals in each jurisdiction who were likely to see the first wildlife cases of an EAD or be involved in assisting government with the response. Those known to have field roles with wildlife were invited, as well as members of the Australian Veterinary Association special interest groups for conservation biology, and exotic and unusual pets.

The Australian Government also funded two issues of the *Emergency Animal Disease Bulletin* (on rabies and managing EADs globally), to be published in the *Australian Veterinary Journal*, and the publication of three EAD alerts, providing updates on a wide range of EAD topics.[87]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82 Emergency Animal Disease Watch Hotline: 1800 675 888

83 Exotic Plant Pest Hotline: 1800 084 881

84 www.farmbiosecurity.com.au

85 www.farmbiosecurity.com.au/new-farm-biosecurity-videos-out-now

86 www.daff.gov.au/animal-plant-health/pests-diseases-weeds/animal/fmd/review-foot-and-mouth-disease

87 www.daff.gov.au/animal-plant-health/pests-diseases-weeds/animal/ead-bulletin

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 AHA and Farm Biosecurity websites.[88]

Australia's *National biosecurity manual for beef cattle feedlots*,[89] published in 2013, is a cooperative initiative of AHA and Australia's beef cattle feedlot industry. The manual documents and raises awareness of best practice in biosecurity. Designed as an industry resource, the manual can be used by lot feeders 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 feedlot industry's quality assurance program — the National Feedlot Accreditation Scheme (see Section 1.5.2). Every year, a third party audits each accredited feedlot against these standards.

4.5 Preparedness against specific diseases

In 2013, FMD was a focus of Australia's EAD preparedness activities, in response to the Matthews review (see Section 4.1.1). Work also continued on other important diseases, including ensuring that Australia is well prepared for an incursion of avian influenza.

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

89 www.farmbiosecurity.com.au/wp-content/uploads/2013/10/National-Biosecurity-Manual-for-Beef-Cattle-Feedlots.pdf

4.5.1 Avian influenza

Throughout 2013, reports continued of outbreaks of H5N1 highly pathogenic avian influenza (HPAI) in wild birds, poultry and humans in Asia. In early 2013, a new zoonotic low pathogenic avian influenza (LPAI) H7N9 strain was also reported as causing 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:

- maintained the Avian Influenza Toolkit website,[90] which provides resources to help countries manage the threat of avian influenza and other EADs
- continued an agreement with the FAO that includes funding to improve monitoring and response capacity for EAD outbreaks and threats in Asia.

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 continuously, and to maintain awareness of biosecurity among poultry owners. The policy and scientific aspects of avian influenza in Australia are complex. The AHC discussed this issue during a meeting on 26–27 November 2013 in Canberra.

An AHC working group was convened to provide advice on what measures might feasibly be explored to reduce the recent and ongoing occurrence of avian influenza outbreaks in Australian poultry. The influence of production systems and opportunities to improve biosecurity measures within all types of Australian poultry systems will be actively investigated.

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

Through the AWHN, the Department of Agriculture, coordinates a national surveillance program for avian influenza in wild birds (see Section 3.4.1). The program provides information on the prevalence and subtypes of avian influenza viruses in wild birds, and acts as an early warning system for

90 www.aitoolkit.org

the poultry industry. Samples were taken from 6458 wild birds during 2013, and a variety of LPAI virus subtypes (including H5 and H7, which are notifiable to the OIE) were found.

In 2013, surveillance of poultry flocks for avian influenza continued. One incident of HPAI H7N2 was detected (see Section 4.6.4). There were no other detections of HPAI during 2013. Australia declared freedom from HPAI in February 2014.

4.5.2 Diseases in wildlife

The risk of diseases emerging from wildlife is receiving increasing attention from agricultural agencies worldwide. Australia recognises the importance of monitoring wildlife health to address the impacts of diseases and mass mortalities in wild fauna on livestock, human health, agriculture, aquaculture, biodiversity and trade. The Australian Government, state and territory governments, and the AWHN are constantly on alert for emerging and emergency diseases in wildlife. The AWHN alerts relevant authorities of outbreaks of disease in wildlife, such as wild bird mortality events.

The Wildlife and Exotic Disease Preparedness Program is a national partnership between the Australian Government and state and territory governments. Established in 1984–85, it aims to develop practical field strategies for disease eradication, control and management in the event of an emergency, emerging or exotic disease that involves wild animals and could threaten Australia's livestock industries. In recent years, the program has focused on improving wildlife disease surveillance.

The program is funding five projects in 2013–14:

- 'A biogeographic and ecological approach to wildlife health surveillance in Sahul' aims to limit risks to Australia by developing capacity in Papua New Guinea to identify key risks for emergence of disease in wildlife and wildlife incidents.
- 'Preparing for rabies: incursion pathways among free-ranging and domestic dogs' will assist in preparedness and planning for rabies incursions by developing parameters for models of rabies transmission in Australia and quantifying free-roaming dog behaviours, using likely scenarios in northern Australian.
- 'National Avian Influenza Wild Bird Surveillance Program' will contribute to targeted and general avian influenza surveillance.
- 'Identification of lyssavirus variants in Australian microbats' will adopt an intentionally biased disease detection strategy by using available sensitive, broad-spectrum lyssavirus tests to test brain tissues that give the most reliable results in the subpopulation of microbats most likely to have Australian bat lyssavirus.
- 'Development of a reporting and analysis tool for national wildlife health datasets' will progress development of a data reporting and analysis tool for the national wildlife health datasets in the Electronic Wildlife Health Information System.

More information about the Wildlife and Exotic Disease Preparedness Program and results from previous projects are available on the Department of Agriculture website.[91]

4.6 Emergency animal disease responses in 2013

Appendix 3 lists investigations of potential exotic and other EADs in Australia during 2013. Incidents and responses to several diseases are discussed in Sections 4.6.1–4.6.4.

4.6.1 Hendra virus in New South Wales and Queensland

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

In 2013, eight incidents were reported: in January in the Mackay area, Queensland; in February in the Atherton Tablelands, Queensland; in June in Kempsey, New South Wales, and the Brisbane Valley, Queensland; and in July in Kempsey, New South Wales (three incidents), and the Gold Coast, 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. In 2011, a dog was infected with Hendra virus, most likely acquired from an infected horse, and was euthanased. One of the July incidents in Macksville

91 www.daff.gov.au/animal-plant-health/emergency/wedpp

also involved a dog, which was euthanased; this was only the second report of Hendra virus infection of a dog.

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 similarly have been in close contact with infected horses. There are no reports of person-to-person or bat-to-person transmission of the virus.

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 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.

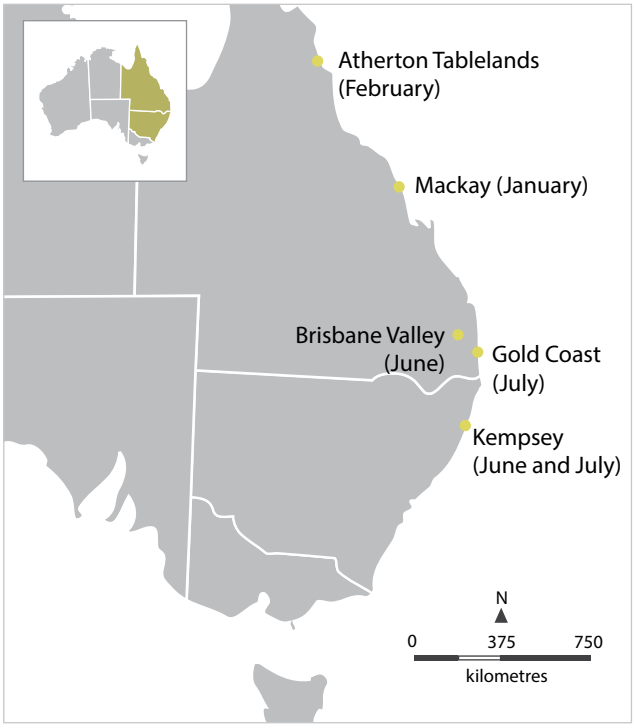

Figure 4.1 Locations of Hendra virus incidents, 2013

Table 4.1 Hendra virus incidents, 2013

Location	State	Month	Equine cases	Canine cases	Human cases	Human deaths
Mackay area	Queensland	January	1	0	0	0
Atherton Tablelands	Queensland	February	1	0	0	0
Kempsey	New South Wales	June	1	0	0	0
Brisbane Valley	Queensland	June	1	0	0	0
Kempsey	New South Wales	July	1	1	0	0
Kempsey	New South Wales	July	1	0	0	0
Kempsey	New South Wales	July	2	0	0	0
Gold Coast	Queensland	July	1	0	0	0
Total			**9**	**1**	**0**	**0**

4.6.2 Australian bat lyssavirus in Queensland

In February 2013, an eight-year-old boy died from Australian bat lyssavirus (ABLV) infection. It is suspected that the boy had contracted the virus via a scratch or bite from a bat in north Queensland in December 2012.

In early May 2013, two horses from a group of three paddocked together on a property in south-east Queensland became progressively unwell over a period of several days. The horses were examined and treated by a local private veterinary practitioner. They showed neurological signs that progressed over the clinical course of the disease. Both sick horses were euthanased by the veterinarian, and laboratory samples were collected. Samples from both horses tested positive for the yellow-bellied sheath-tailed bat variant of ABLV.

The Queensland Department of Agriculture, Fisheries and Forestry placed the property under quarantine and undertook a risk assessment. The risk assessment identified another four horses and three dogs that had potentially been exposed to ABLV. These seven animals were vaccinated with Intervet Nobivac® rabies vaccine, and blood samples were taken for baseline rabies serology on 29 May 2013. A second vaccine was given to the animals on 5 June, and serology tests were repeated on 26 June. All seven potentially exposed animals met the criteria for having negligible risk of developing ABLV. Quarantine on the property ended on 17 July 2013. All other animals on the property remained clinically healthy. Several species of microbat have been identified on the property, but not the yellow-bellied sheath-tailed bat (*Saccolaimus flaviventris*).

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4.6.3 H5N3 avian influenza in ducks in Western Australia

Routine diagnostic testing for H5 avian influenza was undertaken on two domestic ducks that were surrendered to the RSPCA animal shelter in Malaga from a property in Henley Brook, Western Australia, on 14 February 2013. The birds were euthanased. One of these tested returned a positive result for low pathogenic notifiable avian influenza (LPAI) H5 on 6 March 2013. This was confirmed by CSIRO-AAHL, and the virus was characterised as LPAI H5N3. Although the ducks were in general poor condition, this diagnostic finding was incidental — no particular clinical signs were noted at the time the ducks were euthanased.

The CCEAD noted Western Australia's EADRP to stamp out the LPAI infection in accordance with AUSVETPLAN. The original premises at Henley Brook had surrendered all of its susceptible animals to the RSPCA animal shelter on 14 February 2013 and no longer presented a risk. The RSPCA premises were designated as a dangerous contact premises (DCP) in response to the detection of LPAI. Quarantine, stamping out and disinfection of the DCP, combined with tracing and surveillance of at-risk premises, resulted in control of the incident.

Following decontamination of the DCP, completed on 15 March 2013, surveillance for proof of freedom was undertaken. This consisted of surveillance of the commercial poultry premises located within the 1-kilometre surveillance zone surrounding the Henley Brook property. No further evidence of LPAI H5N3 infection was detected.

4.6.4 Avian influenza H7N2 in chickens in New South Wales

An outbreak of HPAI H7N2 affecting two layer poultry farms near Young in New South Wales was first confirmed on 15 October 2013. The outbreak started in the free-range area of the mixed-system enterprise before entering the caged production area. The property held approximately 435 000 layers, with approximately 165 000 in free-range and 270 000 in caged facilities.

An EADRP developed by the New South Wales Department of Primary Industries was endorsed by the CCEAD on 15 October and by the NMG on 16 October 2013. Agreement was reached to share eligible costs of the response as for a Category 2 disease under the EADRA (i.e. funded 80% by governments and 20% by industry). Response actions implemented by the New South Wales Government, in collaboration with the farm owners, included quarantine measures; humane destruction of all hens on affected farms; tracing of movements of people, eggs, vehicles and equipment; and cleaning and disinfection. No significant human health incidents related to the outbreak and its management were reported by New South Wales.

On 23 October 2013, enhanced surveillance detected a second infected premises 35 kilometres west of the first infected premises; increased mortalities in 55 000 caged layers were investigated immediately. This property was a trace premises — it had received a truck with egg packaging materials from the first property just before the first property was quarantined. Laboratory testing (including gene sequencing) demonstrated that the virus involved was the same HPAI H7N2 virus.

The CCEAD and the NMG met again and approved an amended EADRP and budget.


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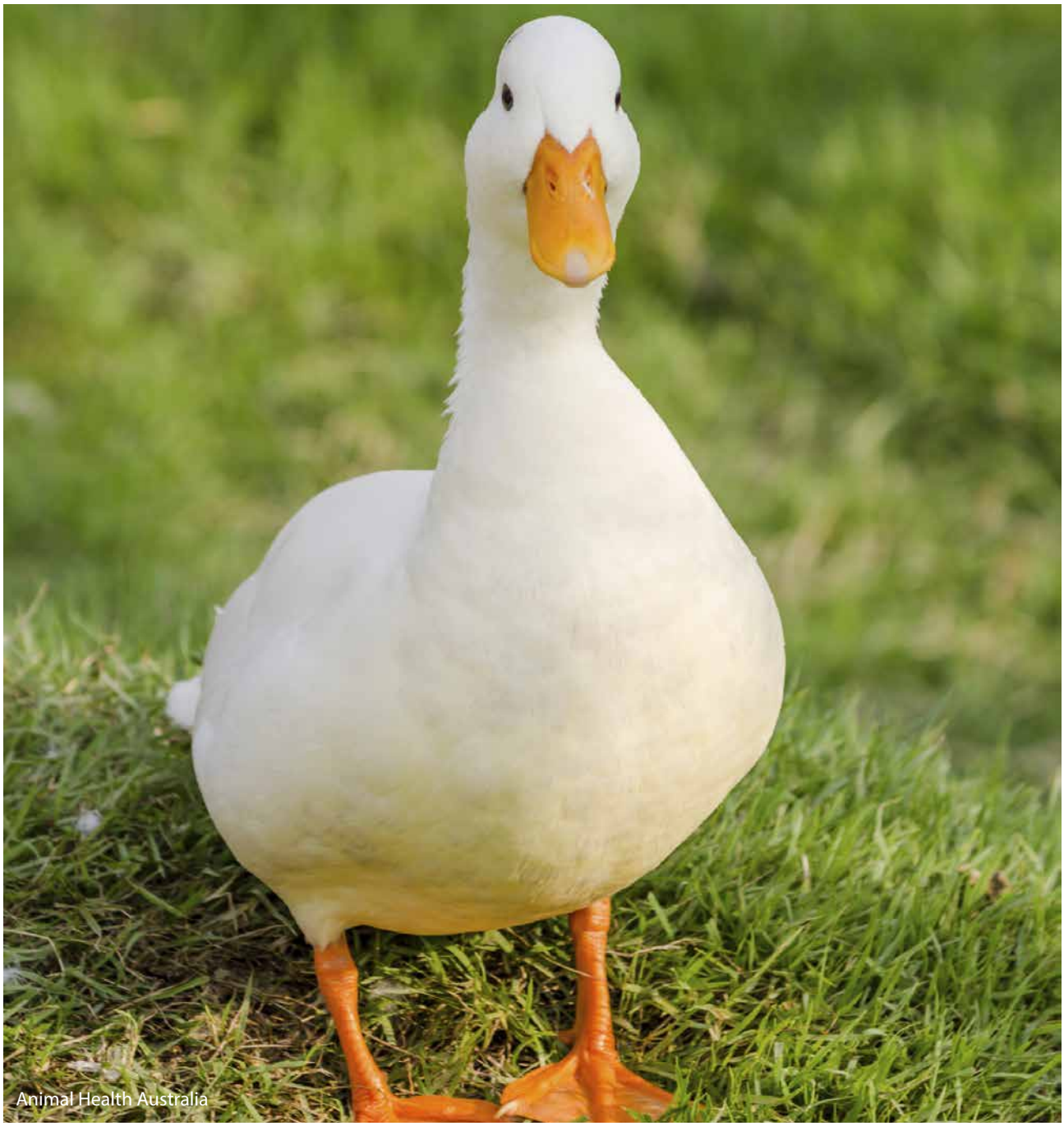
Full decontamination was completed on the second property on 21 November 2013. Properties are required to complete a 21-day empty period before restocking is permitted. Australia has a three-month waiting period from final decontamination before it can again declare official OIE freedom from HPAI, in the absence of further detection.

The Department of Agriculture notified the OIE and trading partners about the outbreak. Departmental staff worked with overseas trading partners to manage market-access issues for poultry, poultry products and eggs. Australia corresponded proactively, and on request with trading partners, through letters and Australia's agricultural counsellor network. Australia declared freedom from HPAI in February 2014.

The 2013 outbreak started in a free-range flock. Australia's previous HPAI outbreak, in Maitland in New South Wales in late 2012, also involved introduction of the virus to a free-range establishment. This has raised concerns from experts about the disease risks posed by birds in open-air environments, which may have greater exposure to wild waterfowl as a potential source of virus than those kept indoors (see also Section 4.5.1).



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Shutterstock: Lee Torrens

Chapter 5

Aquatic animal health

The health management of finfish, crustaceans and molluscs is an essential element of maintaining aquaculture productivity, fisheries resources and biodiversity in Australia.

This chapter provides details on the status of aquatic animal health in Australia, including details about national aquatic animal health policy and programs, aquatic animal disease emergency preparedness, disease events in 2013, 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 Aquatic Animal Diseases.[92]

In 2013, nine fish diseases, seven mollusc diseases, eight crustacean diseases and two 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 2013 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.

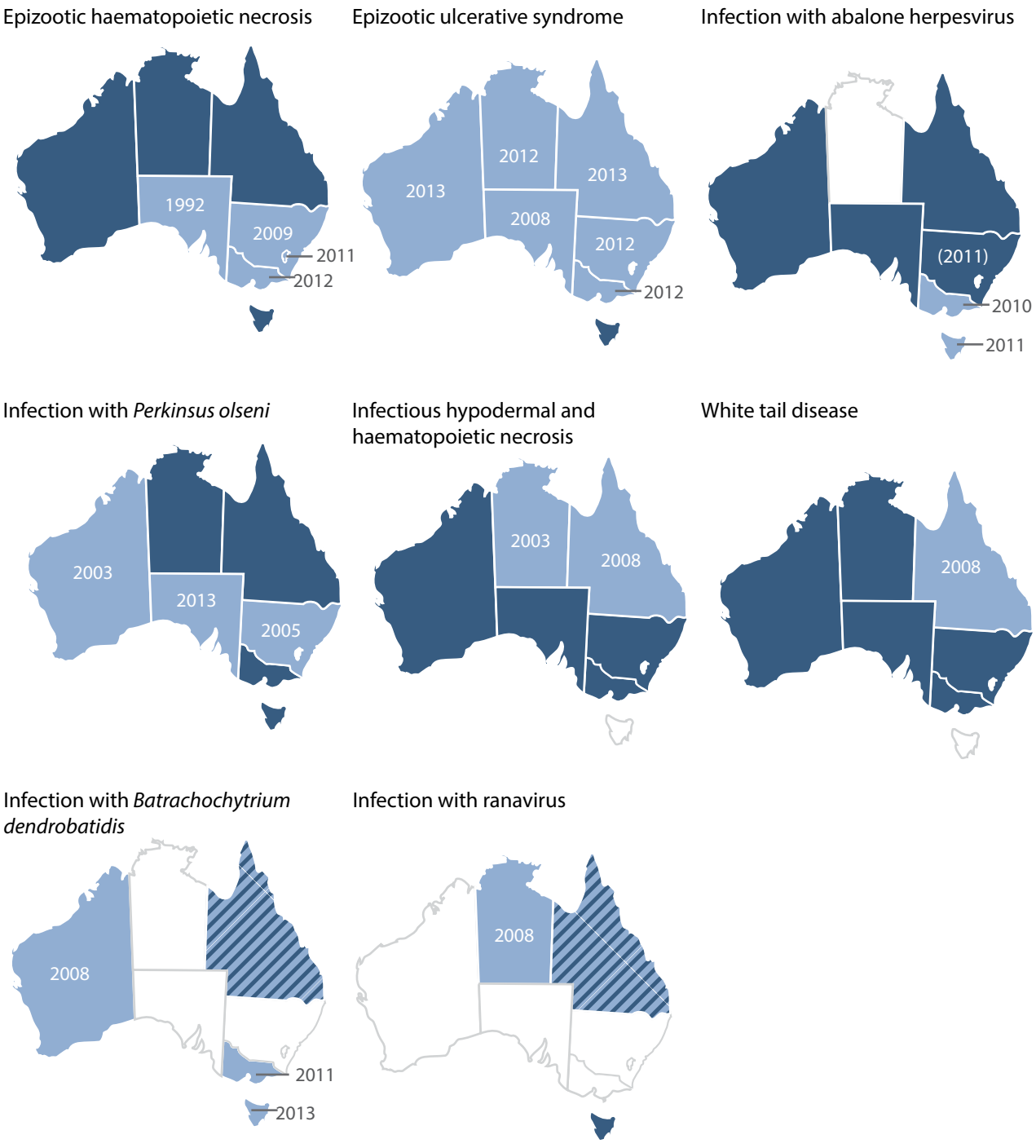
The other aquatic animal diseases of national significance to Australia, and their status in 2013, are listed in Table 5.2.

92 www.daff.gov.au/animal-plant-health/aquatic/reporting/reportable-diseases

Table 5.1 Australia's status for OIE-listed diseases of aquatic animals, 2013

Disease or agent	Status
Finfish diseases	
Epizootic haematopoietic necrosis	Locally present
Epizootic ulcerative syndrome	Locally present
Infection with *Gyrodactylus salaris*	Never reported
Infectious salmon anaemia	Never reported
Infectious haematopoietic necrosis	Never reported
Koi herpesvirus disease	Never reported
Red sea bream iridoviral disease	Never reported
Spring viraemia of carp	Never reported
Viral haemorrhagic septicaemia	Never reported
Mollusc diseases	
Infection with abalone herpesvirus	Locally present
Infection with *Bonamia exitiosa*	Never reported
Infection with *Bonamia ostreae*	Never reported
Infection with *Marteilia refringens*	Never reported
Infection with *Perkinsus marinus*	Never reported
Infection with *Perkinsus olseni*	Locally present
Infection with *Xenohaliotis californiensis*	Never reported
Crustacean diseases	
Crayfish plague (*Aphanomyces astaci*)	Never reported
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
Yellowhead disease	Never reported
Amphibian diseases	
Infection with *Batrachochytrium dendrobatidis*	Locally present
Infection with ranavirus	Locally present

OIE = World Organisation for Animal Health
Note: Aquatic animal diseases that were reportable to the OIE in 2013 are those listed in the OIE's 2012 *Aquatic animal health code.*



OIE = World Organisation for Animal Health

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, 2013

Disease or agent	Status
Finfish diseases	
Aeromonas salmonicida — atypical strains	Locally present
Bacterial kidney disease (*Renibacterium salmoninarum*)	Never reported
Channel catfish virus disease	Never reported
Enteric redmouth disease (*Yersinia ruckeri* — Hagerman strain)	Never reported
Enteric septicaemia of catfish (*Edwardsiella ictaluri*)	Never detected in wild fish populations. Reported in 2011 from native fish in one aquarium facility also holding imported ornamental fish
Epizootic haematopoietic necrosis — European catfish virus/European sheatfish virus	Never reported
Furunculosis (*Aeromonas salmonicida* subsp. *salmonicida*)	Never reported
Grouper iridoviral disease	Never reported
Infectious spleen and kidney necrosis virus (ISKNV)–like viruses	Never detected in wild fish populations. Detected in imported aquarium fish
Infectious pancreatic necrosis	Never reported
Piscirickettsiosis (*Piscirickettsia salmonis*)	Never reported
Viral encephalopathy and retinopathy	Locally present
Whirling disease (*Myxobolus cerebralis*)	Never reported
Mollusc diseases	
Akoya oyster disease	Never reported
Infection with *Bonamia* species	Locally present
Infection with *Marteilia sydneyi*	Locally present
Infection with *Marteilioides chungmuensis*	Never reported
Infection with *Mikrocytos mackini*	Never reported
Infection with ostreid herpesvirus 1 microvariant	Locally present
Iridoviroses	Never reported
Crustacean diseases	
Gill-associated virus	Locally present
Milky haemolymph disease of spiny lobster (*Panulirus* spp.)	Never reported
Monodon slow growth syndrome	Never reported

5.2 National aquatic animal health policy and programs

Australia's Animal Health Committee (AHC) is responsible for public policy and government technical decision making on aquatic animal health. The Sub-Committee on Aquatic Animal Health (SCAAH) supports the 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, Northern Territory and New Zealand governments; the Commonwealth Scientific and Industrial Research Organisation Australian Animal Health Laboratory (CSIRO-AAHL); and Australian universities (one representative). The 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 2005–2010 was Australia's second national strategic plan for aquatic animal health. The plan aimed to maximise Australia's ability to control aquatic animal disease outbreaks, maintain market access, support quality assurance, and improve the productivity and sustainability of aquatic animal production industries. In 2013, a review of AQUAPLAN 2005–2010 was endorsed by Australia's aquatic animal industries and the Australian, state and territory governments. The review reports on the plan's development and implementation, achievements and future approaches to aquatic animal health. The review found that:

- the plan made substantial progress in strengthening Australia's aquatic animal health systems
- the plan was successful in focusing and attracting available resources on agreed national strategic priorities
- there is a strong ongoing need for a nationally coordinated approach to aquatic animal health in Australia.

The review findings are available on the website of the Australian Government Department of Agriculture.[93]

In 2013, aquatic animal industries and governments agreed to develop a successor plan to AQUAPLAN 2005–2010. Aquatic animal industry and government representatives met in September 2013 to discuss priority objectives and activities for inclusion in the new plan. They agreed that the following objectives would form the basis of AQUAPLAN 2014–2019:

- enhancing surveillance and diagnostic services
- strengthening emergency preparedness and response arrangements
- improving regional and enterprise level biosecurity
- improving the availability of appropriate veterinary medicines
- improving education, training and awareness.

An industry–government working group operating under the auspices of SCAAH developed a draft plan based on the workshop outcomes. By the end of 2013, the draft plan had begun the process for formal industry and government endorsement. It is anticipated that, once it has been endorsed, AQUAPLAN 2014–2019 will formally commence on 1 July 2014.

5.2.2 Aquatic animal health training scheme

The National Aquatic Animal Health Training Scheme was established in 2010 to improve knowledge and skills in aquatic animal health management to support Australia's fishing and aquaculture industries, including the aquarium sector. Under the scheme, practising professionals with a role in aquatic animal health could apply for funding to undertake short, focused training activities, either within Australia or overseas.

The scheme initially ran from 2010 to 2012, and a review of its performance and value was completed in 2013. The review found that the scheme's competitive, merit-based approach ensured that projects addressed user needs, and that the scheme provided training in a variety of disciplines critical to the management of aquatic animal health in Australia. The scheme also provided excellent value for money. Based on these positive findings, the Department of Agriculture, and the Fisheries Research and Development Corporation (FRDC) agreed to fund the program for a further two years (financial years 2013–15).

93 www.daff.gov.au/animal-plant-health/aquatic/aquaplan

5.2.3 National laboratory proficiency testing program

The Australian Laboratory Proficiency Testing Program for Aquatic Animal Diseases was established in 2010 and ran until 2013. The program provided Australian laboratories with an opportunity to assess their capabilities to correctly detect six priority aquatic animal diseases using molecular (polymerase chain reaction) methods. The program was 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.

A review of the program found that it provided a range of benefits to participating laboratories, including a benchmark to support reproducibility and validation of tests, and strengthening of competencies and effective laboratory techniques. The program results confirmed that Australia has strong diagnostic capabilities for the six priority diseases studied. Laboratories were strongly supportive of continuing the program.

Based on the review findings, the Department of Agriculture has funded renewal of the program from 2013 to 2015. Under the program, Australian laboratories can participate in proficiency testing for the following seven aquatic animal diseases:

- infection with ostreid herpesvirus 1 microvariant
- white spot disease of prawns
- abalone viral ganglioneuritis (due to infection with abalone herpesvirus)
- viral encephalopathy and retinopathy
- yellowhead disease
- gill-associated virus
- megalocytivirus (infectious spleen and kidney necrosis virus (ISKNV)–like viruses).

5.2.4 National guidelines for translocation of domestic bait

Work to develop national policy guidelines for translocation of domestic bait was progressed in 2013. It was informed by the comprehensive analysis of aquatic animal disease risks associated with translocation of domestic bait completed in 2011. The guidelines aim to inform and guide

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development of state and territory policy on bait translocation.

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 2013 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 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.

Manuals are considered for revision every five years or in the event of significant new developments.

In 2013, a draft disease strategy manual for ostreid herpesvirus 1 (OsHV-1) microvariant was completed. It is currently being considered for endorsement by governments and industry. Other manuals that have progressed through the revision and endorsement process include abalone viral ganglioneuritis, white spot disease and viral haemorrhagic septicaemia.

AQUAVETPLAN manuals can be downloaded from the Department of Agriculture website.[94]

5.3.2 Surveillance

Each jurisdiction in Australia is responsible for surveillance activities within its borders. General surveillance includes regular health monitoring, investigating unusual aquatic animal mortality events, and reporting and investigating diseases listed on Australia's National List of Reportable Aquatic Animal Diseases. Active surveillance is conducted for specific purposes — for example, export certification for particular industries or specific diseases of importance to Australia. Active surveillance is conducted to OIE standards or using methods required to meet export market requirements.

5.3.3 Response exercises

In 2012, an exercise called Seafox was conducted to identify gaps in the response capability of governments and industry to a hypothetical outbreak of Pacific oyster mortality syndrome (POMS) in South Australia. Outcomes of the exercise have been used to inform development of an AQUAVETPLAN disease strategy manual for OsHV-1 microvariant (see Section 5.3.1).

In 2013, risk assessments for hypothetical outbreaks of POMS in South Australia were undertaken to assist with planning and resource prioritisation in South Australia. Industry and

94 www.daff.gov.au/animal-plant-health/aquatic/aquavetplan

government emergency response personnel participated in two workshops, which used a standardised methodology to allow comparison with other biosecurity threats. The workshops identified some weaknesses or gaps in preparedness, as well as avenues to improve preparedness and mitigate high-risk potential threats.

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 June 2013, 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 itself, a digital microscopy platform is now 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 keep growing as more slides are collected for scanning.

Free webinars are another aspect of the Neptune project. The project manager at the Queensland Museum hosts these online presentations, which are provided by expert speakers on a range of topics relevant to aquatic animal disease research and management. Several presentations were held in 2013 on topics including histopathology, finfish parasite management, management of bacteria in prawn hatcheries and use of Neptune.

The Neptune project was initially funded through the National Collaborative Research Infrastructure Strategy, with support from the Queensland Department of Agriculture, Fisheries and Forestry. Neptune is now funded by the FRDC and the Department of Agriculture, with contributions from the Queensland Museum.

5.4 Disease events in 2013

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 continued presence of the virus each subsequent year, most recently confirmed in the Georges River estuary in November 2013.

In January 2013, significant mortalities of Pacific oysters in the Hawkesbury River, New South Wales, were reported, and testing confirmed the presence of OsHV-1 microvariant. This is an extension of the known distribution of the virus. Mortalities affected all Pacific oyster farming operations in the Hawkesbury River estuary in January and February, with significant impacts on industry, including those associated with the implementation of strict biosecurity movement controls. The virus was also detected in wild Pacific oysters from Brisbane Water, New South Wales, which shares a common mouth with the Hawkesbury River. New South Wales authorities, with the close cooperation of industry, acted quickly to contain the disease to the affected areas. The virus was again detected in experimental oysters in the Hawkesbury River estuary in October 2013.

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.

OsHV-1 microvariant was not detected elsewhere in Australia in 2013.

As part of the strategic approach to management and containment of POMS, a suite of projects to inform response and management of the disease are under way. These include:

- Understanding biotic and abiotic environmental and husbandry effects to reduce economic losses from POMS

- Understanding and planning for the potential impacts of OsHV-1 microvariant on the Australian Pacific oyster industry
- Risk mitigation, epidemiology and biology of OsHV-1 microvariant
- Development of a laboratory model for infectious challenge of Pacific oysters (*Crassostrea gigas*) with ostreid herpesvirus type-1 microvariant
- Selective breeding of Pacific oysters for resistance to OsHV-1 microvariant.

Information on these projects is available on the FRDC website.[95]

5.5 Research and development

Australia's aquatic animal health research community includes personnel in government agencies, universities and industry, and 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:

- provide leadership, coordination, management and planning for aquatic animal health research and development
- set and review national priorities for aquatic animal health research
- oversee the communication, extension and adoption of results of aquatic animal health research projects.

In 2013, the subprogram consulted with stakeholders to determine research priorities for funding in 2014 and identified four research priorities:

- research to underpin disease risk minimisation procedures for imported aquatic animals and products, particularly ornamental fish
- development and standardisation of diagnostic tests for significant disease agents, including *Bonamia*, yellowhead virus/gill-associated virus complex and salmonid alphavirus (pancreas disease)
- development of immortal prawn cell lines
- development of a national aquatic animal health curriculum for delivery by tertiary institutions (universities, veterinary schools, and technical and further education colleges).

Information on the subprogram and final reports of projects funded by the FRDC are available on the FRDC website.[96]

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95 http://frdc.com.au/research/aquatic_animal_health

96 http://frdc.com.au/research/aquatic_animal_health

5.5.1 Second Australasian Scientific Conference on Aquatic Animal Health

The Second Australasian Scientific Conference on Aquatic Animal Health, organised by the FRDC Aquatic Animal Health Subprogram, was held on 8–12 July 2013 in Cairns, Queensland. The conference brought together more than 120 scientists, and industry and government representatives from across Australia and the Asia–Pacific region. Presentations were made on a range of topics, including finfish viruses, POMS, crustacean health, finfish vaccines, amoebic gill disease, finfish pathology, diagnostic test development and validation, bacteriology, finfish parasites and mollusc diseases.

5.5.2 Workshop on mollusc disease diagnosis

Australia hosted a workshop on mollusc disease diagnosis in Geelong, Victoria, on 21–24 October 2013. The workshop was initiated through the European Union's Knowledge Based Bio-Economy program, and included participation by mollusc disease experts from the European Union, New Zealand and Australia. The objectives of the workshop were to:

- exchange information to determine the mollusc disease priorities and diagnostic capabilities of participating countries
- identify mollusc disease diagnostic problems
- identify research strengths, and opportunities for collaboration to address diagnostic problems.

The workshop met its objectives, including identifying opportunities for immediate collaboration on priority diseases such as ostreid herpesvirus, *Bonamia* and *Perkinsus*.

5.6 Regional aquatic animal health initiatives

Australia collaborates with many countries — particularly its neighbours in the Asia–Pacific region — to help improve their aquatic animal health. Cooperation occurs through Australia's membership of the Network of Aquaculture Centres in Asia–Pacific (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.

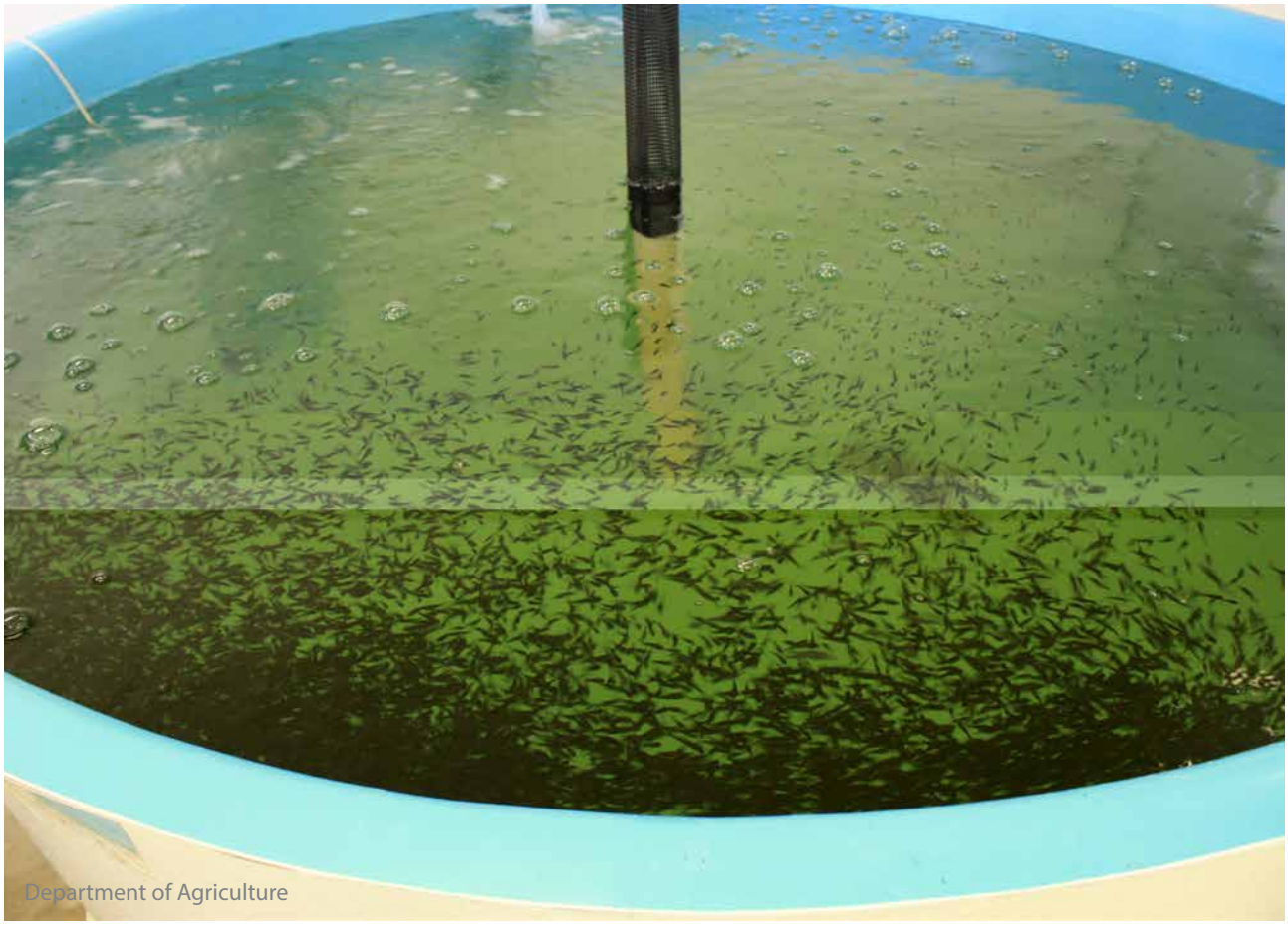
5.6.1 Network of Aquaculture Centres in Asia–Pacific

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 is currently chairing the advisory group and chaired the group's 12th meeting in Bangkok, Thailand, in November 2013. 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 made 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.[97]

5.6.2 Regional Proficiency Testing Program for Aquatic Animal Disease Laboratories

The Department of Agriculture is funding the Regional Proficiency Testing Program for Aquatic Animal Disease Laboratories in Asia. The program aims to strengthen regional capability to diagnose important aquatic animal diseases that affect trade, industry sustainability or productivity. The program is being implemented with NACA, the Australian National Quality Assurance Program and CSIRO. More than 40 laboratories in 13 countries in the region are participating in the program, which assesses laboratory testing for 10 pathogens of significance. Four rounds of testing are to be run in 2013–14; two of these were completed in 2013.

97 www.enaca.org (under 'Publications' on the right-hand bar, and then 'Health')



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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 2013, an elected Australian member of the OIE Aquatics Commission participated in two meetings of the commission. He also participated in a Regional Seminar for OIE Delegates on Activities of Specialist Commissions, which was held in Cebu, the Philippines, on 18–22 November 2013 in conjunction with the 28th Conference of the OIE Regional Commission for Asia, the Far East and Oceania.

A Department of Agriculture representative participated in an OIE regional workshop for advanced training on the second version of the World Animal Health Information System and the World Animal Health Information Database, which was held for OIE focal points for animal disease notification to the OIE on 8–10 October 2013 in Bangkok. The workshop focused on OIE reporting obligations, effective entry of accurate data into the online system and improvements to the system.

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Chapter 6

Imports and exports

The Australian Government has allocated seven years of funding for the construction and operation of a new post-entry quarantine (PEQ) facility at Mickleham, Victoria. The design of the facility is expected to be finalised in early 2014, enabling construction to begin.[98]

The new PEQ facility will contribute to managing imports of plant and animal species that are associated with a high biosecurity risk. Additional information about future PEQ arrangements is provided in Section 6.1.4.

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.

Four divisions of the Australian Government Department of Agriculture manage pest and disease risks associated with imports: Biosecurity Policy, Biosecurity Animal, Biosecurity Plant and Border Compliance. The divisions work together, using policies and procedures that meet international obligations under the World Trade Organization (WTO) Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement).

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

This chapter outlines the department's import and export-related activities in 2013.

98 www.daff.gov.au/biosecurity/quarantine/future-post-entry-quarantine-arrangements

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.

On 4 July 2012, the then Department of Agriculture, Fisheries and Forestry commenced consultation on draft biosecurity legislation to replace the century-old *Quarantine Act 1908*. A Bill to replace the *Quarantine Act 1908* was introduced into the Australian Parliament in November 2012. On 29 November 2013, the Bill was referred to the Senate Standing Committee on Rural and Regional Affairs and Transport for inquiry and report. Following the federal election in September 2013, the Bill lapsed, having not been passed by Parliament before the election. The Australian Government is giving further consideration to new biosecurity legislation.

6.1.1 Import risk analyses

Many of Australia's quarantine requirements are based on standards, guidelines and recommendations established by international organisations, such as the World Organisation for Animal Health (OIE). However, additional measures are sometimes needed to reduce risk to an acceptable level. Import conditions are only applied to the extent necessary to protect human, animal and plant health.

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 will be completed within 24 months, and an expanded IRA within 30 months. IRAs 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 SPS Agreement, and relevant international animal health standards. The IRA report assesses the quarantine risks and, where appropriate, recommends risk management measures. The IRA process provides for public consultations, including consultation on the draft report.

In 2013, the Department of Agriculture continued to focus on management of the biosecurity risks associated with ornamental fish imports, following completion of the IRA in 2011. In November 2012, the Animal Biosecurity Branch announced proposed changes to the management of disease risks associated with imported ornamental fish. The changes place greater emphasis on managing the biosecurity risks offshore — at the source — and include the introduction of an on-arrival fish health surveillance program. This allows the department to monitor the performance of overseas authorities and export establishments, and ensure that health requirements for ornamental fish exported to Australia are met. The arrangements also enable the department to be more responsive to emerging disease issues and to work closely with exporting countries to manage biosecurity risks effectively.

The Department of Agriculture began a trial of the on-arrival fish health surveillance program during 2013 to test its operational feasibility. The first trial involved only bags of fish that would otherwise have been destroyed because of noncompliance with Australian import requirements. The department worked with a number of holders of ornamental fish import permits throughout the trial.

6.1.2 Policy reviews and competent authority evaluations

The Animal Biosecurity Branch conducted seven reviews of animal biosecurity policy in 2013:

- A draft policy review of the IRA report for horses from approved countries was released on 22 January 2013. After consultation with stakeholders, a final biosecurity policy for importing these animals was announced on 1 August 2013.
- A draft policy review of gamma-irradiation as a treatment to address pathogens of animal biosecurity concern was released on 30 January 2013, for comment by 30 March 2013. After consideration of input received from stakeholders, a final biosecurity policy is being prepared for release in early 2014.

- The second edition of the *Review of published tests to detect pathogens in veterinary vaccines intended for importation into Australia* was released on 1 March 2013. The second edition contains only test methods for pathogens of biosecurity concern (significant exotic animal pathogens and more virulent exotic strains of endemic animal pathogens). Test methods for pathogens that are not of biosecurity concern (i.e. endemic pathogens that do not have more virulent exotic strains) have been removed; these pathogens will be assessed and managed by the Australian Pesticides and Veterinary Medicines Authority.
- A draft policy review of the importation of zoo elephants from approved countries was released on 21 June 2013. After consultation with stakeholders, a final biosecurity policy for importing these animals was announced on 22 August 2013.
- A draft policy review of the importation of hatching eggs with respect to avian paramyxovirus was released on 7 August 2013, for comment by 30 October 2013. After consideration of input received from stakeholders, a final biosecurity policy is being prepared for release in early 2014.
- A policy review of the importation of laboratory mouse embryos from approved countries was finalised on 14 August 2013.
- A policy review of the importation of dogs and cats, and their semen, from approved countries was finalised on 6 November 2013. The report reviewed the major diseases of dogs and cats that are of biosecurity concern, including rabies and piroplasmosis. When the new policy is in operation, the time that dogs and cats spend in PEQ will be reduced from 30 to 10 days, in most instances.

The Department of Agriculture evaluates overseas veterinary authorities, as well as the disease status of countries with which Australia trades or for which market access has been sought. The evaluations assess the management of pre-border biosecurity risks. This includes application, verification and certification of Australian import requirements by the competent authority for the commodities of concern. The evaluations are typically comprehensive desk assessments, followed by on-site (in-country) verification visits.

The Animal Biosecurity Branch also continued its programs of assessing the capacity of competent authorities to meet Australia's pre-export biosecurity requirements in relation to pre-export testing prawns intended for human consumption and ornamental fish.

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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 and dairy products), fertilisers, laboratory material 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 or plant health status of the country of origin
- manufacturing processes that might mitigate risk
- the proposed end use of the product.

The Biological Imports Program (BIP) makes an important contribution to maintaining Australia's animal health status by managing disease threats from imported biological products. BIP 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, or refusing to grant, import permits
- 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.

BIP is staffed with veterinarians, scientists and program administrators. As well as assessing import permit applications, it develops assessment procedures, work instructions and import conditions. Examples include improving ICON (the import conditions database) and website information, and contributing to the development of BICON, the new import information technology system.

In 2013, BIP received approximately 7600 import permit applications, provided advice in response to approximately 17 000 email enquiries and responded to about 11 500 phone calls through the public helpline.

Stakeholder engagement through formal and informal consultations was a key focus for BIP in 2013. 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 2013. 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 and bees — for the improvement of genetic stocks in agricultural industries, for racing purposes, or for use as assistance, military or companion animals. The Department of Agriculture's Animal Import Operations Branch implements import policies for live animals and reproductive material. It also oversees the post-arrival quarantine of imported animals through department-operated quarantine stations, and approved, privately operated quarantine premises.

Before importation, 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.

On arrival of an import, staff from the Animal Import Operations Branch, in conjunction with Post-Entry Quarantine Operations staff, audit health certification for compliance with import conditions, and examine imported animals and genetic material. The branch also liaises with overseas certifying authorities to verify that certification is consistent with import conditions and international standards for the live animal trade.

Access to appropriate PEQ facilities to manage the associated biosecurity risks is a key component of Australia's biosecurity system. The Australian Government currently leases and operates three PEQ facilities around Australia for live animal imports. As noted earlier in this chapter, these will eventually be replaced by a single, integrated PEQ facility, providing the latest and most advanced technology and operating practices available.

6.1.5 Animal health and food safety notifications

Australia advised WTO member states of revised import policies for animal, plant and food products through a process set up by the WTO. Notifications made during 2013 relating to import policies for animals were as follows:

- Draft policy review: import risk analysis report for horses from approved countries (G/SPS/N/AUS/242/Add.1)
- Final policy review: import risk analysis report for horses from approved countries (G/SPS/N/AUS/242/Add.2)
- Draft review: gamma-irradiation as a treatment to address pathogens of animal biosecurity concern (G/SPS/N/AUS/315)
- Release of biosecurity regulations (G/SPS/N/AUS/319)
- Release of additional regulations for biosecurity legislation (G/SPS/N/AUS/319/Add.1)
- Draft policy review: importation of zoo elephants from approved countries (G/SPS/N/AUS/320)
- Draft policy review: hatching eggs of domestic hens and turkeys — avian paramyxovirus 2 and 3 (G/SPS/N/AUS/326)
- Importation of laboratory mouse (*Mus musculus*) embryos from approved countries — policy review of hantavirus and biosecurity measures (G/SPS/N/AUS/327)
- Final review of policy for the importation of dogs and cats and their semen from approved countries (G/SPS/N/AUS/301/Add.1).

Australia also notified WTO member states of nine specific proposals to amend the Australia New Zealand Food Standards Code as it relates to maximum residue levels in food. The notifications were numbered G/SPS/N/AUS/316, G/SPS/N/AUS/318, G/SPS/N/AUS/318/Corr.1, G/SPS/N/AUS/321, G/SPS/N/AUS/324, G/SPS/N/AUS/328, G/SPS/N/AUS/329, G/SPS/N/AUS/330 and G/SPS/N/AUS/331. Australia also notified an assessment summary for a maximum residue limits proposal (G/SPS/N/AUS/323).

6.2 Exports

The Australian Government continues its endeavours to improve trade opportunities and access arrangements for Australian agricultural products through the Doha Round of WTO negotiations. In addition to this participation at the multilateral level, Australian producers benefit from free trade agreements with some members of the Association of Southeast Asian Nations (ASEAN), — Malaysia, Singapore and Thailand — and Chile, New Zealand 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. The WTO General Council will formally adopt the TFA by 31 July 2014.

Economic modelling has estimated that adherence to the principles contained in the TFA may contribute between US$400 billion and US$1 trillion to the world economy. These gains are through the simplification of customs procedures and use of technological advances. The TFA will also 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.

Countries also reached agreement on other trade and development issues at MC9, including food

stockholding, export subsidies and quotas. Despite the agreement on the trade reform package at MC9, the ongoing round of trade negotiations at the WTO (referred to as the Doha Development Agenda) is not considered to have been officially completed because a number of issues are outstanding. MC9 members agreed to finalise a work program by the end of 2014 that will address remaining issues on the Doha agenda.

Australia's Prime Minister announced the conclusion of negotiations for the Korea–Australia Free Trade Agreement on 5 December 2013. The Republic of Korea is Australia's third-largest goods export market and Australia's 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 already giving preferential access to Australia's major competitors, including the United States, the European Union and ASEAN countries.

Australia and the Republic of Korea each have to complete their domestic ratification processes before the agreement comes into effect.

Free trade agreement negotiations are continuing with China, the Gulf Cooperation Council, Japan, India and Indonesia. Australia is also participating in the negotiation of a Pacific Agreement on Closer Economic Relations Plus agreement with Pacific island nations; a 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 works with industry to take advantage of market access opportunities. Major activities include:

- consulting with industry on export priorities and strategies
- identifying impediments 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 access to foreign markets during disease or pest emergencies by contributing to technical negotiations with overseas authorities
- contributing to the development of international standards.

Animal Health Australia

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 (ASEL), as well as all requirements of relevant state and territory legislation. The ASEL apply to the domestic elements of the livestock export supply chain and are referenced in Commonwealth law. In addition, livestock vessels must meet the requirements of the Australian Maritime Safety Authority.

The ASEL are given legislative effect through the Australian Meat and Live-stock Industry (Standards) Order 2005 and are referenced in the Export Control (Animals) Order 2004.

The standards cover the six major steps in the domestic portion of the livestock export supply chain:

- sourcing and on-farm preparation of livestock
- land transport of livestock
- management of livestock in registered premises
- preparation and loading of vessels or aircraft
- on-board management of livestock
- air transport of livestock.

The livestock species covered by these standards are cattle, sheep, goat, buffalo and deer, and camelids (camels, llama, alpaca and vicuñas).

6.2.2 Technical input for market access

In 2013, the Animal Biosecurity Branch assisted with 68 issues involving more than 53 countries. These included technical matters in the export of:

- alpaca to New Zealand and Thailand
- barramundi fingerlings to Costa Rica, Saudi Arabia and Taiwan
- bovine semen to Argentina, China, Colombia and Fiji; bovine semen and embryos to Mexico and New Zealand; and bovine tissue to the United States
- breeder goats to Vietnam
- breeder camels to Malaysia
- buffalo to Vietnam
- camelids to China, Hong Kong and Taiwan
- caprine embryos to New Caledonia
- cattle to Bahrain, Egypt, Indonesia, Iran, Iraq, Israel, Oman, Papua New Guinea, Sri Lanka and markets that are sensitive to the use of hormone growth promotants
- day-old poultry and fertile eggs to a range of destinations, including Bangladesh, Bhutan, Burma, Malaysia, Indonesia, Nepal, Pakistan, the Philippines and Taiwan
- genetic material (bovine, ovine, caprine, and equine semen and embryos) to the European Union
- honey bees to the United States
- horses to Brazil, China, Hong Kong, Japan, Malaysia, Singapore and the United Arab Emirates
- live aquatic animals to Canada
- live fish for breeding purposes to Taiwan
- live Murray cod for breeding purposes and live seahorses to Malaysia
- live fish and corals for ornamental purposes to Brazil
- ovine semen to Peru
- rabbits to India
- ruminant genetic materials to China and Mexico
- salmon ova to Chile
- sheep, goats, breeder cattle, slaughter and feeder cattle, bovine embryos and semen, and live aquatic animals for nonhuman consumption to the Customs Union of Belarus, Kazakhstan and Russia
- sheep and goats to Norfolk Island
- ovine and caprine ova and embryos to Serbia
- ovine and caprine semen to Chile, the Republic of Korea and Peru
- ovine and caprine semen and embryos to Mexico.

The Department of Agriculture followed up its requests for acceptance of Australia's bluetongue-free zone and bovine tuberculosis–free status with the relevant trading partners, including the European Union and the United States.

6.2.3 Food and byproducts derived from animals

The Department of Agriculture's Food 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 Food 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 2013, the Food Division continued developing the *Manual of importing country requirements*. This involves revising and updating market access requirements for more than 100 trading partners in a comprehensive electronic database for use by registered exporters.

The Food Division managed visits by competent authorities of trading partners, who regularly audit Australia's export meat, fish and dairy systems. The department develops pre-visit submissions, advises visiting delegations on the Australian production and export system, and responds to audit and other findings. In 2013, visits included:

- a systems audit by Vietnamese authorities in March — the itinerary included seafood, beef and poultry establishments, and the delegation also viewed on-farm animal production and Australia's laboratory system
- hosting the Australian–China Joint Technical Research and Advisory Group meeting in April — the Chinese delegation viewed the kangaroo production chain and met with animal welfare experts, as well as visiting processing establishments to view tallow production
- a systems audit of Australia's beef and sheepmeat production by Thailand from April to May — the visit included export establishments, inspection of a microbiological laboratory and a residue laboratory, and inspection of procedures at a seaport
- a review of Australian meat production by the United States Food Safety and Inspection Service from July to August
- a review of Australia's export meat traceability system and a listing audit by China's General Administration of Quality Inspection and Quarantine in October
- an audit by Malaysia of Australian meat establishments listed for export to Malaysia and inspection of the halal certification processes in October and November
- an audit by Taiwan's Food and Drug Administration of the Australian dairy system from November to December — the delegation visited five dairy processing establishments and a food safety testing laboratory.

The Food Division established, maintained or improved market access for a range of commodities and markets — for example:

- establishing new market access for products, including
  - beef exports to Turkey
  - kangaroo meat to Peru
  - salted and pickled hides and skins of cattle, sheep and deer to South Africa
  - dairy products to Ukraine
- maintaining market access for products, including
  - milk products exported to various markets following concerns about the possible contamination of raw material imported from New Zealand with botulism bacteria
  - milk powders to multiple markets through dissemination of official advice regarding use of the fertiliser dicyandiamide in Australia
- minimising disruption to exports of poultry meat and poultry products following the detection of highly pathogenic avian influenza, including
  - poultry meat from outside the quarantined area to Singapore
  - rendered meals containing poultry to Vietnam and Canada
  - processed pet foods containing poultry to Japan and the Philippines
  - eggs to Hong Kong
- improving market access through implementation of electronic halal certification, and increasing availability of electronic certification for commodities such as eggs to Papua New Guinea and blood products to New Zealand.

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

6.2.4 Export certification arrangements

The Department of Agriculture provides export certification for animal genetic material, live animals, edible animal products and animal byproducts.

Export certification and inspection services for live animals and reproductive material

Live animals can be exported for both commercial and private purposes. The Department of Agriculture regulates, and issues export certification and documentation for a wide range of live animals and reproductive material — for example, companion and assistance animals, racehorses, poultry, aquatic animals, insects, zoo animals and livestock. Reproductive material includes the semen, ova and embryos of animal species.

Exports of live animals and reproductive material are managed by both the central program office in Canberra and animal program officers in each of the department's regions. In general, export applications and licensing for livestock are assessed in the Canberra office, and export inspection and certification are performed by officers in the regions. Exports of nonlivestock species and reproductive material are managed by the regions.

As part of the Export Certification Reform Program, the department implemented the Tracking Animal Certification for Export (TRACE) system to improve the management and tracking of export documentation and certification for livestock exports. The department is continuing work to expand the functionality of TRACE, with a project to expand its scope to include nonlivestock animals and reproductive material.

Activities conducted under the Export Certification Reform Program include:

- verifying that Australian legislation and the importing country animal health requirements have been met
- inspecting live animals and animal reproductive material to confirm fitness for export in accordance with the ASEL 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
- assisting with negotiating technical market access for live animals and animal reproductive material.

Export certification for edible animal products and animal byproducts

The Department of Agriculture is responsible for regulating the export of edible animal products and animal byproducts prescribed under the *Export Control Act 1982*, such as meat, dairy, fish, eggs, wool, skins and hides. The department issues export documentation, including export permits and certificates. Producers and exporters must meet specified criteria confirming that their exports meet the requirements of importing countries before export documentation can be issued.

The export of animal products and byproducts is regulated by:

- licensing meat exporters
- registering businesses involved in the production of animal products for export, and businesses that export these products
- requiring all registered establishments to have approved arrangements; these are food safety plans, based on hazard analysis and critical control points (HACCP) principles, that ensure the safety of the product and compliance with importing country requirements
- auditing export establishments or verifying their performance, as appropriate.

Australia's export food establishments are subject to audit by trading partners. A number of audits are hosted each year.

6.2.5 Export legislation

The *Export Control Act 1982* controls the export of all goods regulated by the department. Subordinate legislation to the Act provides specific commodity-based regulation and includes:

- 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
- Australian Meat and Live-stock Industry (Conditions on Live-stock Export Licences) Order 2012.

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.*


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

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 Food Safety and Animal Health Quadrilateral Forums (comprising Australia, Canada, New Zealand and the United States), the OIE, the International Plant Protection Convention (IPPC) of the Food and Agriculture Organization of the United Nations (FAO), and the Codex Alimentarius Commission (Codex), 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 Australia's interests and situation.

Australia's delegate to the OIE and Chief Veterinary Officer became a member of the OIE Council in May 2012. In 2013, 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 2013 include greater transparency in OIE decision-making processes, collaboration with the FAO and development of the OIE's Sixth Strategic Plan for 2016–20.

Other Australian experts participated in the OIE Aquatic Animal Health Commission (see Chapter 5), the OIE Biological Standards Commission and the OIE Permanent Animal Welfare Working Group (see Chapter 8).

Several Australians also participated in OIE expert groups, including the OIE ad hoc groups on harmonisation of African horse sickness, bluetongue and epizootic haemorrhagic disease; veterinary legislation; evaluation of foot-and-mouth disease status of member countries; and zoonotic parasites.

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

Shutterstock: alexpro9500

Chapter 7

Consumer protection

Consumers in Australia and overseas expect that the food they purchase will be safe. The Australian Government, state authorities and industries work together to protect the public, and ensure the safety of foods consumed in Australia or exported from Australia.

The Australian Government Department of Agriculture,[99] Food Standards Australia New Zealand (FSANZ),[100] the Australian Government Department of Health,[101] state and territory government authorities, and Animal Health Australia[102] all administer consumer protection programs. Activities in the many networks and partnerships that help to protect consumers include:

- establishment of domestic and international food standards
- identification of outbreaks of foodborne illness
- surveillance, prevention and control of communicable diseases
- monitoring of chemical residues, pathogens and environmental contaminants in products
- development of traceability systems for livestock used in food production
- promotion of sound management systems to deliver safe and hygienic food products to the marketplace.

7.1 Regulations and standards

The following two sections outline the international and national regulations and standards that apply to industry for the protection of consumers.

99 www.daff.gov.au
100 www.foodstandards.gov.au
101 www.health.gov.au
102 www.animalhealthaustralia.com.au

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 2013, Australia's participation continued to ensure that Codex outcomes are consistent with, and support improved outcomes for, domestic policies on food safety and public health. Australia also focused on areas of benefit to the domestic agricultural and food industries, to maintain Australia's position as an internationally competitive food exporter.

Australia continues to chair the Codex Committee on Food Import and Export Inspection and Certification Systems. In 2013, the committee continued discussions on proposals for new work on the burden of multiple questionnaires directed at exporting countries, and monitoring regulatory performance of national food control systems. Further work will refine the scope of the new work proposals in the lead-up to the next meeting in 2014.

Australia was an active participant in the finalisation of the *Proposed draft guidelines for control of zoonotic parasites in meat:* Trichinella *spp. and* Cysticercus bovis at the Codex Committee on Food Hygiene in 2013. The committee also discussed a proposal for new work on the control of nontyphoidal *Salmonella* species in beef and pork meat. Once Codex approves this new work in 2014, Australia will contribute to the development of the draft guidelines.

The Codex Committee on Residues of Veterinary Drugs in Foods has been developing risk management recommendations for veterinary drugs for which no acceptable daily intake and/or maximum residue limit has been recommended. Australia was involved in this work as a priority to ensure suitable outcomes for Australia's export industry.

Australia will also be participating in ongoing work to strengthen the cooperation between Codex and the World Organisation for Animal Health (OIE). This work will propose guidance so that each organisation takes into account relevant work being undertaken by the other, and identify ways for organisations to reference each other's standards and guidance. Maintenance and further strengthening of these arrangements is essential to ensure that standards relevant to food production are consistent, and to avoid gaps, contradictions and duplication in coverage.

Codex also agreed to continue discussion on possible standards for halal products. An important element of this discussion will be collaboration between Codex and the OIE to ensure that there is no duplication or overlap with existing OIE standards on slaughter methods that are compatible with Islamic law.

In 2013, Codex adopted a new strategic plan for 2014–19. The purpose of the plan is to advance the mandate of Codex during this period. The plan presents the vision, goals and objectives for Codex, and is supported by a more detailed work plan that includes activities, milestones and measurable indicators to track progress towards the goals.

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 the two countries.

Policy agreed by the Legislative and Governance Forum on Food Regulation, under the Council of Australian Governments, is taken into account by FSANZ (a statutory authority) 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.

Food safety policy focuses on a 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, ready-to-eat meat, dairy products, poultry meat, eggs and egg products, and seed sprouts. All states and territories are implementing these standards. FSANZ is developing primary production and processing standards for meat and meat products (including game meat), and 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 has two protective measures in place to ensure consumer safety: communicable disease surveillance by the Communicable Diseases Network Australia (CDNA) and OzFoodNet, and residue monitoring.

7.2.1 Communicable disease surveillance

Communicable Diseases Network Australia

CDNA[103] 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. CDNA offers advice to governments and other bodies on public health strategies to minimise the effect of communicable diseases in Australia and the region. The network oversees the development and implementation of the National Communicable Diseases Surveillance Strategy, which provides effective national surveillance, preparedness and responses for communicable disease risks. CDNA reports to the Australian Health Ministers' Advisory Council through the National Public Health Partnership.

OzFoodNet

In 2002, the then Department of Health and Ageing, in collaboration with state and territory health agencies, established OzFoodNet to improve surveillance for 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 CDNA and are published in *Communicable Diseases Intelligence*, a quarterly publication of the Department of Health.[104]

OzFoodNet identifies outbreaks and provides early warning of foodborne illnesses in Australia. It ensures a consistent national response to such outbreaks (which may include recall of a food product), and reduces the number of incidents and spread of foodborne illness by prompt preventive action.

7.2.2 Residue monitoring

Australian animal and plant industries participate in residue monitoring programs that assess whether existing controls on the use of pesticides and veterinary medicines are appropriate, and determine the levels of these chemicals and environmental contaminants in commodities. The programs are risk based and are designed to identify and monitor chemical inputs into Australian agricultural production systems. Results from residue and contaminant monitoring are assessed against relevant Australian standards. If a noncompliance is detected, the relevant state or territory authority conducts a traceback investigation to identify and resolve the source of the noncompliance. 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.[105]

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

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

105 www.daff.gov.au/agriculture-food/nrs/nrs-results-publications

The Australian Milk Residue Analysis survey provides a national, independent monitoring program for residues of agricultural and veterinary chemicals, and environmental contaminants in the raw milk of cows. Dairy Food Safety Victoria coordinates the survey on behalf of the Australian dairy industry.

The Department of Agriculture 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 South Australian Research and Development Institute implemented national residue monitoring programs for aquaculture salmonids and yellowtail kingfish in 2012–13. In 2013–14, all aquatic programs will be delivered nationally by the NRS.

The National Association of Testing Authorities accredits laboratories involved in residue monitoring. For programs managed by the NRS, laboratories undergo proficiency testing before being contracted and throughout the contractual period.

7.3 Antimicrobial resistance

7.3.1 Antimicrobial Resistance Prevention and Containment Steering Group

In February 2013, the Antimicrobial Resistance Prevention and Containment Steering Group was established. The steering group is jointly chaired by the secretaries of the Department of Agriculture and the Department of Health, and includes the Australian Chief Veterinary Officer and the Australian Chief Medical Officer as members. The role of the steering group is to provide governance and leadership on antimicrobial resistance (AMR) issues, and oversee the development and implementation of a coherent national strategy on AMR.

Two stakeholder consultation events were held in 2013 to inform the work of the steering group:

- On 4 July 2013, the Department of Agriculture held a roundtable event on AMR as it relates to the agriculture sector.
- On 18 July 2013, the Australian Commission on Safety and Quality in Health Care (ACSQHC) hosted the Australian One Health AMR Colloquium. This event was attended by stakeholders from the human, animal and food sectors.

The steering group has a focus on effective AMR surveillance across the human, animal and food sectors. Effective surveillance is the cornerstone of efforts to control AMR. Work is currently under way to develop options for effective AMR surveillance.

7.3.2 Antimicrobial Resistance Standing Committee

In April 2012, the Australian Health Ministers' Advisory Council endorsed the establishment of the Antimicrobial Resistance Standing Committee (AMRSC) — a new standing committee.[106] This committee supports an integrative approach to the national strategy on AMR in Australia and is chaired by the Healthcare Associated Infection Program Manager from the ACSQHC. Membership of the standing committee brings together agencies that are currently driving national AMR activities, including animal health–related nominations from the Department of Agriculture, and the Australian Pesticides and Veterinary Medicines Authority.

7.3.3 National Antibiotic Awareness Week

National Antibiotic Awareness Week took place on 18–24 November 2013, with activities led by the ACSQHC.[107] The Department of Agriculture participated in associated activities.

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.[108] The Australian Government, led by the Department of Health, is currently drafting its responses to the report recommendations.

106 www.safetyandquality.gov.au/our-work/healthcare-associated-infection/antimicrobial-resistance-standing-committee

107 www.safetyandquality.gov.au/our-work/healthcare-associated-infection/antimicrobial-stewardship/antibiotic-awareness-week/antibiotic-awareness-week-2013

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

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, the Export Control Orders (see Chapter 6). 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 registration, and the product from the establishment will no longer be eligible for export.

CSIRO Australian Animal Health Laboratory

The Department of Agriculture also facilitates and manages audits of Australian export systems by major trading partners (see Chapter 6). Australia has recently hosted a number of countries to demonstrate improvements to Australia's export systems. 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.

The reforms will ensure that Australian export industries continue to meet importing country requirements, while facilitating market access to expand Australia's $30.5 billion agricultural export industry.[109]

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 oversight. 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 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 carcases and in processed meat.

Australian domestic 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 industry 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

109 www.daff.gov.au/__data/assets/pdf_file/0007/2269762/daff-foodstats-2011-12.pdf

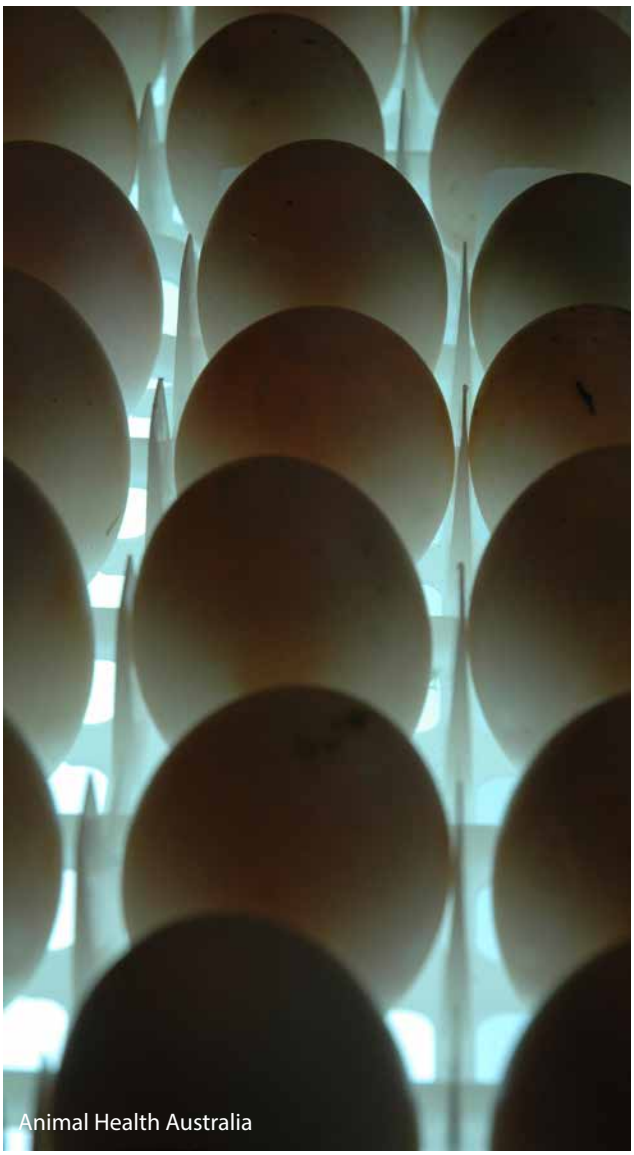
and export certification requirements are met. Senior departmental veterinarians and food safety auditors conduct regular audits of the export meat system.

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 managing compliance with export requirements at dairy, seafood and egg export establishments through systems auditing. On behalf of the Department of Agriculture 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.

In 2012–13, the department certified the export of Australian dairy products worth approximately $2.3 billion to more than 100 countries. Exports of Australian edible and inedible fisheries products in 2012–13 were worth $1.2 billion; these products were exported to approximately 115 countries. Eggs and egg products worth approximately $6.1 million were exported.



Animal Health Australia

Geordie Charles, photograph supplied by Australian Pork Limited

Chapter 8

Animal welfare

Each state and territory government is responsible for its own 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). There is no national animal welfare legislation.

State and territory governments are working to develop and implement nationally consistent animal welfare standards and guidelines in place of an array of 'model codes of practice'. The standards establish minimum animal welfare requirements that are enacted through state and territory legislation. The guidelines are voluntary and represent recommended practices to achieve desirable animal welfare outcomes. The development of animal welfare standards and guidelines involves stakeholders from industry, government, research institutions and animal welfare groups.

The Australian Government regulates the livestock export and meat export industries through conditions imposed on licence holders that export animals, or meat and meat products. Licence holders must meet the Australian Standards for the Export of Livestock and comply with importing country requirements, including requirements for animal welfare.

8.1 Jurisdictional updates

8.1.1 Australian Government

The Australian Government Department of Agriculture provides policy advice to facilitate and improve the productivity, competitiveness and sustainability of Australia's agricultural industries while meeting its animal welfare obligations.

The success of Australia's export-oriented livestock industries will increasingly be influenced by strategies to improve animal welfare outcomes. Australia's reputation as a supplier of high-quality livestock and livestock products depends on robust animal welfare arrangements that are forward-looking and demonstrate continuous improvement.

8.1.2 Australian Capital Territory

The Animal Welfare (Factory Farming) Amendment Bill 2013 was introduced in the Australian Capital Territory (ACT) Legislative Assembly on 19 September 2013. If enacted, the Bill will prohibit intensive farming practices, including caged egg production, debeaking of laying fowls and use of sow stalls associated with pork production.

The new *Code of practice for the sale of animals in the ACT (other than stock and commercial scale poultry)* came into force on 21 October 2013. The code contains mandatory provisions relating to the sale of animals, including a requirement to provide care information to purchasers at the time of sale. As a mandatory code, it is enforceable under the *Animal Welfare Act 1992*, with penalties ranging from a warning letter to prosecution.

Through its Animal Welfare Advisory Committee, the ACT Government is currently drafting and finalising several other mandatory codes on animal welfare.

Kangaroo management continues to be a divisive issue in the ACT. The majority of residents support culling of kangaroos as a management option; however, some residents are opposed to any form of human intervention in the kangaroo population. Kangaroo management is often needed in areas where overgrazing by kangaroos presents a danger to the environment and endangered species.

The licences for the ACT's 2013 kangaroo cull in nature reserves were the subject of challenges in the ACT Civil and Administrative Tribunal. The tribunal held that the 2013 cull could proceed, although for a reduced number of animals.

8.1.3 New South Wales

The New South Wales Prevention of Cruelty to Animals Standards, which implements the *Australian animal welfare standards and guidelines for the land transport of livestock*, under the New South Wales Prevention of Cruelty to Animals Regulation 2012, were gazetted on 14 June 2013.

New South Wales continued to coordinate the project on national standards and guidelines for exhibited animals, and participated in the writing and reference groups for the cattle standards and guidelines, and the reference group for the sheep standards and guidelines.

Further work was undertaken on standards for rodeos and pounds; and reviews of the existing codes of practice for boarding kennels, the keeping and trading of birds, security dogs and animal tethering.

Policies are in development for the controlled breeding of species held under the *Exhibited Animals Protection Act 1986*, and escape management requirements for exhibitors of large cats under the Act. A policy is also being developed for responses to livestock transport accidents.

8.1.4 Northern Territory

During 2013, the Northern Territory *Animal Welfare Act* was amended to include criteria for 'minimum level of care' owed to animals. An offence for 'aggravated cruelty' was also established, with increases in the penalties for cruelty to animals. A major review of the Act is currently under way.

The *Australian animal welfare standards and guidelines for the land transport of livestock* were adopted under the Northern Territory Livestock Regulations and implemented across the Northern Territory on 1 January 2013.

During 2013, the Animal Welfare Branch, previously a shared responsibility with the Department of Local Government, was repositioned under the Department of Primary Industry and Fisheries. One government agency now has responsibility for all animal welfare legislation.

The Department of Primary Industry and Fisheries has been working with emergency response and recovery agencies to ensure that the welfare and management of animals is incorporated into disaster planning. A plan has been developed for the management of domestic animals, livestock and wildlife in an emergency.

8.1.5 Queensland

In 2013, Queensland increased penalties for breaches of the *Animal Care and Protection Act 2001*. The penalty for cruelty offences has been increased to a maximum of 2000 penalty units or three years imprisonment.

Queensland has established a new Animal Welfare Advisory Committee to advise the Minister for Agriculture, Fisheries and Forestry on animal welfare matters. It comprises representatives from intensive and broadacre livestock industries, the veterinary profession, government and the animal welfare sector.

To improve management of animal welfare issues in Queensland abattoirs, the *Animal Care and Protection Act 2001* has been amended to allow the appointment of officers from Safe Food Production Queensland as inspectors.

Queensland has been engaging with Indigenous communities, stakeholders and hunters to inform them about amendments to the *Animal Care and Protection Act 2001* that remove an exemption that previously excluded the Act from applying to Aboriginal people acting according to Aboriginal tradition, or Torres Strait Islander people acting according to Islander custom. The amendments require Aboriginal and Torres Strait Islander people exercising traditional or customary hunting rights to deal with animals in a way that causes as little pain as is reasonable. The changes do not affect native title rights.

The Queensland Department of Agriculture, Fisheries and Forestry is also working with an Indigenous state school to develop a new teaching resource that will increase student understanding of animal welfare and empathy for animals. A key focus is the cultural significance and welfare of dogs within communities.

The Poultry Welfare Monitoring Program continued in 2013. This program monitors compliance with the poultry standards under the *Animal Care and Protection Act 2001*. The standards were derived from the national *Model code of practice for the welfare of animals — domestic poultry* (4th edition).

Queensland has contributed to various national processes, including:

- the Live Export Standards Advisory Group
- the National Farmed Animal Welfare Steering Committee
- development of
  - the National Primary Industries Research, Development and Extension Framework
  - the eighth edition of the *Australian code for the care and use of animals for scientific purposes*
  - rodeo standards under the Australian Animal Welfare Strategy (AAWS).

8.1.6 South Australia

The *Australian code for the care and use of animals for scientific purposes* (8th edition) was released on 24 July 2013 and is now in force. The purpose of the code is to promote the ethical, humane and responsible care and use of animals for scientific purposes. The Animal Welfare Unit, Department of Environment, Water and Natural Resources (DEWNR) organised a workshop in November 2013 to assist animal ethics committees, researchers and teachers in the adoption of changes from the previous edition.

To support eliminating cruelty and reducing the number of unwanted animals being euthanased, the South Australian Legislative Council established a select committee to investigate and report on the legislative and regulatory management of companion animals. The Minister for Sustainability, Environment and Conservation, who is responsible for animal welfare, has sought the advice of DEWNR, the Dog and Cat Management Board, and the Animal Welfare Advisory Committee on the recommendations of the report from the select committee, and will determine whether the recommendations will be implemented.

The Animal Welfare Unit also completed a review of the *South Australian code of practice for the care and management of animals in the pet trade* (2nd edition, 1999). The minister will consider the the outcomes of the review in the context of the recommendations of the select committee. South Australia continues to contribute to the development of national welfare standards and guidelines for cattle, sheep and saleyards. The *Australian animal welfare standards and guidelines for the land transport of livestock* were prescribed in regulation in August 2012.

The Vertebrate Pest Committee has determined that five vertebrate pest control methods are unacceptable. These methods have been administratively phased out or banned by regulation in South Australia.

8.1.7 Tasmania

The Tasmanian Government has reviewed the *Animal Welfare Act 1993* and is drafting amendments to it. The main proposed changes are designed to improve administration of the Act and to provide for better animal welfare outcomes without the need to prove an offence under the Act. It is anticipated that the amendment Bill will be introduced into the Tasmanian Parliament in 2014.

Tasmania has made Animal Welfare Regulations — the Animal Welfare (Transport of Livestock) Regulations 2013 and the Animal Welfare (Pigs)

Regulations 2013 — to legislate the standards in the *Australian animal welfare standards and guidelines for the land transport of livestock* and the *Model code of practice for the welfare of animals — pigs* (3rd edition). The Animal Welfare (Pigs) Regulations 2013 also further restrict the use of sow stalls. The Animal Welfare (Domestic Poultry) Regulations 2013 have commenced; these regulations legislate standards in the *Model code of practice for the welfare of animals — domestic poultry* (4th edition) and also cap the number of caged layer hens in Tasmania.

Dog welfare regulations are currently being developed with input from stakeholders and the general public. There is significant community interest in the welfare of dogs, particularly in relation to so-called puppy farms. The proposed regulations will cover all people who have care or charge of dogs, including pet owners, breeders, and businesses such as animal shelters.

Random inspections of intensive piggeries and poultry farms continue to be undertaken. A program will also be developed to inspect vehicles used to transport livestock in Tasmania. Welfare of animals being transported across Bass Strait is being reviewed in light of the new Animal Welfare (Transport of Livestock) Regulations 2013. This review may lead to an update of the animal welfare guidelines for transport of livestock by sea.

8.1.8 Victoria

The *Australian animal welfare standards and guidelines for the land transport of livestock* were prescribed in regulations under the *Livestock Management Act 2010* on 5 March 2013. Industry quality assurance programs, including the Australian Pork Industry Quality Assurance Program (APIQ✓®) and the National Saleyard Quality Assurance program, have been formally recognised for demonstrating compliance with the Victorian *Standards and guidelines for the welfare of pigs* and/or the *Australian animal welfare standards and guidelines for the land transport of livestock* by their accredited members.

The revised Victorian *Code of practice for the welfare of horses* (revision 1) was adopted under the *Prevention of Cruelty to Animals Act 1986* on 8 November 2012. New provisions were included for conducting dental procedures, microchip implantation, treating stereotypic behaviours and assessing body condition.

The mandatory code of practice for breeding of cats and dogs as a business has been reviewed to meet contemporary standards, which underpin the management of premises and animal welfare. Legislation was amended to strengthen the powers of local government officers and permit RSPCA inspectors to regulate this industry.

A survey of 1629 dog, cat, bird and rabbit pet owners measured how well they understood their pets' welfare needs. Five key welfare needs were assessed: environment, diet, behaviour, companionship and health. The survey data highlighted that many animals are not receiving adequate care from their owners. The Victorian Government's Responsible Pet Ownership education program developed information resources for pet owners, the community and local government to improve standards of pet care.

The Victorian Emergency Animal Welfare Plan sets out coordination arrangements for animal welfare management in Victoria in the event of an emergency, including the scope of activities, responsibilities and interactions. The need to plan at all levels, including for management of animals in emergencies, was discussed at the annual Victorian Emergency Management Conference. A PETS READY campaign was developed for introduction into the Responsible Pet Ownership education program in schools, to encourage families to prepare for evacuating their companion animals to safety during emergencies.

8.1.9 Western Australia

Work has continued to develop regulations under the *Animal Welfare Act 2002* to give effect to the standards in the *Australian animal welfare standards and guidelines for the land transport of livestock*.

The Department of Agriculture and Food Western Australia (DAFWA) held a workshop for local emergency response agencies to consider integration of animals in disaster planning and response. The aim is to develop a high-level guidance document on the roles and responsibilities of various agencies in emergency management arrangements for companion animals, livestock and wildlife.

DAFWA contributed to the development of national animal welfare policies and standards, including standards and guidelines for sheep and cattle welfare, and animal welfare at saleyards and abattoirs.

DAFWA continues to work closely with the RSPCA (Western Australia) in enforcing the *Animal Welfare Act 2002* in Western Australia.

8.2 Animal Welfare Committee

The Animal Welfare Committee (AWC) was established in March 2012 by the Primary Industries Standing Committee to provide advice and support on national animal welfare policy issues. Membership of the AWC comprises representatives from the Department of Agriculture, each state and territory government, and the New Zealand Government. The committee is supported by the Sub-Committee on Animal Welfare.

The AWC continues to focus on delivering nationally consistent animal welfare standards and guidelines for livestock production; these are based on the revision of the model codes of practice for the welfare of animals.

During 2013, the AWC:

- undertook a review of the development process for animal welfare standards and guidelines (see Section 8.3)
- progressed the development of animal welfare standards and guidelines for cattle, sheep, exhibited animals (zoos), and livestock at saleyards and depots
- commenced the development of animal welfare standards and guidelines for poultry.

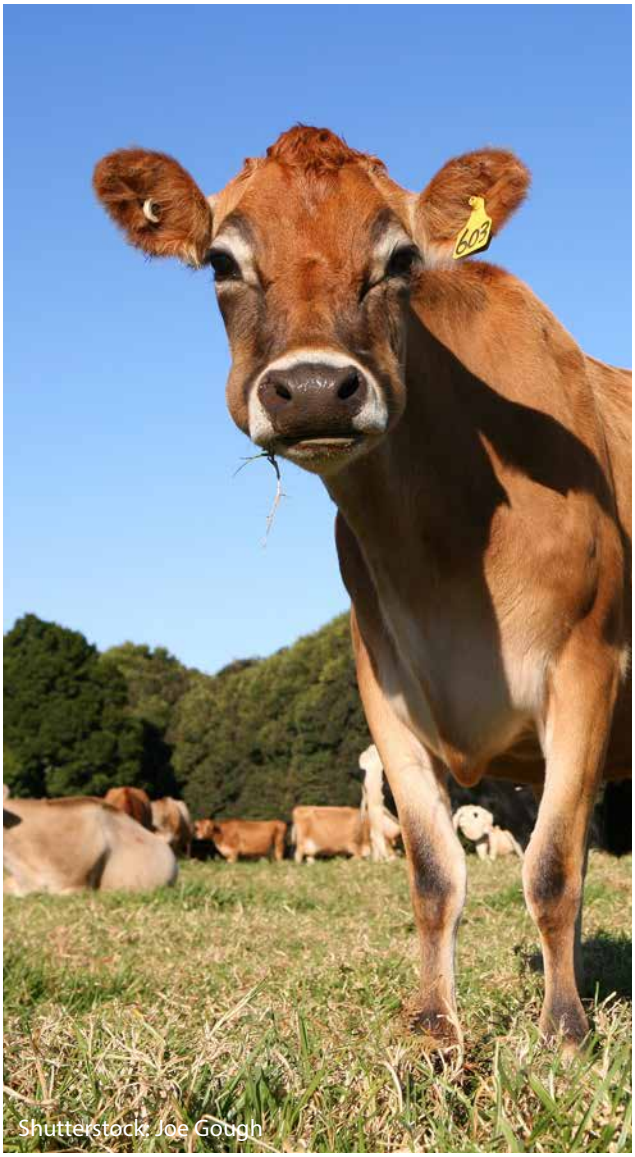
8.3 Standards and guidelines

In July 2013, the AWC finalised a review of the development process for animal welfare standards and guidelines. The review sought to identify the strengths and weaknesses of the current process, and to recommend improvements. A range of stakeholders across agricultural industries, government and animal welfare organisations were consulted. The review made 20 recommendations to improve the current process, including:

- more clearly defined roles and responsibilities
- improved mechanisms to resolve conflict
- better use of the regulation impact analysis process
- targeted research to support the regulation impact analysis.

8.3.1 Australian animal welfare standards and guidelines for the land transport of livestock

The *Australian animal welfare standards and guidelines for the land transport of livestock* apply to the major commercial livestock species, and to all people responsible for the care and management of livestock transported through the supply chain. Since the standards and guidelines were endorsed by the then Primary Industries Ministerial Council in May 2009, most state and territory governments have implemented them; the remainder will finalise implementation in 2014.



Shutterstock: Joe Gough

Industry partners of the bobby calf supply chain implemented a national industry standard during 2012 that sets a limit of 30 hours maximum time off feed for bobby calves aged 5–30 days being transported to meat processing plants. The National Livestock Identification System (NLIS) is being used to monitor compliance with the standard. The NLIS database records individual calf identification and key times along the supply chain by scanning at farm collection, at saleyards or calf scales, on arrival in lairage and at slaughter.

Data from the 2012 and 2013 calf season will be used to inform consideration of a legislated time-off-feed standard under the *Australian animal welfare standards and guidelines for the land transport of livestock*.

8.3.2 Australian animal welfare standards and guidelines for cattle and sheep

The consultation period for cattle and sheep standards and guidelines and the associated regulatory impact statements (RISs) closed on 5 August 2013. This period included a 90-day extension granted by agriculture ministers on 3 May 2012 to ensure that all stakeholders had ample opportunity to comment on the draft standards and guidelines.

The submissions made during public consultation were considered by standards and guidelines writing and reference groups. Membership of these groups includes industry, governments, service providers, animal welfare scientists and animal welfare groups. Public responses focused on tail docking, mulesing and handling procedures for sheep, and castration, dehorning and spaying of cattle. There was also discussion around the use of pain relief for invasive husbandry procedures.

It is expected that the draft cattle and sheep standards and guidelines will be considered for endorsement by governments in 2014.

8.3.3 Australian animal welfare standards and guidelines for exhibited animals (zoos)

During 2013, work continued on the development of Australian animal welfare standards and guidelines for exhibited animals (animal exhibited by the zoo industry). Effort focused on finalising the draft consultation RIS in preparation for public consultation.

Refinement of the exhibited animals RIS revealed that some amendments to the draft standards and guidelines documents were necessary to provide clarity and to avoid unintended costs. In May 2013, a revised draft consultation RIS for exhibited animals was submitted to the Australian Government Office of Best Practice Regulation (OBPR).

The OBPR review led to a request for further amendments to the draft RIS. The writing group completed the review of the standards and guidelines documents in September 2013, and a third revised draft consultation RIS was submitted to the OBPR in October 2013. The latest revisions resulted in a significant reduction in the forecast financial costs for industry.

The RIS consultants and the New South Wales Department of Primary Industries are working with the OBPR regarding amendments to the consultation RISs and draft standards and guidelines, with a view to releasing these for public consultation in early 2014. Government endorsement is expected in 2014.

8.3.4 Australian animal welfare standards and guidelines for saleyards and depots

Australian animal welfare standards and guidelines for livestock at saleyards and depots are being developed under the guidance of the AWC. The standards are based on a revision of the 1991 *Model code of practice for the welfare of animals — animals at saleyards*.

Development of the new standards and guidelines is being managed by the Victorian Department of Environment and Primary Industries. A Standards Reference Group — with national representation from the saleyard and livestock industries, animal welfare organisations and governments — has provided expert advice and direction to the drafting process. Public consultation through a consultation RIS will be undertaken in early 2014, after which the standards and guidelines will be finalised for implementation later in 2014.

The standards and guidelines will apply to the main livestock species handled through saleyards: cattle, sheep, pigs, goats and horses. They will provide the basis for developing and implementing consistent legislation and enforcement across Australia. The

standards and guidelines should also be reflected in industry-based quality assurance programs that include livestock welfare provisions.

The standards and guidelines will better inform all those involved in the saleyard process of their responsibilities along the supply chain. The welfare of livestock at saleyards and depots will be ensured through standards addressing key welfare risks, such as:

- livestock handling
- penning density
- pre-sale inspection and selection of an animal as fit for sale
- humane management of any unfit animals
- water and feed requirements.

8.4 Australian Animal Welfare Strategy

The AAWS is a key policy document for delivering sustainable animal welfare outcomes across all key animal-use sectors. It encourages industry, research organisations, animal welfare organisations, professional associations and governments to work on strategic national animal welfare issues and projects using a partnership approach.

Four areas of strategic work initiated in 2012 were delivered in 2013: development of a state-of-the-nation reporting framework, development of an AAWS monitoring and evaluation framework, a scoping study into improving collaboration among AAWS stakeholders and an assessment of AAWS communications to maximise impact.

A key milestone in 2013 was the launch of the redeveloped AAWS website.[110]

Since 2010, 50 AAWS projects have been funded. These projects include work on national animal welfare standards, teaching and education resources, communications, and research and development. Details are available on the AAWS website.

The Australian Animal Welfare Advisory Committee, which had oversight of the AAWS in this current phase, was abolished in November 2013.

8.4.1 7th AAWS national workshop

The 7th AAWS National Workshop, held on the Gold Coast on 30–31 July 2013, was viewed by participants as the most successful to date. More than 125 delegates from around Australia attended the workshop. The annual face-to-face meetings of the AAWS working groups were held the following day.

The workshop developed a road map for ongoing improvements in animal welfare. In mapping the future direction of the AAWS, participants considered the four pieces of strategic work delivered during the year (see Section 8.4). Snapshot presentations of AAWS projects were also given, which provided insights into how communication strategies can be used to deliver information on important initiatives, such as the role of Indigenous animal welfare officers in northern Australia.

The international influence of the AAWS and Australia's role as a global leader in animal welfare were highlighted by the keynote speaker, Dr Abdul Rahman, chair of the World Organisation for Animal Health (OIE) Permanent Animal Welfare Working Group and President of the Commonwealth Veterinary Association.

8.4.2 National planning principles for animals in natural disasters

The AAWS and the World Society for the Protection of Animals (WSPA) continued to advance the issue of caring for animals in emergencies by co-sponsoring the third National Workshop on Plans for Animals in Disasters, held in Melbourne on 24–25 September 2013. Approximately 60 participants attended, representing the AAWS, WSPA, state and territory governments, local governments, emergency services, the RSPCA, the Red Cross, the Australian Veterinary Association, the media and social researchers.

The workshop acknowledged the significant work done at the local government level to develop and advance local planning for people and animals in disasters, including the establishment of networks, the identification of experts and an inventory of equipment that could be shared across regions during disaster events.

Key outcomes included endorsement by participants of the National Planning Principles for

110 www.australianananimalwelfare.com.au

Animals in Disasters.[111] These had been endorsed by the AWC in June 2013 and are being progressed for endorsement by the Australia New Zealand Emergency Management Committee. These principles will then be applied to state, territory and local government plans.

The National Advisory Committee for Animals in Emergencies was also formed in 2013 to provide leadership, insight and advice to organisations attempting to integrate animals into emergency management systems. The committee is developing an action plan based on the recommendations of the third national workshop.

8.5 National Primary Industries Animal Welfare Research, Development and Extension Strategy

The aim of the National Primary Industries Animal Welfare Research, Development and Strategy is to encourage greater co-investment and collaboration to improve the efficient use of research, development and extension resources nationally.[112] Participants include the Australian Government, the state and Northern Territory governments, rural research and development corporations, the Commonwealth Scientific and Industrial Research Organisation (CSIRO), and universities.

In 2010, the Victorian Department of Primary Industries facilitated formation of the National Primary Industries Animal Welfare Research, Development and Extension Strategy Steering Committee. The steering committee consists of 18 major funders and providers of animal welfare research relating to the Australian farm sector, and representatives from government; during 2013, it was chaired by a representative from the Department of Agriculture. The steering committee guides the development of programs under the strategy.

In 2013, Australian Pork Limited and the South Australian Research and Development Institute were appointed as strategy champions to drive further development of the strategy.

The strategy has commissioned two collaboratively funded research projects and is in the process of commissioning a further two projects. The four projects are:

- 'Identify and integrate measures of animal welfare that meet the needs of animals and society' (CSIRO, Murdoch University, University of Melbourne) — this project is now complete
- 'Develop a public attitude monitoring scheme to inform animal welfare policy development' (University of Melbourne, Ohio State University, University of Western Australia) — this project commenced in July 2013 and is due to report in March 2014
- 'A scoping study looking for novel measures of pain' (University of Adelaide, University of Melbourne, University of Sydney) — commissioning of this project is in progress
- 'National Animal Welfare RD&E Project Register' (University of Melbourne; Queensland Department of Agriculture, Fisheries and Forestry) — commissioning of this project is in progress.

8.6 Livestock exports

8.6.1 Australian Government response to the Independent Review of Australia's Livestock Export Trade (Farmer review)

The Australian Government commissioned the Farmer review in 2011 to focus on the sustainability of the livestock export trade and assurance of animal welfare. The objective was to help the government establish new safeguards to provide verifiable and transparent supply chain assurance for every livestock consignment that leaves Australia for feeder and slaughter purposes. The government accepted all 14 recommendations of the Farmer review report on 21 October 2011.

The Department of Agriculture worked with state and territory governments and industry on all 14 recommendations. One key outcome was the phased implementation of the Exporter Supply Chain Assurance System (ESCAS), which is described in Section 8.6.6.

111 www.australiananimalwelfare.com.au/content/pets-and-companion-animals/national-planning-principles-for-animals-in-disastersPCA

112 www.daff.gov.au/agriculture-food/innovation/national-primary-industries

8.6.2 Australian standards for the export of livestock

A report proposing a revised set of livestock export standards was prepared by the Australian Standards for the Export of Livestock Steering Committee and finalised on 31 May 2013.

8.6.3 Inspection regime at Fremantle Port

A steering committee was convened to review the current inspection regime at Fremantle Port. The committee undertook site visits and conducted a desktop review. The report on the review was referred to the Australian Standards for the Export of Livestock Steering Committee for consideration.

8.6.4 Export of breeder cattle

The Department of Agriculture coordinated a review of breeder livestock exports on behalf of the Industry Government Implementation Group, in response to recommendation 14 from the Farmer review — 'that the Australian Government should articulate an approach to the question of whether there is a need for any additional conditions for the export trade in breeder livestock'.[113]

The report *Breeder livestock exports* made four recommendations to minimise animal welfare concerns for livestock exported for breeding purposes. The recommendations were accepted by the Minister for Agriculture, and the report was published on the department's website on 30 April 2013. The department is working with industry to address the four recommendations.

8.6.5 Mark IV box review

During 2012, concerns were raised about the ability of 'Mark IV-type' restraint boxes used for slaughter of Australian cattle in foreign markets to deliver animal welfare outcomes consistent with the OIE *Terrestrial animal health code*.[114] In response, Australia's Chief Veterinary Officer, supported by departmental staff, undertook a review of these devices and the manner in which they are used. The review process included a call for public submissions and stakeholder comment on the draft report.

The final report[115] found that boxes of this type are a humane animal welfare tool for the slaughter of cattle if the boxes are designed, maintained and operated according to the original manufacturer's instructions. However, a number of boxes of this type that were in use had been constructed locally and did not meet the original design specifications, resulting in animal welfare hazards during slaughter of cattle through ESCAS.

The report provided 10 recommendations to address these concerns and animal welfare hazards. Consideration is being given to amending ESCAS by inclusion of a specific checklist for the assessment of slaughter restraint boxes.

8.6.6 Exporter Supply Chain Assurance System

The Department of Agriculture regulates the live animal export industry to ensure that it meets the standards set by Australian legislation and importing country requirements. The regulatory framework that established the requirements for ESCAS was implemented in 2012 to strengthen animal welfare outcomes in the destination country. From January 2013, all exports of Australian livestock for feeder and slaughter purposes are required to have compliant ESCAS arrangements in place. This will apply to all livestock export markets except for live cattle exports to Egypt, which are covered under a pre-existing government-to-government agreement.

Exporters must provide the Department of Agriculture with evidence demonstrating:

- handling and processing of animals through specified supply chains to the point of slaughter in accordance with the internationally accepted requirements for animal welfare established by the OIE
- control of the movement of animals within the supply chain
- traceability or accounting of animals through the supply chain
- independent auditing of the supply chain to assess compliance with ESCAS requirements.

The aim of ESCAS requirements is to minimise adverse animal welfare incidents for Australian livestock. Exporters are required to work in conjunction with their commercial

113 http://daff.gov.au/__data/assets/pdf_file/0020/2030366/australian-government-response-LAE-reports.pdf

114 www.oie.int/international-standard-setting/terrestrial-code

115 www.daff.gov.au/__data/assets/pdf_file/0007/2328208/mark-iv-review.pdf

partners in importing countries to ensure that their supply chains meet the Australian regulatory requirements.

When animal welfare incidents do occur within the export supply chain, the Department of Agriculture can investigate and take regulatory action against the Australian exporter, where appropriate, in a manner that minimises disruption to trade and improves animal welfare outcomes.

To date, more than 4.38 million animals have been exported in accordance with ESCAS requirements. Work has now commenced to assess the regulatory framework and ESCAS requirements to remove inefficiency and duplication in administrative processes, and reduce the burden of compliance on exporters.

Kelly Casement

8.7 International animal welfare

8.7.1 World Organisation for Animal Health

Since May 2005, the World Assembly of OIE Delegates (representing the 178 member countries of the OIE) has adopted eight animal welfare standards in the *Terrestrial animal health code* and three animal welfare standards in the *Aquatic animal health code*.[116]

Australia supports the OIE's development of scientifically based international animal welfare guidelines. These 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 when developing Australian positions on issues being discussed in the OIE forum.

An animal welfare veterinary expert from the Department of Agriculture represents Asia/Oceania on the OIE Permanent Animal Welfare Working Group. This working group develops international animal welfare guidelines and reports to the OIE Terrestrial Animal Health Standards Commission. Once the OIE member countries endorse standards, they are published in the *Terrestrial animal health code*. Current work includes development of standards for dairy cattle, working animals (equids) and animals in disasters, and collation of resources to assist member countries to implement the OIE animal welfare standards.

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 Australian Animal Welfare Science Centre (Victoria); the Centre for Animal Welfare and Ethics at the University of Queensland; and CSIRO Animal, Food and Health Sciences (Armidale, New South Wales).[117]

116 www.oie.int/animal-welfare/animal-welfare-key-themes

117 www.australiananimalwelfare.com.au/app/webroot/files/upload/files/OIE%20CC%20Final%20Flier%281%29.pdf

The Collaborating Centre Management Committee is currently editing a scientific and technical review on the future of animal welfare, which the OIE will publish in April 2014. The committee is also cooperating with partners from University Putra, Malaysia, to build animal welfare science capacity in the region. This project has funding from the Australian, Malaysian and New Zealand governments, the University Putra, the European Union and WSPA. Workshops and lectures will be delivered across China, Malaysia, Thailand and Vietnam. Other countries covered by the Regional Animal Welfare Strategy (RAWS; see Section 8.7.2) will be invited to participate.

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

The RAWS Coordination Group held two meetings in 2013. The group's fifth meeting was held on 26–27 March 2013 in Bangkok, Thailand. At this meeting, the group endorsed RAWS (edition 2), updated the RAWS Action Plan and discussed project proposals for activities that support RAWS.

The sixth meeting was held on 26 August 2013 in Seoul, Republic of Korea. The group discussed and made recommendations relating to progress by countries and organisations, and regulatory developments. It also endorsed the publication of RAWS (edition 2) and distributed the English translation. The group revised the RAWS Action Plan, agreed on the preparation of a draft paper for the meeting of the Regional Commission for Asia, the Far East and Oceania in November 2013 in Cebu, the Philippines, and agreed on the publication and translation of RAWS (edition 2) into regional languages.

8.7.3 Other welfare activities with trading partners

The Australian Government provided $5 million under the Approved Supply Chain Improvements Program for the financial years 2011–12 and 2012–13 to help Australian exporters improve their supply chains. The program funded infrastructure upgrades, the installation of stunning equipment, and training for feedlot and abattoir staff in overseas markets.

The Australian Government has also allocated $10 million of aid funding (2011–12 to 2014–15) through the Improved Animal Welfare Program. This program provides support for improved animal welfare outcomes in countries that import live animals from Australia and are eligible for official development assistance.

8.7.4 Quadrilateral Animal Welfare Network

The Quadrilateral Animal Welfare Network met via teleconference on 30 November 2012 and 6 March 2013. The key topics discussed included information sharing on country animal welfare priorities, the outcomes of the Third OIE Global Conference on Animal Welfare in November 2012, responses to international initiatives on animal welfare standards such as the International Organization for Standardization technical specifications on animal welfare, and the development of Australian animal welfare standards and guidelines.

8.7.5 European Commission – Australia Animal Welfare Cooperation Forum

In September 2008, the European Commission and the Department of Agriculture agreed to terms of reference for establishing the Animal Welfare Cooperation Forum of the European Commission and the Australian Government. The forum aims to promote dialogue on current animal welfare systems, activities and priorities. In addition, the forum works to further develop a science-based approach to animal welfare, and to strengthen the bilateral relationship on animal welfare issues, including advancing OIE work in this area.

Since 2008, the forum has provided regular opportunities, through videoconferences and face-to-face meetings, to exchange information and foster cooperation on animal welfare issues of operational and strategic importance to both participants. The most recent forum, in March 2013, discussed the animal welfare activities of Australia and the European Commission. Participants also discussed strategic issues and trends, such as the European Union Strategy for the Protection and Welfare of Animals (2012–15) and the European Network of Reference Centres for Animal Protection and Welfare. Participants agreed to update the forum's terms of reference to reflect progress in policies and programs.

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 exotic and zoonotic disease awareness, preparedness and control.

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 initiatives are conducted in collaboration with overseas government agencies, veterinary associations and private organisations, and aim to improve the control of animal diseases, including zoonoses, thereby improving livelihoods in these countries. Aid and research activities are primarily resourced through the Australian Government Department of Foreign Affairs and Trade (DFAT[118]) and the Australian Centre for International Agricultural Research (ACIAR[119]), 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.

9.1 Regional representation

The Australian Chief Veterinary Officer and Delegate to the OIE is a member of the OIE Council, where he represents the OIE Regional Commission for Asia, the Far East and Oceania. In 2013, for the first time,

118 http://aid.dfat.gov.au

119 www.aciar.gov.au

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.

Australia's Delegate to the OIE, along with other Australian experts, participated in the 28th Conference of the OIE Regional Commission for Asia, the Far East and Oceania, held in Cebu, the Philippines, on 18–22 November 2013.

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. These activities are conducted by the Australian Government Department of Agriculture 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 2013, joint animal health surveys were conducted in the New Ireland, East New Britain and West New Britain provinces of PNG, and the eastern districts of Timor-Leste. The Department of Agriculture also funded:

- an animal health monitoring program in PNG, in which NAQIA planned and conducted five activities in various locations
- a rabies workshop and subsequent rabies public awareness activities in high-risk coastal areas in Timor-Leste — Timor-Leste is currently free from rabies, and these activities aimed to help maintain that status.

Activities such as these gather information about the presence and distribution of animal diseases important to Australia and its near neighbours, including risk factors for their spread. Participants develop their 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 is conducting pest and disease surveys of Norfolk Island. The surveillance outcomes will be used to determine whether there is any threat to Norfolk Island's unique environment, and whether it is possible to change the island's quarantine regulations to reduce barriers to tourism and other investment. During the surveys, samples were collected from livestock on Norfolk Island, in cooperation with the island's veterinarian. The samples were tested for a range of diseases at the Elizabeth Macarthur Agricultural Institute, New South Wales. The animal disease status of Norfolk Island is broadly similar to, or better than, Australia's status for the same diseases.

9.3 Overseas aid

The Australian Government's overseas aid program is improving the lives of millions of people in developing countries. Australia is working with the governments and people of developing countries to deliver aid where it is most needed and most effective. Australia's aid program focuses on the Indo-Pacific region.

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

Australia's international development assistance for pandemics and EIDs is guided by the Pandemics and Emerging Infectious Diseases Framework 2010–2015. Under this framework, Australia assists partner countries in Asia and the Pacific to translate gains in preventing, detecting and controlling diseases (e.g. H5N1 avian influenza and severe acute respiratory syndrome) into stronger systems for responding to EIDs. The framework supports a long-term, systemic approach that strengthens the capacity of partner governments to deal with EIDs more broadly, rather than dealing with a single disease in isolation.

The framework has four objectives:

- promoting adherence to international standards of animal and human health
- strengthening systems for preventing, detecting and controlling EIDs, particularly at the community level
- responding to outbreaks of EIDs when they occur
- building an evidence base for the response to EIDs.

Australia supports partner governments in building surveillance systems and improving their ability to respond to emerging disease threats. This includes 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 health security, as well as for productivity at the farm level.

9.3.1 Previous contributions to pandemics and EIDs

Since 2003, Australia has played a leading role in the response to pandemics and EIDs in the region. It has provided more than $200 million to assist countries to strengthen prevention, detection and response capabilities. Through the previous Pandemics and Emerging Infectious Diseases Framework (2006–10), Australia contributed $100 million to partner governments, nongovernment organisations, and regional and multilateral institutions to strengthen EID capacity and response. Assistance provided under this framework significantly improved the capacity of countries to respond to pandemics and EIDs.

Department of Agriculture

9.3.2 Current commitments to pandemics and EIDs

Current commitments, guided by the Pandemics and Emerging Infectious Diseases Framework 2010–2015, 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)
- $12.7 million to the OIE to strengthen veterinary services and to better manage animal-borne diseases in the region, 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 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. The initiative is strengthening the capacity of animal health sectors in Southeast Asian countries to prevent, control and eradicate priority transboundary animal diseases and zoonoses.

The four objectives of STANDZ are to:

- support regional and international coordination on animal health in Southeast Asia
- strengthen the capacity of national veterinary services, consistent with OIE tools and standards
- develop, better resource and implement priority animal disease management strategies; this includes providing more intensive in-country support to the South-East Asia and China Foot and Mouth Disease program (SEACFMD), consistent with the revised 2020 roadmap for the program
- strengthen the capacity of the OIE Sub-Regional Representation for South-East Asia in priority areas of embedding gender and social issues in project design and delivery, monitoring and evaluation, operations research, and communications.

The Department of Agriculture will continue to provide technical and governance support to DFAT for the STANDZ initiative.

PREVENT Community-based Emerging Infectious Disease Risk Reduction in the Mekong

Strengthening the capacity of communities to prevent, detect and control EIDs in the Mekong region is a key objective of the Pandemics and Emerging Infectious Diseases Framework 2010–2015. The framework underscores prevention at the community level, since this is where EIDs are most likely to emerge. It is also where timely recognition and response to threats can be most effective in preventing the spread of disease. However, knowledge, systems and capacities are often weak at the community level.

The Australian Government partners with USAID to deliver the PREVENT Community-based Emerging Infectious Disease Risk Reduction in the Mekong project (2012–15). Australian support is earmarked to high-risk, poor communities in priority countries, including Burma, Cambodia, Laos and Vietnam.

PREVENT's operational research focuses on generating new knowledge on EID transmission from wildlife. It also examines the context-specific (e.g. socioeconomic, political and cultural) factors motivating the behaviours of people and organisations that expose them to higher risk of EID infection. PREVENT will conduct communication activities for social and behavioural change to promote more effective and locally sustainable preventive practices that pre-empt the spread of EIDs.

Australia–Indonesia Partnership for Emerging Infectious Diseases, Animal Health, 2010–14

In December 2010, the Australian Government committed $22 million for the Australia–Indonesia Partnership for Emerging Infectious Diseases, Animal Health, 2010–14. This program builds on previous work relating to avian influenza and focuses on strengthening the Indonesian animal health systems to meet the challenges presented by EIDs. In this context, EIDs are new diseases

originating in animals that have the potential to infect and spread between humans, with serious consequences for human populations.

Program activities concentrate on strengthening capacity in disease planning and management, subnational field activities (in South Sulawesi and West Sulawesi), quarantine, information management and animal health laboratories. Activities in 2013 included:

- commencing the building of an integrated national animal health information system
- supporting foot-and-mouth disease and rabies emergency response exercises
- providing support for strengthening capacity to prevent, prepare and respond to emergencies
- providing support for preparation of a national strategic plan for brucellosis control, and district control plans in three pilot districts
- training to support standardised and harmonised testing for rabies, anthrax and brucellosis
- training to laboratories in proficiency testing, quality assurance, records management and validation of laboratory test kits
- developing guidelines to help assess quarantine risk pathways
- training in planning and budgeting for animal health (in all districts of South Sulawesi and West Sulawesi)
- building capacity of field staff (in South Sulawesi and West Sulawesi) in passive disease reporting, disease recognition, disease investigation and disease management.

Improving the management of animal health in Indonesia will benefit both Indonesia and Australia. It will protect animal and human health, increase agricultural production, support economic development and international trade, help alleviate poverty and promote regional stability.

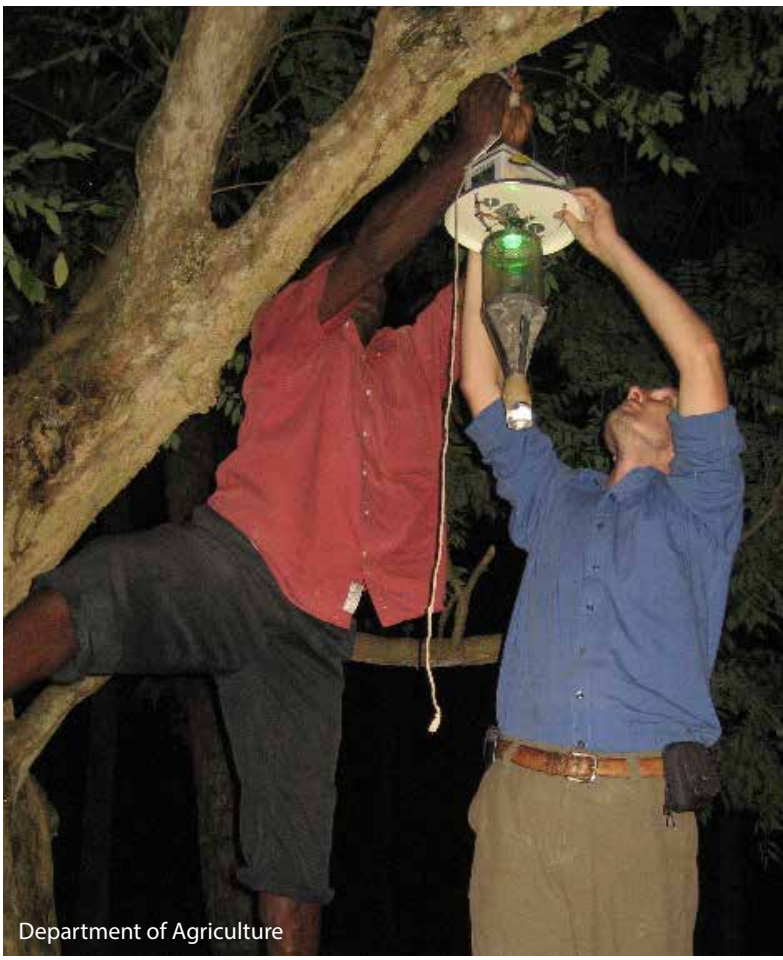
The program is being delivered by Australian technical advisers from the Department of Agriculture who are based in Jakarta and Makassar (South Sulawesi), in partnership with their animal health counterparts in the Indonesian Government.

Public Sector Linkages Program

In 2013, the Department of Agriculture managed two projects in the Asia–Pacific region that were supported by the Public Sector Linkages Program. The program, which is no longer offering new rounds, provided funds to Australian Government agencies and statutory authorities to work with their counterpart public sector agencies in partner countries. Program activities include training, work placements and twinning arrangements. These activities aim to transfer capacity-building skills and expertise, and strengthen linkages that focus on sustainable development.

Projects included:

- strengthening the animal health surveillance and reporting network throughout provincial PNG through a series of training workshops and systematic reporting using mobile phone (SMS) technology (completed in 2013)
- building Timor-Leste's animal health laboratory capacity, following training provided by the FAO under its previous biosecurity strengthening project (ongoing). (A well-functioning and sustainable animal health laboratory is a key component of Timor-Leste's progress towards a functional animal health system.)



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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.

Specifically, ACIAR's animal health program supports research organisations in Australia and partner countries to use multidisciplinary approaches to solve problems in smallholder animal health and production. The program focuses on Indonesia, the Mekong region, the Philippines, PNG and southern Africa. Progress and final reports of projects are published on the ACIAR website[120] and via other media.

9.4.1 Indonesia

Important animal diseases in Indonesia include anthrax, avian influenza, brucellosis, classical swine fever and rabies. Research is being undertaken to support strategies to manage these diseases, including:

- a project on improving monitoring and control of avian influenza
- a project on smallholder pig systems in eastern Indonesia (as well as in Timor-Leste), with a focus on the 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.

9.4.2 Mekong region

Major livestock diseases such as foot-and-mouth disease 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.

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120 www.aciar.gov.au

Research projects include:

- three projects on biosecurity and transboundary animal diseases in Laos and Cambodia, focusing on village-based biosecurity in Cambodia, and on risk management of transboundary animal diseases and 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 control of a tapeworm (*Taenia solium*) that spreads through pigmeat and can cause serious neurological disease in people
- a project in Burma that aims to improve the health and production of small ruminants, cattle, buffalo and poultry in the central dry zone
- a new project, implemented through the OIE, that is examining livestock movement and the control of transboundary animal diseases in SEACFMD countries. The project builds on earlier ACIAR-funded research on understanding livestock movement and the risk of spread of transboundary animal diseases in Laos and Cambodia.

9.4.3 The Philippines

A new project building on previous work on respiratory diseases of pigs aims to improve production and competitiveness of smallholder pig production systems through better pig health and biosecurity.

9.4.4 Papua New Guinea

Building on a previous project on syndromic surveillance in PNG, a new project 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.

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 livestock producers. It is examining constraints to smallholder livestock production and ways to improve livestock marketing systems.

In Tanzania and Zambia, a project aims to demonstrate that poultry health and production can be improved by more closely integrating village poultry with crop production systems.

CSIRO Australian Animal Health Laboratory

Chapter 10

Research and development

The Commonwealth Scientific and Industrial Research Organisation (CSIRO), the cooperative research centres, Australia's veterinary schools, and industry-based research and development corporations participate in an active research program in livestock health.

This chapter summarises Australian research in livestock health during 2013. Individual research projects are listed in Appendix 4.

10.1 CSIRO Australian Animal Health Laboratory and Biosecurity Flagship

Research at the CSIRO Australian Animal Health Laboratory (CSIRO-AAHL), and through the CSIRO Biosecurity Flagship, includes terrestrial and aquatic animal health, and diseases that affect both people and animals.

The research is undertaken on behalf of Australia to manage 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. Lessons learnt from CSIRO-AAHL's research activities are provided through published scientific papers and participation in numerous 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 disease, including characterisation of arboviruses (arthropod-borne viruses) and their vectors, insect innate immunity, vaccines and episystems (the biological and environmental factors affecting a disease at a particular time and place).

Research activity is supported by funding from CSIRO, the Australian Government Department of Agriculture and external funding bodies. A small selection of projects undertaken during 2013 is presented in Table A4.1.

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Director
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10.2 Biosecurity Animal Division of the Australian Government Department of Agriculture

The Biosecurity Animal Division 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 in complexity increase. Strategic foresight is useful when managing uncertainty, both now and in the future. The Biosecurity Animal Division therefore uses strategic foresight to consider current and future 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 Biosecurity Animal Division to identify, understand and respond to significant emerging issues before they establish or become critical.

Some of the Biosecurity Animal Division's strategic foresight activities for 2013 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 aims to identify early emerging trends relevant to the management of animal health in the medium term in Australia. Emerging trends that have been identified include synthetic biology, the future of food, the increasing interest in zoonoses from (and to) animals, new uses of social media and the growing importance of waste in all its forms (e.g. food waste, electronic waste and plastic waste)
- cooperative work with Quadrilateral Group partners (Canada, New Zealand and the United States) on future approaches to identify and heighten awareness of emerging issues
- participation in the Australasian Joint Agencies Scanning Network.[121] The group is facilitated by a professional futurist.

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10.3 Cooperative research centres

10.3.1 Cooperative Research Centre for High Integrity Australian Pork

The overall objective of the health program of the previous Cooperative Research Centre (CRC) for an Internationally Competitive Pork Industry was to reduce the impact of disease on the efficiency of pork production. It aimed to improve pig survival and growth performance through strategies other than reliance on antibiotics, and to reduce medication and veterinary costs.

The CRC for an Internationally Competitive Pork Industry finished operation in July 2011 and has been replaced by the CRC for High Integrity Australian Pork (Pork CRC). The new Pork CRC also has a program directed at improving animal health and reducing antibiotic use in the industry.

The Pork CRC has three subprograms within Program 2 (Animal health management):

- SP-1 — Diagnostic and health monitoring systems to control disease. This will concentrate on real-time diagnostics, and monitoring pathogen challenge loads in the environment and the pig.
- SP-2 — New pig genotypes and genetic technologies to provide immune competence traits for disease resilience. This will be based on existing and unique overseas lines, genomic and phenotypic relationships for robustness traits (based on Australian and overseas genetics), and statistical methodology for incorporating environmental pathogen challenge data in current breeding programs.

121 www.ajasn.com.au

- SP-3 — Integrated alternative health strategies and technologies to reduce the reliance on antibiotics.

Pork CRC research projects funded in 2013 are listed in Table A4.2. Details are available on the Pork CRC website.[122]

Contact: CRC for High Integrity Australian Pork
Email: roger.campbell@porkcrc.com.au

10.3.2 Cooperative Research Centre for Sheep Industry Innovation

The major focus of the parasite project of the CRC for Sheep Industry Innovation (Sheep CRC) is the development and communication of efficient and sustainable management recommendations for internal and external sheep parasites.

Recent activities have focused on upgrading the Boss parasite management websites to increase accessibility and provide additional information. The redeveloped WormBoss site was launched in November 2012.[123] It includes a series of regional worm control plans and a comprehensive anthelmintic information guide. A similar redevelopment is in progress for LiceBoss,[124] with a review of the technical content and site layout. The more recent FlyBoss website[125] will also be updated, when required.

A series of technical workshops based on the Boss websites has been run in all states for the past two years. The workshops help sheep producers develop control plans against blowfly strike (Managing Flystrike) and sheep worms (WormBoss Regional Plans).

A significant initiative in progress is the development of ParaBoss, a national parasite management coordination program. ParaBoss[126] will ensure the maintenance and updating of the Boss websites, facilitate communication activities, and provide a technical forum for the debate of parasite control issues. Current activities centre on identifying a host organisation for the ParaBoss program after the Sheep CRC terminates.

No further experimental activities are in progress. However, the outcome of investigations into strategies to minimise the development of anthelmintic resistance will lead to modifications to the strategies, as appropriate for different environments, which will be incorporated into general recommendations. Strategies include targeted treatment for individual sheep within flocks, to reduce anthelmintic exposure. Also in progress is data analysis from the Information Nucleus flocks. This will provide genetic parameters for genetic resistance of sheep to worms, and correlations with production and other traits. Two postgraduate students will complete these studies within the next 2–3 years.

Current Sheep CRC projects are listed in Table A4.3.

Contact: CRC for Sheep Industry Innovation
Email: sheepcrc@sheepcrc.org.au

10.3.3 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 1 — Designer Forages
  - Deliver a range of plant breeding technology — both genetic manipulation and conventional — for ryegrass, to provide benefits in persistence and yield.
  - Deliver DNA-based tools for plant selection and quality assurance of endophytes on a commercial scale.
  - Identify novel endophytes that can form superior associations with ryegrass.
  - Extend ryegrass technology into warm-season grasses.
  - Identify the capacity for genetic manipulation of white clover to increase persistence and yield, and extend research into lucerne.
- Program 2 — Animal Improvement
  - Deliver technology that substantially expands Australia's national DNA reference set, thus increasing the reliability of genomic products, for both elite sires and commercial cows.

122 www.porkcrc.com.au
123 www.wormboss.com.au
124 www.liceboss.com.au
125 www.flyboss.com.au
126 www.paraboss.com.au

- Complete the commercialisation process for the use of genomic selection in Holstein and Jersey breeds.
- Complete an international collaboration to map the entire DNA sequence of 1000 key ancestor bulls.
- Use genomic selection to drive progress with difficult traits such as fertility, and to assess new traits such as feed-conversion efficiency.
- Expand the value of animal breeding through the production of sex-selected semen using two approaches: induced true cattle stem cells, and antibodies to sex-specific proteins on the surface of sperm.

Contact: Dairy Futures CRC
Email: enquiries@dairyfuturescrc.com.au

10.3.4 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 — will undertake research to link the fundamental aspects of feeding to environmental outcomes.
- Program 3 — Safe & Quality Food Production — aims to control foodborne illness associated with poultry products.

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, or hatchery or breeder farms. These events are vital to forming strong links between current and future researchers and industry, to keep research relevant and focused on the end user.

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. In addition, 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 websites,[127] and by subscribing to the 'eChook' newsletter. Current projects are listed in Table A4.4.

Contact: Poultry CRC
Email: info@poultrycrc.com.au

10.4 University research programs

10.4.1 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

127 www.poultrycrc.com.au; www.poultryhub.org

PhD training opportunities to Australian and international students.

Charles Sturt University has recently developed the National Life Sciences Hub on its Wagga Wagga campus. The hub provides world-class research laboratory facilities, and a site for interaction and collaboration between researchers from the various schools on the campus and other research organisations.

Academic staff in the School of Animal and Veterinary Sciences have research interests in animal health across a range of species and disciplines. The school offers research training that focuses on production animal research, with an emphasis on sustainable livestock production systems, as well as equine medicine and surgery, 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 major research groupings are:

- animal physiology, reproduction and genetics
- parasitology, infectious diseases and animal health
- public health
- animal welfare
- nutrition and production
- clinical sciences
- research in teaching.

Contact: Professor Nick Sangster
School of Animal and Veterinary Sciences
Email: nsangster@csu.edu.au

10.4.2 Murdoch University

Research into animal health and production has a high priority within the School of Veterinary and Life Sciences at Murdoch University.

Research areas of particular importance include:

- animal production and animal health (e.g. meat quality, efficiency of production)
- animal biosecurity and public health
- biomolecular approaches to disease control
- aquatic animal health
- wildlife and conservation medicine
- companion animal health
- animal welfare (e.g. practical approaches to developing indicators for animal welfare, the live export industry).

Researchers are active in projects to improve production, health and welfare in the sheep, cattle, pig, poultry and equine industries. Of particular interest are the growing areas of animal biosecurity, public health, One Health and animal welfare.

More information can be found on the website of the School of Veterinary and Life Sciences.[128]

Contact: Professor David Hampson
Email: d.hampson@murdoch.edu.au

10.4.3 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, including the South Australian Research and Development Institute, the Department of Primary Industries and Resources South Australia, the Pig and Poultry Production Institute, and Martindale Holdings. In addition, the school is building partnerships with Zoos South Australia, TAFE South Australia, and the Institute of Medical and Veterinary Science.

The research interests of the school 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.

128 www.murdoch.edu.au/School-of-Veterinary-and-Life-Sciences

The research profile has expanded greatly over the past years, with key research appointments in veterinary infectious diseases, veterinary epidemiology and veterinary public health, as well as the clinical disciplines.

Table A4.5 lists the current research projects of the School of Animal and Veterinary Sciences.

Contact: Professor Michael P Reichel
Email: michael.reichel@adelaide.edu.au

10.4.4 University of Melbourne

The Faculty of Veterinary Science[129] 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
- understanding the pharmacology of vasoactive agents and the pathophysiology of laminitis
- wildlife disease surveillance.

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CSIRO Australian Animal Health Laboratory

129 www.vet.unimelb.edu.au

10.4.5 University of Queensland

The completion in 2010 of new veterinary science facilities at the University of Queensland's Gatton campus was a key component of the university's strategy to develop world-class, on-campus animal and veterinary science facilities. Since then, the university has further strengthened its animal health capability through the formation, with the Queensland Government, of a new research institute — the Queensland Alliance for Agriculture and Food Innovation (QAAFI).[130]

Several staff in the School of Veterinary Science and the School of Agriculture and Food Sciences hold affiliate appointments in QAAFI. In the beef cattle area, QAAFI has seen the formation of the Northern Beef Research Alliance: a collaboration between the university, the Queensland Government and CSIRO. The alliance seeks to facilitate sharing of existing research infrastructure, establish new shared infrastructure, and sustain an appropriate number of beef researchers through staff and student exchanges, joint appointments and co-locations.

Research strengths of the School of Veterinary Science are in:

- infectious disease and pathology
- companion animal health
- genetics and reproduction
- production animal health, with a focus on beef cattle
- animal welfare science and ethics.

The school is also fostering an emerging strength in wildlife health and biology.

Contact: Professor Michael Holland
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10.4.6 University of Sydney

The Faculty of Veterinary Science,[131] 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 research and development (R&D) corporations.

The faculty's research[132] strengths are concentrated in:

- 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: Associate Professor Peter Williamson
Associate Dean Research
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10.5 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 do research themselves.

10.5.1 Australian Egg Corporation Limited

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

130 www.qaafi.uq.edu.au

131 www.sydney.edu.au/vetscience

132 www.sydney.edu.au/vetscience/research

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 on-farm levels of 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 rapid diagnosis of hen health problems
- ensuring that disease research, which acts as an industry 'insurance policy', is conducted.

The AECL is a major contributor and core participant in the Poultry CRC (see Section 10.3.4).

Current AECL projects are listed in Table A4.6.

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Managing Director
Email: james@aecl.org

10.5.2 Australian Honey Bee Council

The Australian Honey Bee Industry Council participated in the Asian Honey Bee Transition to Management Program (AHB T2M). The program has estabilised an Asian Honey Bee Transition Management Group and an Asian Honey Bee Scientific Advisory Group. Further information on the AHB T2M can be found in Section 2.4.3 and on the program's website.[133]

10.5.3 Australian Wool Innovation Limited

The mission of Australian Wool Innovation Limited[134] is to invest in R&D, marketing and promotion to:

- enhance the profitability, international competitiveness and sustainability of the Australian wool industry
- increase demand and market access for Australian wool.


Animal Health Australia

The 2013 calendar year was covered by two operational plans (2012–13 and 2013–14), which focus on:

- sheep health, welfare and productivity for efficient production and wool quality through
  - improvements in fly, lice and worm management
  - reduced impact of wild dog predation
  - reduced impact of husbandry practices
  - improved tools for labour efficiency
  - efficient reproduction rate
  - genetic gain
- efficient delivery of high-quality wool clips through
  - career promotion to increase recruitment into shearing and wool harvesting
  - delivery of high-quality training
  - retention of those trained within the sector
- managing productive and profitable wool growing systems while improving the eco-credentials of wool through
  - new and improved tools to help wool growers make better informed decisions
  - nutrient-use efficiency

133 http://asianhoneybee.net.au

134 www.wool.com/en/home

- grazing and pasture management
- carbon management
- feed utilisation
- chemical-use efficiency

- education and extension, including
  - effective communication with growers and the community
  - new skills training for growers
  - peer support and networking
  - leadership and mentoring
  - availability of production experts.

Table A4.7 lists Australian Wool Innovation Limited's current research projects.

Contact: Jane Littlejohn
Head On-Farm RDE
Email: jane.littlejohn@wool.com

10.5.4 Dairy Australia

Dairy Australia, the dairy industry's service company, 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 is 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 research, development and extension has focused on projects for prevention and control of cattle diseases, genetic improvement, better 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 disease occurrence, 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 Downunder[135] is Australia's national extension program for prevention, diagnosis and treatment of mastitis; the InCalf[136] project focuses on improving reproductive performance; and BJD Aware[137] promotes strategies to manage and control bovine Johne's disease. CowTime,[138] 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 was achieved in December 2009, and 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 to plant and animal breeding.

Contact: Dr Robin Condron
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10.5.5 Fisheries Research and Development Corporation — Aquatic Animal Health Subprogram

The Fisheries Research and Development Corporation (FRDC) invests in areas of R&D that aim to benefit all sectors of Australian fisheries: the commercial sector (wild catch, aquaculture and post-harvest), the recreational sector and the Indigenous sector.

The FRDC's Aquatic Animal Health Subprogram was established specifically to develop, support and manage a portfolio of aquatic animal health research projects, in consultation with the fisheries and aquaculture industry. The focus of the subprogram is infectious (viral, bacterial, fungal and parasitic) diseases of finfish, crustaceans and molluscs.

135 countdown2020@dairyaustralia.com.au

136 www.dairyaustralia.com.au/Animal-management/Fertility/About-InCalf.aspx

137 www.bjdaware.com.au

138 www.cowtime.com.au

Australian aquaculture continues to grow and currently contributes close to 43% ($948 million) of Australian fisheries' gross value of production ($2.23 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.[139] The revised Aquatic Animal Health Subprogram R&D Plan can be obtained by contacting the subprogram leader. Table A4.8 lists current research projects.

Contact: Dr Mark Crane
Subprogram Leader
Email: mark.crane@csiro.au

10.5.6 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. MLA invests in research into:

- Johne's disease (ovine and bovine) — diagnostics, prevention, epidemiology, economics
- respiratory disease in feedlot cattle
- bovine ephemeral fever
- plant intoxications
- nutritional (including trace mineral) deficiencies
- internal and external parasites in cattle, goats and sheep — management, diagnosis and epidemiology
- diagnosis, treatment and epidemiology of emerging diseases, such as *Theileria orientalis*
- control of scouring in sheep and young calves
- diseases of localised geographic significance (e.g. anthrax, bovine balanitis, besnoitiosis in macropods).


Animal Health Australia

139 http://frdc.com.au/research/aquatic_animal_health

Department of Agriculture

MLA also invests in research that will improve disease surveillance, both to demonstrate freedom from disease and improve biosecurity. This includes better tools for screw-worm fly diagnosis and incursion control, bluetongue diagnosis and vector distribution, response to foot-and-mouth disease, and capripox diagnosis.

Table A4.9 lists MLA's livestock health research projects. More information can be found on the MLA website.[140]

Contact: Scott Hansen
Managing Director
Email: shansen@mla.com.au

10.5.7 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 RIRDC's Chicken Meat, Honeybee, Horse and New Animal Products programs.

In 2013, a substantial number of reports from completed projects relating to animal health were published. These can be accessed on the RIRDC website,[141] together with detailed reports of projects in progress.

RIRDC projects relating to animal health in 2013 are listed in Table A4.10.

Contact: Anwen Lovett
Executive Manager
Email: Anwen.Lovett@rirdc.gov.au

140 www.mla.com.au

141 www.rirdc.gov.au

Shutterstock: Kezza

Appendix 1

Livestock industries in Australia[142]

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 smaller intensive pig, poultry, fisheries and aquaculture industries.

Changes in livestock numbers since 2009–10 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	2009–10	2010–11	2011–12	2012–13
Sheep	68.1	73.1	74.7	73.8
Cattle				
Beef	24.0	25.9	25.7	25.5
Dairy	2.5	2.6	2.7	2.9
Total[a]	*26.6*	*28.5*	*28.4*	*28.4*
Pigs	2.3	2.3	2.1	2.0
Poultry[b]	83.0	90.7	94.2	na

na = not available
a Figures may not add to totals due to rounding
b Meat chickens and laying hens only
Sources: Australian Bureau of Agricultural and Resource Economics and Sciences (2013). *Agricultural commodities: December quarter 2013*, ABARES, Canberra, www.daff.gov.au/abares/pages/publications/display.aspx?url=http://143.188.17.20/anrdl/DAFFService/display.php?fid=pb_agcomd9abcc004201312_11a.xml.
Australian Bureau of Statistics (2013). *Agricultural commodities, Australia, 2011–12*, cat. no. 7121.0, ABS, Canberra, www.abs.gov.au/AUSSTATS/abs@.nsf/mf/7121.0. (For poultry data only)

Livestock industries are located across most agricultural and pastoral areas of Australia.

In 2012–13, the gross value of Australian livestock and livestock products was estimated to be $20.1 billion. Exports of livestock and livestock products were worth $14.9 billion.

142 All figures provided in the tables in this appendix are based on Australian financial years, which run from 1 July to 30 June.

Meat, wool and eggs

Australia has a highly developed meat industry and is a major producer of meat and meat products. In 2012–13, the gross value of Australian livestock slaughtering was estimated to be $12.3 billion.

In 2012–13, Australian exports of beef, veal, sheepmeat, poultry and pork (not including live animals) were worth $6.6 billion. Selected meat 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	2009–10	2010–11	2011–12	2012–13
Beef and veal	899	937	948	1014
Mutton	111	86	89	144
Lamb	157	157	174	201
Pork	30	31	29	26
Poultry	28	31	38	32

Source: Australian Bureau of Agricultural and Resource Economics and Sciences (2013). *Agricultural commodities: December quarter 2013*, ABARES, Canberra, www.daff.gov.au/abares/pages/publications/display.aspx?url=http://143.188.17.20/anrdl/DAFFService/display.php?fid=pb_agcomd9abcc004201312_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.

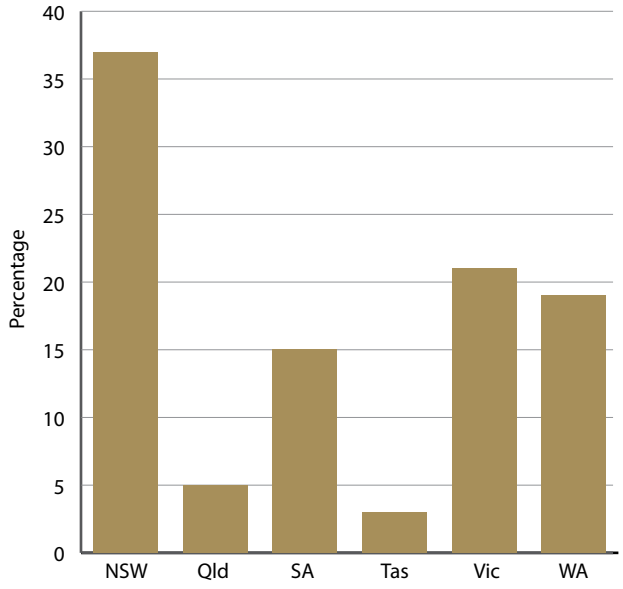
Sheepmeat and wool

Sheep are used to produce meat and wool across a wide range of environments in Australia, from the arid and semi-arid inland to the higher rainfall areas of south-eastern Australia. Most Australian sheep are produced as part of mixed-farming enterprises, frequently along with cropping and beef production.

In 2012–13, sheep numbers were estimated to have declined by 1% to 74 million. This decline follows two consecutive years of strong 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.

During 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 and Asia, has led to a greater emphasis on prime lamb production. Flock numbers steadily declined as significant numbers of wethers (nonbreeding adult sheep), previously used in wool production, were turned off. Farming of specialty meat breeds, such as Dorper and Damara (which do not produce any harvestable wool) is a small but growing sector.

Total wool production increased by 6% in 2012–13 to 435 100 tonnes. Wool cut per head is estimated to have increased by 5% in 2012–13 to 4.41 kilograms per sheep, the highest since 2005–06. Total wool exports increased by 8% to 437 700 tonnes in greasy equivalent. However, the value of wool exports declined by 8% to $2.9 billion. Selected production and export figures for the wool and sheepmeat industries are shown in Table A1.3.



NSW = New South Wales; Qld = Queensland; SA = South Australia; Tas = Tasmania; Vic = Victoria; WA = Western Australia

Source: Australian Bureau of Statistics (2013). *Agricultural commodities, Australia, 2011–12*, cat. no. 7121.0, ABS, Canberra, www.abs.gov.au/AUSSTATS/abs@.nsf/mf/7121.0.

Figure A1.1 Sheep distribution by state, 30 June 2012

Table A1.3 Australian sheep industry production

Sheep production	2010–11	2011–12	2012–13
Sheep numbers (millions)	73.1	74.7	73.8
Sheep slaughterings (millions)	5.3	5.2	8.2
Lamb slaughterings (millions)	17.9	18.9	21.1
Total wool production (kilotonnes)	429.1	410.8	435.1
Mutton production (kilotonnes carcase weight)	123.2	119.7	183.2
Lamb production (kilotonnes carcase weight)	391.3	419.3	457.0
Sheepmeat exports (kilotonnes shipped weight)	242.7	262.9	344.2
Value of sheepmeat exports ($ million)	1429.5	1422.0	1564.4
Live sheep exports (millions)	2.9	2.6	2.0
Value of wool exports ($ million)	3048.0	3123.0	2869.0

Source: Australian Bureau of Agricultural and Resource Economics and Sciences (2013). *Agricultural commodities: December quarter 2013*, ABARES, Canberra, www.daff.gov.au/abares/pages/publications/display.aspx?url=http://143.188.17.20/anrdl/DAFFService/display.php?fid=pb_agcomd9abcc004201312_11a.xml.

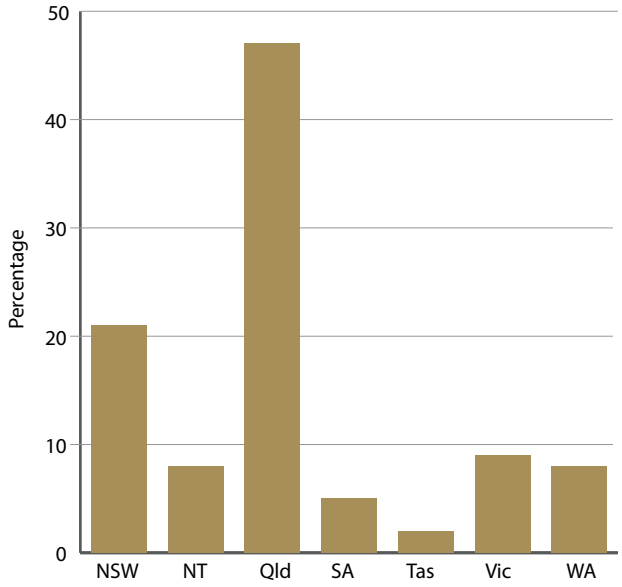
Beef cattle

Cattle are raised across much of Australia (see Figure A1.2). 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. The main outputs are beef, animals for lot feeding and live cattle exports.

In southern Australia, cattle are produced on smaller holdings than those in the north, and graze largely on improved pastures. Breeds derived from *B. taurus* dominate, and smaller, younger animals are produced than in the north.

Improved seasonal conditions in south-eastern and northern Australia between 2010 and 2012 encouraged restocking and reduced cattle turn-off. The improved conditions contributed to an increase in the national herd of approximately 2 million animals in 2010–11 to 25.9 million. Since then, drier seasonal conditions, particularly in northern Australia, have led to a decline to 25.5 million animals in 2012–13.

The volume of Australian beef exports increased by 7% in 2012–13 to approximately 1 million tonnes. The value of these exports increased by 9% to approximately $4.9 billion. The number of live cattle exported for slaughter decreased by 11% in 2012–13 to 513 053 animals (Table A1.4).



NSW = New South Wales; NT = Northern Territory; Qld = Queensland; SA = South Australia; Tas = Tasmania; Vic = Victoria; WA = Western Australia

Source: Australian Bureau of Statistics (2013). *Agricultural commodities, Australia, 2011–12*, cat. no. 7121.0, ABS, Canberra, www.abs.gov.au/AUSSTATS/abs@.nsf/mf/7121.0.

Figure A1.2 Beef cattle distribution by state and territory, 30 June 2012

Table A1.4 Australian beef cattle production

Beef cattle production	2010–11	2011–12	2012–13
Total beef cattle (millions)	25.9	25.7	25.5
Slaughterings (millions)	8.1	7.9	8.5
Beef and veal production (kilotonnes carcase weight)	2133.4	2114.8	2245.0
Live cattle exports (thousands)	728.2	578.6	513.1
Value of live cattle exports ($ million)	499.1	411.7	338.6
Beef exports (kilotonnes shipped weight)	937.3	948.3	1013.9
Value of beef exports ($ million)	4327.7	4466.6	4865.8

Source: Australian Bureau of Agricultural and Resource Economics and Sciences (2013). *Agricultural commodities: December quarter 2013*, ABARES, Canberra, www.daff.gov.au/abares/pages/publications/display.aspx?url=http://143.188.17.20/anrdl/DAFFService/display.php?fid=pb_agcomd9abcc004201312_11a.xml.

Pigs

The number of pigs slaughtered was largely unchanged in 2012–13 compared with 2011–12, at 4.7 million (Table A1.5). Pigmeat production increased by approximately 2% to 355 800 tonnes, while the volume of Australian pigmeat exported declined by approximately 11% to 26 200 tonnes (shipped weight). In 2012–13, exports (in carcase weight equivalent) accounted for approximately 12% 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 2012, Australia had 1488 pig farms, holding a total of 236 600 sows.[143] This compares with 2007–08, when Australia had 1625 pig farms, holding a total of 263 000 sows. In 2011–12, Queensland had the largest number of pigs, followed by Victoria and New South Wales.

Poultry meat and eggs

Poultry farming in Australia is an intensive industry, producing birds for meat and egg production. The poultry industry has grown over recent years, resulting in lower retail prices for poultry. Meat chickens comprise approximately 86% of the flock and layer hens approximately 14%. 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 2011–12, approximately 4013 businesses produced more than 298 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 was estimated to have increased by approximately 12% in 2012–13 to $653 million (Table A1.6).

Goats

Australia is the world's largest exporter of goatmeat, despite the small size of the Australian goatmeat industry. 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 goatmeat 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.

The Australian market for goatmeat is small.

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.

143 Australian Bureau of Statistics (2013). *Agricultural commodities, Australia*, 2011–12, cat. no. 7121.0, ABS, Canberra, www.abs.gov.au/AUSSTATS/abs@.nsf/mf/7121.0.

Table A1.5 Australian pig production

Pig production	2010–11	2011–12	2012–13
Total pigs (millions)	2.3	2.1	2.0
Breeding sows, including gilts (thousands)	295.0	267.0	310.0
Slaughterings (millions)	4.6	4.7	4.7
Pigmeat production (kilotonnes carcase weight)	342.1	350.5	355.8
Pigmeat exports (kilotonnes shipped weight)	31.0	29.4	26.2
Value of pigmeat exports ($ million)	106.3	100.1	81.2
Gross value of production ($ million)	919.1	933.7	933.7

Sources: Australian Bureau of Agricultural and Resource Economics and Sciences (2013). *Agricultural commodities: December quarter 2013*, ABARES, Canberra, www.daff.gov.au/abares/pages/publications/display.aspx?url=http://143.188.17.20/anrdl/DAFFService/display.php?fid=pb_agcomd9abcc004201312_11a.xml.
Australian Bureau of Agricultural and Resource Economics and Sciences (2013). *Agricultural commodity statistics 2013*, ABARES, Canberra, www.daff.gov.au/abares/publications_remote_content/publication_series/australian_commodity_statistics. (For breeding sow data only)

Table A1.6 Australian poultry production

Poultry production	2010–11	2011–12	2012–13
Meat chickens (millions)[a]	77.6	80.8	na
Layer hens and pullets for egg production (millions)	13.1	13.4	na
Poultry slaughterings (millions)[a]	549.9	551.3	563.3
Poultry meat production (kilotonnes carcase weight)[b]	1015.0	1030.1	1046.2
Exports of poultry meat (kilotonnes shipped weight)[c]	30.7	37.8	31.9
Value of poultry meat exports ($ million)[c]	38.4	45.4	42.8
Value of egg production ($ million)	572.2	583.4	653.0
Value of meat production ($ million)	2077.2	2078.1	2213.8

na = not available
a Chickens only
b Includes all poultry
c Excludes processed poultry meat

Sources: Australian Bureau of Agricultural and Resource Economics and Sciences (2013). *Agricultural commodities: December quarter 2013*, ABARES, Canberra, www.daff.gov.au/abares/pages/publications/display.aspx?url=http://143.188.17.20/anrdl/DAFFService/display.php?fid=pb_agcomd9abcc004201312_11a.xml. (For layer hen and pullet data only)
Australian Bureau of Statistics (2013). *Agricultural commodities, Australia, 2011–12*, cat. no. 7121.0, ABS, Canberra, www.abs.gov.au/AUSSTATS/abs@.nsf/mf/7121.0.

Game meat

Australia produces high-quality game meats from animals grazed on native grasslands. Game meat products include venison, kangaroo and buffalo.

Venison

In 2010–11, Australia had 1436 deer farms, carrying a total of 45 073 animals. Deer farms are located throughout Australia, but production is concentrated in Queensland, Victoria, New South Wales and Tasmania. The estimated gross value of production of the industry in 2011–12 was $1.66 million, mainly from production of meat and antler velvet. The number of deer processed in 2011–12 was 5784, down from almost 47 000 in 2002–03. The combination of extended drought and lower prices in recent years for both venison and deer velvet have resulted in deer farmers leaving the industry.

Kangaroo

The gross value of production of the kangaroo industry in 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 average price received by farmers was $727 per animal, compared with an average of $783 per animal over the previous four years. 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 2011–12. Victoria has 66% 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 1.71 million in 2012–13 (Table A1.7).

Australian milk production declined from approximately 9.5 billion litres in 2011–12 to approximately 9.2 billion litres in 2012–13. The decline in milk production and lower farm-gate prices for milk resulted in the gross value of milk production falling by 8% in 2012–13 to $3.7 billion.

In 2012–13, Australia exported processed dairy products worth $2.23 billion to about 100 countries (Table A1.8).

Fisheries and aquaculture

Australia has diverse wild-catch and aquaculture fisheries that produce both native and introduced species. In 2011–12, the gross value of fisheries production was approximately $2.3 billion. The value and volume of fisheries production for 2010–11 and 2011–12 are shown in Table A1.9.

Farmed aquaculture production in Australia includes many major species, such as tuna, salmon, barramundi, abalone and oysters. It is an important component of Australian fisheries production. Between 2001–02 and 2011–12, aquaculture's share of the total value of Australian fisheries production grew from 30% to 46%. The volume of

Table A1.7 Australian dairy production

Dairy production	2010–11	2011–12	2012–13
Dairy cow numbers (millions)	1.59	1.70	1.71
Total milk production (million litres)	9100.0	9480.1	9199.8
Milk yield per cow (litres)	5726.9	5576.5	5389.5
Gross value of milk production ($ million)	3931.8	3986.4	3687.3

Source: Australian Bureau of Agricultural and Resource Economics and Sciences (2013). *Agricultural commodities: December quarter 2013*, ABARES, Canberra, www.daff.gov.au/abares/pages/publications/display.aspx?url=http://143.188.17.20/anrdl/DAFFService/display.php?fid=pb_agcomd9abcc004201312_11a.xml.

aquaculture production in Australia rose by 10% in 2011–12 to approximately 84 600 tonnes. The value of aquaculture production increased by 10% to approximately $1.05 billion.

Selected figures for the volume of production and gross value of aquaculture harvests in 2011–12 are shown in Table A1.10.

Table A1.8 Australian dairy production and exports (kilotonnes)

	Total production			Exports		
Dairy product	2010–11	2011–12	2012–13	2010–11	2011–12	2012–13
Cheese	338.7	346.5	338.3	163.2	161.2	174.1
Butter and butter fat	122.5	119.7	118.2	56.0	48.6	53.7
Milk powder[a]	378.7	375.5	337.4	268.5	247.9	237.8

a Includes whole milk powder, skim milk powder and casein

Source: Australian Bureau of Agricultural and Resource Economics and Sciences (2013). *Agricultural commodities: December quarter 2013*, ABARES, Canberra, www.daff.gov.au/abares/pages/publications/display.aspx?url=http://143.188.17.20/anrdl/DAFFService/display.php?fid=pb_agcomd9abcc004201312_11a.xml.

Table A1.9 Australian fisheries production by species

	Volume of production (kilotonnes)		Value of production ($ million)	
Fishery	2010–11	2011–12	2010–11	2011–12
Abalone	5.2	5.0	178.4	170.1
Oysters	13.9	15.7	97.3	107.4
Prawns	27.0	22.5	306.3	266.2
Rock lobster	9.9	8.7	389.9	384.1
Salmonids	36.8	44.0	427.5	512.6
Scallops	6.2	2.3	22.0	7.8
Tuna	9.1	10.1	139.0	172.3
Other fish	112.0	112.6	428.2	456.3
Other crustaceans and molluscs[a]	16.9	16.6	252.5	239.4
Total[ab]	**237.1**	**237.5**	**2241.0**	**2316.3**

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 (2013). *Australian fisheries statistics 2012*, ABARES, Canberra, http://data.daff.gov.au/data/warehouse/9aam/afstad9aamd003/2012/AustFishStats_2012_v1.0.0.pdf.

Table A1.10 Australian aquaculture production, 2011–12

Aquaculture production	Volume of production (kilotonnes)	Gross value of production ($ thousand)
Fish		
Barramundi	4.5	41 061
Salmonids	44.0	512 577
Silver perch	0.3	4 260
Tuna	7.1	150 000
Other[a]	2.0	21 867
Total[b]	*57.9*	*729 764*
Crustaceans		
Marron	0.06	1 787
Prawns	3.9	59 069
Redclaw	0.04	792
Yabbies	0.05	742
Total[b]	*4.1*	*62 390*
Molluscs		
Abalone	0.6	19 192
Mussels	3.4	9 288
Oysters — edible	15.7	107 369
Oysters — pearl	na	102 312
Total[b]	*19.8*	*238 160*
Production not included elsewhere	*2.8*	*23 789*
Total[bc] (all categories)	**84.6**	**1 054 104**

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 (2013). *Australian fisheries statistics 2012*, ABARES, Canberra, http://data.daff.gov.au/data/warehouse/9aam/afstad9aamd003/2012/AustFishStats_2012_v1.0.0.pdf.

Exports of Australian edible fisheries products, shown in Table A1.11, totalled 40 461 tonnes and were worth $1 billion in 2011–12.

Bees

In 2012–13, honey production was estimated at 23 033 tonnes. The gross value of the whole industry was estimated at $87.8 million, of which $77.8 million was honey production. The remainder was made up of beeswax, pollination services, package bees and queens.

The Australian honey bee industry comprises approximately 10 500 registered beekeepers operating about 542 900 hives of European honey bees. Most honey bee operators are small, family-owned and family-operated businesses. Many of these, particularly businesses with fewer than 250 hives, derive most of their income from other enterprises, investments or government sources. Larger operations (those with more than 500 hives) tend to specialise in honey production, and thus depend on their honey bee businesses as their 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.

Table A1.11 Australian fisheries products exports

	Volume (kilotonnes)			Value ($ thousand)		
Type of food	2009–10	2010–11	2011–12	2009–10	2010–11	2011–12
Edible	40.9	42.4	40.5	987 081	990 346	1 000 719
Non-edible	na	na	na	258 974	257 865	226 050

na = not available
Note: Excludes live tonnage but includes live value
Source: Australian Bureau of Agricultural and Resource Economics and Sciences (2013). *Australian fisheries statistics 2012*, ABARES, Canberra, http://data.daff.gov.au/data/warehouse/9aam/afstad9aamd003/2012/AustFishStats_2012_v1.0.0.pdf.

Further information

Further information on each of the industries may be found on 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.[144]

144 www.daff.gov.au/abares

Appendix 2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Appendix 3


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Investigations of emergency animal diseases

Table A3.1 reports investigations during 2013 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, 2013

Disease	Species	State	Month	Response code[a]	Finding
African horse sickness	Horse	WA	Jan	3	Negative
American foulbrood (*Paenibacillus larvae*)	Bees	NSW	Apr	2	Negative
	Bees	NSW	May	2	Negative
	Bees	NSW	May	2	Positive
	Bees	NSW	Jun	2	Negative
	Bees	NSW	Aug	2	Negative (3 unrelated investigations)
	Bees	NSW	Aug	2	Positive
	Bees	NSW	Oct	2	Negative
	Bees	NSW	Oct	2	Positive
	Bees	NSW	Dec	2	Positive
	Bees	Qld	Jan	2	Negative
	Bees	Qld	Jan	2	Positive (3 unrelated investigations)
	Bees	Qld	Feb	2	Positive (10 unrelated investigations)
	Bees	Qld	Mar	2	Negative (2 unrelated investigations)
	Bees	Qld	Mar	2	Positive (5 unrelated investigations)
	Bees	Qld	Apr	2	Negative (2 unrelated investigations)
	Bees	Qld	Apr	2	Positive (4 unrelated investigations)
	Bees	Qld	May	2	Negative (2 unrelated investigations)

Table A3.1 *continued*

Disease	Species	State	Month	Response code[a]	Finding
American foulbrood (*Paenibacillus larvae*) *continued*	Bees	Qld	May	2	Positive (5 unrelated investigations)
	Bees	Qld	Jun	2	Positive
	Bees	Qld	Jul	2	Positive (5 unrelated investigations)
	Bees	Qld	Aug	2	Negative
	Bees	Qld	Aug	2	Positive (9 unrelated investigations)
	Bees	Qld	Sep	2	Negative (4 unrelated investigations)
	Bees	Qld	Sep	2	Positive (10 unrelated investigations)
	Bees	Qld	Oct	2	Negative (5 unrelated investigations)
	Bees	Qld	Oct	2	Positive (10 unrelated investigations)
	Bees	Qld	Nov	2	Positive (7 unrelated investigations)
	Bees	Qld	Dec	2	Negative (2 unrelated investigations)
	Bees	Qld	Dec	2	Positive (6 unrelated investigations)
Anaplasmosis in tick-free areas	Cattle	Qld	Apr	2	Positive[b]
Aujeszky's disease	Pig	NT	Feb	3	Negative
	Pig	SA	Jun	3	Negative
	Pig	SA	Aug	3	Negative
	Pig	WA	Nov	3	Negative
Australian bat lyssavirus	Cat	Vic	Jun	2	Negative
	Dog	NSW	Jul	3	Negative
	Dog	NSW	Aug	3	Negative
	Dog	NSW	Dec	2	Negative
	Dog	Qld	May	3	Negative
	Dog	Qld	Jul	2	Negative
	Horse	NSW	Jun	2	Negative
	Horse	NSW	Jul	3	Negative
	Horse	NSW	Dec	3	Negative
	Horse	Qld	May	2	Negative (2 unrelated investigations)
	Horse	Qld	May	5	Positive (3 related investigations)
	Horse	Qld	Jun	2	Negative
	Horse	Qld	Oct	2	Negative
	Horse	Qld	Dec	2	Negative
Babesiosis in tick-free areas	Cattle	NSW	Mar	2	Negative
	Cattle	NSW	Jul	2	Negative
	Cattle	NSW	Aug	2	Negative
	Cattle	NSW	Sep	2	Negative
Bluetongue — clinical disease[c]	Cattle	NSW	Dec	2	Negative (2 unrelated investigations)
	Cattle	SA	Nov	3	Negative
	Cattle	Vic	May	2	Negative
	Cattle	Vic	Jun	2	Negative (2 unrelated investigations)
	Goat	SA	Jul	2	Negative
	Sheep	NSW	May	2	Negative
	Sheep	NSW	Aug	2	Negative (2 unrelated investigations)

Table A3.1 *continued*

Disease	Species	State	Month	Response code[a]	Finding
Bluetongue — clinical disease[c] *continued*	Sheep	NSW	Sep	2	Negative
	Sheep	NSW	Oct	2	Negative
	Sheep	NSW	Dec	2	Negative (2 unrelated investigations)
	Sheep	SA	Jun	3	Negative
	Sheep	Vic	May	2	Negative (2 unrelated investigations)
	Sheep	Vic	Jun	2	Negative
Bovine virus diarrhoea type 2	Cattle	Vic	Apr	2	Negative (5 unrelated investigations)
	Cattle	Vic	May	2	Negative (6 unrelated investigations)
Brucellosis (*Brucella abortus, B. suis, B. canis* and *B. melitensis*)	Cattle	Qld	Mar	2	Negative
	Cattle	Vic	Jul	2	Negative
	Cattle	Vic	Nov	2	Negative (2 unrelated investigations)
	Cattle	Vic	Dec	2	Negative
	Dog	Qld	Oct	3	Negative
	Dog	Qld	Nov	2	Positive[d]
	Goat	SA	Aug	2	Negative
	Goat	Vic	Aug	2	Negative (2 related investigations)
	Goat	Vic	Oct	2	Negative
	Horse	NSW	Sep	2	Negative
	Pig	Qld	Jan	2	Negative
	Pig	Qld	Mar	2	Negative
	Sheep	Vic	Jul	2	Negative
Classical swine fever	Pig	NT	Sep	3	Negative
	Pig	SA	Jun	3	Negative
	Pig	SA	Aug	3	Negative
Contagious equine metritis	Horse	Tas	Apr	2	Negative
	Horse	Vic	Jul	2	Negative (2 unrelated investigations)
Duck virus enteritis — duck plague	Bird	NSW	Jun	3	Negative
Enzootic bovine leucosis	Cattle	Vic	Sep	2	Negative
Epizootic haemorrhagic disease (clinical disease)	Cattle	NSW	Dec	2	Negative (2 unrelated investigations)
Equine influenza	Horse	NSW	May	2	Negative
	Horse	NSW	Dec	2	Negative
	Horse	NT	Aug	2	Negative
	Horse	Qld	May	2	Negative
	Horse	Qld	Jun	2	Negative
	Horse	Qld	Jul	2	Negative
	Horse	Qld	Aug	2	Negative
	Horse	Qld	Nov	2	Negative
	Horse	SA	Feb	3	Negative
European foulbrood *(Melissococcus pluton)*	Bees	Qld	Jan	2	Negative
	Bees	Qld	Feb	2	Positive
	Bees	Qld	Mar	2	Negative (2 unrelated investigations)

Table A3.1 *continued*

Disease	Species	State	Month	Response code[a]	Finding
European foulbrood (*Melissococcus pluton*) *continued*	Bees	Qld	Mar	2	Positive (2 unrelated investigations)
	Bees	Qld	Apr	2	Negative (2 unrelated investigations)
	Bees	Qld	May	2	Negative (3 unrelated investigations)
	Bees	Qld	May	2	Positive (2 unrelated investigations)
	Bees	Qld	Jun	2	Positive
	Bees	Qld	Aug	2	Negative (2 unrelated investigations)
	Bees	Qld	Aug	2	Positive (3 unrelated investigations)
	Bees	Qld	Sep	2	Negative (4 unrelated investigations)
	Bees	Qld	Oct	2	Negative (6 unrelated investigations)
	Bees	Qld	Nov	2	Negative
	Bees	Qld	Nov	2	Positive (2 unrelated investigations)
	Bees	Qld	Dec	2	Negative (2 unrelated investigations)
	Bees	Qld	Dec	2	Positive
Foot-and-mouth disease	Cattle	NSW	Jan	3	Negative
	Cattle	NSW	May	2	Negative
	Cattle	NSW	Jul	3	Negative
	Cattle	NSW	Aug	3	Negative (2 unrelated investigations)
	Cattle	NSW	Sep	3	Negative
	Cattle	NSW	Nov	3	Negative
	Cattle	NSW	Dec	2	Negative
	Cattle	NSW	Dec	3	Negative (2 unrelated investigations)
	Cattle	SA	Jul	3	Negative
	Cattle	SA	Nov	3	Negative
	Cattle	Vic	Mar	3	Negative
	Cattle	Vic	Apr	3	Negative
	Cattle	Vic	Jun	3	Negative
	Cattle	Vic	Sep	3	Negative
	Cattle	Vic	Oct	3	Negative
	Cattle	Vic	Nov	3	Negative
	Cattle	Vic	Dec	3	Negative
	Goat	Vic	Aug	3	Negative
	Pig	NSW	Jun	2	Negative
	Pig	Vic	Jul	3	Negative
	Sheep	SA	Jun	3	Negative
	Sheep	Vic	Mar	3	Negative
	Sheep	Vic	May	3	Negative
	Sheep	Vic	Jul	3	Negative
	Sheep	Vic	Sep	3	Negative (2 unrelated investigations)
	Sheep	Vic	Sep	3	Negative (3 related investigations)
	Sheep	Vic	Oct	3	Negative (2 unrelated investigations)
	Sheep	Vic	Nov	3	Negative (5 unrelated investigations)
	Sheep	WA	Feb	3	Negative

Table A3.1 *continued*

Disease	Species	State	Month	Response code[a]	Finding
Glanders	Horse	SA	Aug	2	Negative
	Horse	SA	Sep	2	Negative
Hendra virus infection	Cat	Qld	Jul	5	Negative (3 related investigations)
	Dog	NSW	Apr	2	Negative
	Dog	NSW	Jul	3	Positive
	Dog	Qld	May	3	Negative
	Dog	Qld	Jul	5	Negative (2 related investigations)
	Horse	NSW	Jan	2	Negative (3 unrelated investigations)
	Horse	NSW	Mar	2	Negative
	Horse	NSW	Apr	2	Negative (17 unrelated investigations)
	Horse	NSW	May	2	Negative (9 unrelated investigations)
	Horse	NSW	May	3	Negative
	Horse	NSW	Jun	2	Negative (15 unrelated investigations)
	Horse	NSW	Jun	3	Positive
	Horse	NSW	Jul	2	Negative (3 unrelated investigations)
	Horse	NSW	Jul	2	Positive
	Horse	NSW	Jul	3	Negative (7 unrelated investigations)
	Horse	NSW	Jul	3	Positive (3 unrelated investigations)
	Horse	NSW	Aug	3	Negative (2 unrelated investigations)
	Horse	NSW	Sep	3	Negative (5 unrelated investigations)
	Horse	NSW	Oct	2	Negative (4 unrelated investigations)
	Horse	NSW	Nov	2	Negative (6 unrelated investigations)
	Horse	NSW	Dec	2	Negative (4 unrelated investigations)
	Horse	NT	Jan	2	Negative (3 unrelated investigations)
	Horse	NT	Jan	3	Negative
	Horse	NT	Feb	2	Negative
	Horse	NT	Apr	2	Negative
	Horse	NT	Jul	2	Negative (3 unrelated investigations)
	Horse	NT	Aug	2	Negative (2 unrelated investigations)
	Horse	NT	Sep	2	Negative (3 unrelated investigations)
	Horse	NT	Oct	2	Negative
	Horse	NT	Nov	2	Negative (2 unrelated investigations)
	Horse	Qld	Jan	2	Negative (29 unrelated investigations)
	Horse	Qld	Jan	3	Negative
	Horse	Qld	Jan	5	Negative
	Horse	Qld	Jan	5	Positive
	Horse	Qld	Feb	2	Negative (39 unrelated investigations)
	Horse	Qld	Feb	5	Negative (4 related investigations)
	Horse	Qld	Feb	5	Positive
	Horse	Qld	Mar	2	Negative (2 related investigations)
	Horse	Qld	Mar	2	Negative (36 unrelated investigations)
	Horse	Qld	Mar	3	Negative
	Horse	Qld	Mar	5	Negative (2 related investigations)

Table A3.1 *continued*

Disease	Species	State	Month	Response code[a]	Finding
Hendra virus infection *continued*	Horse	Qld	Apr	2	Negative (31 unrelated investigations)
	Horse	Qld	May	2	Negative (3 related investigations)
	Horse	Qld	May	2	Negative (43 unrelated investigations)
	Horse	Qld	Jun	2	Negative (34 unrelated investigations)
	Horse	Qld	Jun	3	Negative (3 unrelated investigations)
	Horse	Qld	Jun	5	Negative
	Horse	Qld	Jun	5	Positive
	Horse	Qld	Jul	2	Negative (80 unrelated investigations)
	Horse	Qld	Jul	5	Negative (7 related investigations)
	Horse	Qld	Jul	5	Positive
	Horse	Qld	Aug	2	Negative (59 unrelated investigations)
	Horse	Qld	Sep	2	Negative (44 unrelated investigations)
	Horse	Qld	Sep	3	Negative
	Horse	Qld	Oct	2	Negative (34 unrelated investigations)
	Horse	Qld	Nov	2	Negative (37 unrelated investigations)
	Horse	Qld	Dec	2	Negative (18 unrelated investigations)
	Horse	SA	Jan	3	Negative (2 unrelated investigations)
	Horse	SA	Feb	3	Negative
	Horse	SA	May	3	Negative
	Horse	SA	Jul	3	Negative
	Horse	SA	Aug	3	Negative (2 unrelated investigations)
	Horse	SA	Oct	3	Negative (2 unrelated investigations)
	Horse	SA	Nov	3	Negative (2 unrelated investigations)
	Horse	Vic	Jan	2	Negative
	Horse	Vic	May	2	Negative
	Horse	Vic	Jun	2	Negative (2 unrelated investigations)
	Horse	Vic	Jul	3	Negative (4 unrelated investigations)
	Horse	Vic	Aug	3	Negative
	Horse	Vic	Sep	3	Negative (2 unrelated investigations)
	Horse	Vic	Oct	3	Negative
	Horse	Vic	Nov	3	Negative (2 unrelated investigations)
	Horse	Vic	Dec	3	Negative (2 unrelated investigations)
	Horse	WA	Jun	3	Negative
	Horse	WA	Sep	3	Negative
Japanese encephalitis	Pig	NT	Feb	3	Negative
Leishmaniasis of any species	Dog	Qld	Jan	3	Negative
	Dog	Qld	Jan	3	Positive[e]
Malignant catarrhal fever — wildebeest associated	Cattle	Vic	Sep	3	Negative
Nipah virus infection	Pig	SA	Aug	3	Negative
Porcine reproductive and respiratory syndrome	Pig	SA	Jun	3	Negative
	Pig	WA	Jul	3	Negative (2 unrelated investigations)
	Pig	WA	Nov	3	Negative

Table A3.1 *continued*

Disease	Species	State	Month	Response code[a]	Finding
Post-weaning multisystemic wasting syndrome	Pig	Qld	May	2	Negative (2 unrelated investigations)
Pulmonary adenomatosis — Jaagsiekte	Sheep	Tas	Jan	2	Negative
Rabies	Horse	SA	Aug	3	Negative
	Horse	WA	Sep	3	Negative
	Horse	WA	Oct	3	Negative
	Horse	WA	Nov	3	Negative
Salmonella Enteritidis infection in poultry	Chicken	Qld	Jun	2	Positive[f]
	Turkey	Qld	Sep	2	Negative
Swine influenza	Pig	Vic	Aug	3	Negative
	Pig	Vic	Sep	3	Negative (3 unrelated investigations)
	Pig	Vic	Oct	3	Negative (2 unrelated investigations)
	Pig	Vic	Dec	3	Negative
	Pig	WA	Feb	2	Negative
	Pig	WA	Apr	2	Negative (2 unrelated investigations)
	Pig	WA	May	2	Negative
Transmissible gastroenteritis	Pig	WA	Sep	3	Negative
Transmissible spongiform encephalopathies (bovine spongiform encephalopathy, chronic wasting disease of deer, feline spongiform encephalopathy, scrapie)	Buffalo	Vic	Jan	2	Negative
Tropilaelaps mite (*Tropilaelaps clareae*)	Bees	Qld	Aug	2	Negative (2 unrelated investigations)
	Bees	Qld	Sep	2	Negative
Tuberculosis (*Mycobacterium bovis*)	Cattle	Qld	Jan	2	Negative (10 granulomas examined)
	Cattle	Qld	Apr	2	Negative (12 granulomas examined)
	Cattle	Qld	Jul	2	Negative (10 granulomas examined)
	Cattle	Qld	Oct	2	Negative (2 granulomas examined)
	Cattle	SA	Oct	2	Negative (1 granulomas examined)
	Cattle	Vic	Jan	2	Negative (2 granulomas examined)
	Cattle	Vic	Apr	2	Negative (2 granulomas examined)
	Cattle	Vic	Jul	2	Negative (1 granulomas examined)
	Cattle	Vic	Oct	2	Negative (2 granulomas examined)
	Cattle	WA	Jan	2	Negative (1 granulomas examined)
	Cattle	WA	Apr	2	Negative (4 granulomas examined)
Varroosis (*Varroa destructor*)	Bees	Qld	Aug	2	Negative (2 unrelated investigations)
	Bees	Qld	Sep	2	Negative
	Bees	Vic	Jan	2	Negative
	Bees	Vic	May	2	Negative
	Bees	Vic	Sep	2	Negative
	Bees	Vic	Nov	2	Negative (3 unrelated investigations)
	Bees	Vic	Dec	2	Negative (2 unrelated investigations)
	Bees	Qld	Aug	2	Negative (2 unrelated investigations)
	Bees	Qld	Sep	2	Negative

Table A3.1 *continued*

Disease	Species	State	Month	Response code[a]	Finding
Vesicular stomatitis	Cattle	NSW	Jan	3	Negative
	Cattle	NSW	Aug	3	Negative (2 unrelated investigations)
	Cattle	NSW	Dec	2	Negative
	Cattle	NSW	Dec	3	Negative
	Cattle	SA	Jul	3	Negative
	Cattle	SA	Nov	3	Negative
	Cattle	Vic	Sep	3	Negative
	Goat	Vic	Aug	3	Negative
	Horse	NSW	Sep	3	Negative
	Horse	Qld	Jul	3	Negative
	Horse	WA	Jun	3	Negative
	Horse	WA	Aug	3	Negative
	Pig	Vic	Jul	3	Negative
	Sheep	SA	Jun	3	Negative
	Sheep	Vic	Sep	3	Negative (3 related investigations)
West Nile virus infection — clinical	Bird	SA	Jul	3	Negative
	Bird	SA	Sep	3	Negative
	Bird	SA	Oct	3	Negative
	Bird	SA	Dec	3	Negative (2 unrelated investigations)
	Horse	NSW	Apr	2	Negative (4 unrelated investigations)
	Horse	NSW	May	3	Negative
	Horse	NSW	Jul	2	Negative
	Horse	NSW	Aug	2	Negative
	Horse	NSW	Oct	2	Negative (4 unrelated investigations)
	Horse	NSW	Nov	2	Negative (2 unrelated investigations)
	Horse	NSW	Dec	2	Negative (2 unrelated investigations)
	Horse	Qld	Mar	3	Negative
	Horse	SA	May	3	Negative
	Horse	SA	Aug	3	Negative (2 unrelated investigations)
	Horse	SA	Oct	3	Negative (2 unrelated investigations)
	Horse	SA	Nov	3	Negative (2 unrelated investigations)
	Horse	Tas	Mar	2	Negative
	Horse	Tas	Apr	2	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 *Anaplasma marginale* was detected by blood smear examination.

c For additional negative monitoring data, see the National Arbovirus Monitoring Program: www.animalhealthaustralia.com.au/programs/disease-surveillance/national-arbovirus-monitoring-program.

d It is not uncommon for dogs used for pig hunting, as this dog is, to be infected with *Brucella suis*. The dog has spent its entire life in Australia and is receiving appropriate antibiotic therapy under private veterinary supervision.

e The dog, an 8-year-old Siberian husky, was imported to Australia in 2007. The dog had lived in Portugal and spent time travelling between Portugal and the United Kingdom before arriving in Australia, where it has remained in southeast Queensland.

f Destocked under supervision by Safe Food Production Queensland.

Appendix 4


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Research projects in livestock health

Tables A4.1–A4.10 list some of the research projects in livestock health undertaken during 2013 by the Commonwealth Scientific and Industrial Research Organisation, and some of Australia's cooperative research centres, veterinary schools, and industry-based research and development corporations. Further information on research and development activities by these organisations is provided in Chapter 10.

Table A4.1 Commonwealth Scientific and Industrial Research Organisation Australian Animal Health Laboratory and Biosecurity Flagship animal health research projects

Project	Granting body/collaborator
Development of necrotic enteritis vaccines	Poultry Cooperative Research Centre
Development of interferon lambda as an in ovo vaccine adjuvant	Poultry Cooperative Research Centre
Development of a *Campylobacter* vaccine	Poultry Cooperative Research Centre
Gut microbes in poultry	Poultry Cooperative Research Centre
Infectious bursal disease virus vaccines and surveillance	Rural Industries Research and Development Corporation
Development of antivirals for Hendra virus	CSIRO
Hendra virus detection	CSIRO
Development of a mouse model for Hendra infection	National Health and Medical Research Council, Zoetis Australia
Development of a vaccine for Hendra virus	Australian Government Department of Agriculture
Emerging infectious diseases: development of novel antiviral treatments for henipavirus infections	National Institutes of Health (United States)
Foot-and-mouth disease risk assessment	Meat & Livestock Australia, Animal Health Australia
Control of sex determination in poultry	Poultry Cooperative Research Centre
Development of avian influenza–resistant poultry	Malta Advanced Technologies (Germany)

Table A4.1 *continued*

Project	Granting body/collaborator
Improving diagnostic capability for henipavirus infections	Australian Biosecurity Cooperative Research Centre for Emerging Infectious Disease, National Institutes of Health (United States), Australian Government Department of Agriculture
Development of molecular diagnostic tests for rapid identification and differentiation of important poultry viruses (infectious bursal disease virus, Newcastle disease virus, avian influenza)	Rural Industries Research and Development Corporation
Evaluation of rapid molecular detection and characterisation systems for risk evaluation of unknown viruses isolated in Australia	Defence Science and Technology Organisation, Australian Biosecurity Cooperative Research Centre for Emerging Infectious Disease
Pathogenicity of porcine reproductive and respiratory syndrome (PRRS) in pigs	CSIRO
Australian influenza viruses	Australian Government Department of Agriculture, Food and Agriculture Organization of the United Nations, Australian Government Department of Foreign Affairs and Trade, National Health and Medical Research Council
Emerging bat viruses	CSIRO, National Health and Medical Research Council, Australian Research Council
Highly pathogenic avian influenza in ducks in Indonesia and Vietnam	Australian Centre for International Agricultural Research
Koi herpesvirus as a potential biological control agent	Invasive Animals Cooperative Research Centre
Pathogenesis of highly pathogenic avian influenza	National Institutes of Health (United States)
Mycobacterium paratuberculosis as potential zoonotic pathogen with food safety concerns	CSIRO, Victorian Department of Environment and Primary Industries
Development of quality-assured bioreagents for molecular diagnosis of viral and bacterial pathogens, and for research purposes	CSIRO, Australian Government Department of Agriculture
Novel, based on protein-array, diagnostic test for capripox	CSIRO, Meat & Livestock Australia
Hendra virus micro-ribonucleic acid (miRNA) detection for early diagnosis of infection	Rural Industries Research and Development Corporation, National Health and Medical Research Council
Development of modified eggs and cell lines for enhanced production of influenza vaccines	National Institutes of Health (United States), University of Georgia (United States)
Assessment of the bluetongue virus vector potential of selected *Culicoides* species in southern Australia	CSIRO, Meat & Livestock Australia
Improving the management of Hendra virus infection in humans by optimisation of post-exposure therapy strategies	National Health and Medical Research Council
Understanding pathogenicity and immunity in an encephalitic mouse model of Hendra virus infection	National Health and Medical Research Council, CSIRO, Deakin University
Development of a DIVA vaccine for Hendra	CSIRO, Zoetis Australia, Uniformed Services University of the Health Sciences (United States), Intergovernmental Hendra Virus Taskforce
Novel vaccination strategies against influenza virus infections including prepandemic preparedness	CSIRO, University of Queensland, CSL Ltd
Novel post-exposure therapeutics against influenza virus infections	CSIRO, University of Melbourne, Immuron
Determinants of spikes in Hendra virus outbreaks	Rural Industries Research and Development Corporation
Development of disease model and diagnostics for African swine fever	CSIRO, Kansas State University

Table A4.2 Cooperative Research Centre for High Integrity Australian Pork animal health research projects

Project	Collaborative partners
Validation of a data collection protocol on Australian pig farms	Rivalea Australia
Real-time detection of airborne pathogens in the piggery	University of Melbourne
Comparing the mucosal and systemic immune response after APPAlive vaccination with natural challenge	New South Wales Department of Primary Industries
Evaluation of diagnostic tests to detect *Clostridium difficile* in piglets	University of Western Australia
Reduce the risk of post-weaning *E. coli* diarrhoea using a potentially innovative feeding ingredient, lupin hulls	Murdoch University
A comprehensive risk factor analysis of *E. coli* disease in the piggery environment	University of Sydney
Antibiotic sensitivity of *Haemophilus parasuis* plus *Actinobacillus pleuropneumoniae* and other respiratory pathogens	University of Queensland
Evaluation of oral fluid samples for herd health monitoring of pathogens and the immune response in pigs	New South Wales Department of Primary Industries
Development and validation of assays to measure gut health in order to identify risk factors for *E. coli* disease in weaner pigs	New South Wales Department of Primary Industries
Quantifying variation in environments within and across herds	University of New England, New South Wales Department of Primary Industries, Animal Genetics and Breeding Unit
Development of economic methodology to incorporate robustness in pig breeding programs	University of New England, New South Wales Department of Primary Industries, Animal Genetics and Breeding Unit
Estimation of genetic parameters for immune competence and other physiological priority traits for use in selection of disease resilience	University of New England, New South Wales Department of Primary Industries, Animal Genetics and Breeding Unit
Bacteriophage to control enterotoxigenic *E. coli*	University of South Australia, Rivalea Australia
Strategies to quantitatively measure and reduce the load of *Lawsonia* in commercial herds	New South Wales Department of Primary Industries, Rivalea Australia
Evaluating the efficacy of a live APP vaccine with and without bacterin vaccines	Chris Richards & Associates, Australian Pork Farms Group
Assessment of a live, attenuated, oral *Erysipelothrix rhusiopathiae* vaccine	Pfizer, Rivalea Australia
Use of plant-derived compounds to condition piglet intake at weaning and reduce post-weaning use of therapeutics	University of Queensland
Bacteriophage-displayed peptides for the control of pathogens in swine	CSIRO
Investigation of oral rennin (chymosin) supplementation as a farm-level protocol to improve the passive transfer of immunity in neonatal piglets	University of Adelaide
Passive immunisation for oedema disease	Chris Richards & Associates, University of Queensland
Reducing sucker mortality through use of a novel feed supplement	Rivalea Australia, Nutreco
Dietary manipulation of inflammatory cascade to minimise the impact of inflammation on production and health traits in weaner pigs experimentally infected with an enterotoxigenic strain of *E. coli*	Department of Agriculture and Food Western Australia, Murdoch University, Rivalea Australia

Table A4.2 *continued*

Project	Collaborative partners
Use of bacteriophage to prevent and treat enterotoxigenic *E. coli* (ETEC) infections in pigs	University of South Australia, Rivalea Australia
Enhancing intestinal barrier function through supplementation of N-acetylcysteine and arginine in diets for weaner pigs experimentally challenged with enterotoxigenic *E. coli*	Department of Agriculture and Food Western Australia, Murdoch University

Table A4.3 Cooperative Research Centre for Sheep Industry Innovation animal health research projects

Project	Research institute
ParaBoss parasite communication coordination program	Department of Agriculture and Food Western Australia; University of New England; New South Wales Department of Primary Industries; Queensland Department of Agriculture, Fisheries and Forestry
WormBoss website	Department of Agriculture and Food Western Australia; New South Wales Department of Primary Industries; Queensland Department of Agriculture, Fisheries and Forestry; University of New England; South Australian Research and Development Institute; University of Tasmania
FlyBoss website	New South Wales Department of Primary Industries; University of Tasmania; Queensland Department of Agriculture, Fisheries and Forestry; Department of Agriculture and Food Western Australia
Commercialisation of the worm-control program and supporting products for the summer rainfall region of eastern Australia	University of New England; New South Wales Department of Primary Industries; Queensland Department of Agriculture, Fisheries and Forestry
'Managing Flystrike' workshops for sheep producers	New South Wales Department of Primary Industries; Victorian Department of Environment and Primary Industries; Queensland Department of Agriculture, Fisheries and Forestry; University of Tasmania; Department of Agriculture and Food Western Australia
Parasite genetics — Information Nucleus flocks	Department of Agriculture and Food Western Australia, South Australian Research and Development Institute, University of New England, New South Wales Department of Primary Industries, Victorian Department of Environment and Primary Industries

Table A4.4 Poultry Cooperative Research Centre animal health research projects

Project	Lead research institute
Towards commercialisation of a next-generation infectious laryngotracheitis virus (ILTV) vaccine and differential enzyme-linked immunosorbent assay (ELISA)	University of Melbourne
Vaccine against *Clostridium perfringens* to protect birds from necrotic enteritis	CSIRO, Monash University
Vaccine strategies and interactions of attenuated coccidial vaccines	Bioproperties Pty Ltd
Testing a novel adjuvant to improve immune responses to *Salmonella* vaccination	University of Melbourne
Long-term protection against *Salmonella* Typhimurium	Bioproperties Pty Ltd
Development of a temperature-sensitive *Mycoplasma gallisepticum* vaccine for use in turkeys	Bioproperties Pty Ltd
Rapid multiplex polymerase chain reaction (PCR) assay for differentiating *Pasteurella multocida serovars*	Monash University
Riemerella anatipestifer diagnostics	University of Queensland
Sex determination in poultry	CSIRO
Development of interferon lambda as an adjuvant and immune enhancer for in ovo use	CSIRO
New approaches to assess welfare in free-range layers	University of New England
Development and extension of industry best practice for on-farm euthanasia of spent layer hens	Australian Egg Corporation Ltd
A new test for the measure of poultry welfare	Deakin University
Influence of betaine on embryo survival, hatchability and progeny performance	Feedworks
In ovo therapeutics to improve gut efficiency and health in the broiler chicken	University of Adelaide
Post-hatch feed restriction effects on broiler muscle growth	Ohio State University (United States)
Identification of microbial and gut-related factors driving bird performance	South Australian Research and Development Institute, University of New England, CSIRO, Ohio State University (United States)
Net energy system for the Australian chicken meat industry	University of New England
Improving the performance of free-range poultry production	University of Sydney
Replacing supplemental oil with full-fat canola seed in broiler diets	University of New England
Use of novel protein sources and improved starter feed formulation for broiler chicks	University of New England
Maximising spent litter fertiliser returns through nutrient and carbon management	Queensland Department of Agriculture, Fisheries and Forestry
Litter management strategies to reduce odour emissions from poultry litter	University of New South Wales
Molecular detection and survival of viral pathogens in litter	University of New England

Table A4.4 *continued*

Project	Lead research institute
Odour measurement and impact from spent hen composting	FSA Consulting
Adding value by sustainable waste processing	Active Research Pty Ltd
Value addition to feather from poultry-processing waste	CSIRO
Small molecule inhibitors as anti-*Campylobacter jejuni* agents	Ohio State University (United States)
Vaccine to reduce *Campylobacter* colonisation in meat chickens	CSIRO
Epidemiology of *Salmonella* on layer farms	University of Adelaide
Proteomic measures of albumen degradation as indicators of egg freshness	University of Sydney
Floor laying as a production efficiency issue in duck farming	University of Western Australia

Table A4.5 University of Adelaide — School of Animal and Veterinary Sciences animal health research projects

Project	Funding body
Characterisation of a new class of antimicrobial agent for multidrug-resistant infections	Australian Research Council, Neoculi Pty Ltd
Surveillance tools and strategies for improved control, monitoring and eradication of avian influenza in Indonesia	Australian Centre for International Agricultural Research
Besnoitiosis in Australian wildlife and significance to cattle	Meat & Livestock Australia
Measures of behavioural reactivity and their relationships with production traits in sheep	Meat & Livestock Australia
A slow-release capsule for reducing winter scours in sheep — Stage 1: Proof of concept	Meat & Livestock Australia
Public health significance of layer farm or egg-associated *Salmonella* isolates	Australian Egg Corporation Ltd
Mammary cancer and activation of transportable elements	United States Army
Detection of cows carrying a persistently pestivirus (BVDV)-infected foetus	Meat & Livestock Australia
Using specific functional dietary fibre sources to increase the number of piglets weaned per sow per litter	Australian Pork Ltd
Maternal creatine monohydrate supplementation: a novel strategy to buffer the neonate against hypoxia and reduce preweaning mortality	Australian Pork Ltd
Reshaping veterinary business curricula to improve graduates' business skills: a shared resource for educators	Office for Learning & Teaching

Table A4.5 *continued*

Project	Funding body
Influence of birth litter size and suckled litter size on gilt ovarian development	Australian Pork Ltd
Emu oil and prevention of intestinal damage	Rural Industries Research and Development Corporation
Interventions to reduce stillbirth rates and improve postnatal viability in piglets	Australian Government Department of Agriculture
Wombat health vs habit quality in the Murraylands and Eyre Peninsula regions	Department of Environment, Water and Natural Resources (South Australia)
Use of straw-filled racks to alleviate aggression in group-housed gestating sows	Primary Industries and Regions South Australia — Pig Industry Fund
Using pig-appeasing pheromones to reduce aggression in group-housed gestating sows	Primary Industries and Regions South Australia — Pig Industry Fund
Effect of swing-sided farrowing crates on sow and litter performance, behaviour and welfare	Primary Industries and Regions South Australia — Pig Industry Fund
Rapid post-weaning growth of steers reduces greenhouse gas emissions	Australian Government Department of Agriculture
Methane reduction from beef cattle in southern Australia	Australian Government Department of Agriculture
Characterisation and control of emerging, multidrug-resistant zoonotic pathogens in animals	Pfizer Australia Ltd
NEAT: networking to enhance the use of economics in animal health education, research and policy making in Europe and beyond	European Commission ERASMUS Programme
Field trials of antimicrobial agents for the treatment of mastitis	Luoda Pharma
The physiology of heat tolerance in desert birds	ANZ Holsworth Wildlife Research Fund
The effects of alternate lactation housing on piglet welfare and performance around weaning	Cooperative Research Centre for High Integrity Australian Pork
Reducing the labour costs and increasing synchrony and predictability of lactation oestrus	Cooperative Research Centre for High Integrity Australian Pork
In ovo therapeutics to improve gut health and efficiency in the broiler chicken	Poultry Cooperative Research Centre
Dietary ractopamine supplementation to improve the productivity of early parity sows	Cooperative Research Centre for High Integrity Australian Pork
Novel strategies to enhance creep attractiveness and reduce piglet mortality	Cooperative Research Centre for High Integrity Australian Pork
Egg shell quality and risks of foodborne pathogens	Poultry Cooperative Research Centre
Epidemiology of *Salmonella* on layer farms	Poultry Cooperative Research Centre
Periweaning polyamine supplementation: effects on intestinal function, growth of weaned piglets and feed conversion to slaughter	Cooperative Research Centre for High Integrity Australian Pork

Table A4.6 Australian Egg Corporation Limited animal health research projects

Project	Research institute
Dietary available phosphorus requirements of laying hens	University of Queensland
Determine the cause and methods of control for spotty liver syndrome	Scolexia Pty Ltd
Field application of Rispens-specific quantitative polymerase chain reaction (PCR) test	University of New England
Effects of rearing on inappropriate conflict behaviours that predispose cannibalism	University of Sydney, University of Melbourne
Understanding the physiology of shell pigmentation and colour deterioration in laying hens	University of New England
Public health significance of layer farm or egg-associated *Salmonella* isolates	University of Adelaide
Nutrient-specific appetite as a driver for feather pecking in hens	University of Queensland
Optimising calcium formulation in modern laying hens	University of Sydney
Free-range hen welfare: characterisation of 'indoor' and 'outdoor' hens and physical features in the range	University of Melbourne
On-farm euthanasia of spent hens	Scolexia Pty Ltd
Producer diagnostics and communication tool	Fractal Solutions
Optimising ventilation and egg production in environmentally controlled sheds	FSA Consulting
Pullet and layer flock uniformity: an epidemiological industry-based approach	University of New England
Formation of the Council for Sustainable Egg Farming	GoAhead Business Solutions

Table A4.7 Australian Wool Innovation animal health research projects

Project	Research institute
Aerial baiting for wild dogs	New South Wales Department of Primary Industries
Analgesia for sheep	CSIRO Manufacturing & Infrastructure, Meat & Livestock Australia, Troy Laboratories Pty Ltd, University of Sydney
AWI Wool Clip BESTWOOL/BESTLAMB 2011–2014	New South Wales Department of Primary Industries
Bredwell/Fedwell workshops phase 1	Meat & Livestock Australia, Murdoch University
Breech flystrike genomics project	CSIRO Manufacturing and Infrastructure
Breeding for breech strike resistance 3	CSIRO Manufacturing and Infrastructure, Department of Agriculture and Food Western Australia, University of Western Australia
Commercialisation of shearing shed safety signage kit	Clarity Print Image
Community wild dog control initiative	Barcaldine Wild Dog Syndicate, Central North Livestock Health and Pest Authority — Mudgee, Far South Coast Region National Parks, Granite Borders Landcare Committee Inc., Hargraves Hill End Wild Dog Group, Ledknapper Wild Dog Action Group Inc., Longreach Division 3 South Dog Action Working Group, Northern Mallee Declared Species Group
CSIRO carbon credentials	CSIRO Food and Nutritional Sciences
Dicyclanil resistance survey	New South Wales Department of Trade and Investment
EverGraze IV 2012–2014	Future Farm Industries Cooperative Research Centre
Eyre Peninsula Agricultural Research Foundation	Primary Industries and Regions South Australia
FSA life cycle assessment	Feedlot Services Australia Pty Ltd
Improving producer confidence in the wheat and sheep zone	CSIRO Manufacturing and Infrastructure
Invasive Animals CRC contribution 2012–13 to 2016–17	Invasive Animals Ltd
Laser depilation alternative	CSIRO Manufacturing and Infrastructure, Zeta Corp LLC
Leading Sheep 2011–2014	Australian Government Department of Agriculture
Lifetime ewe management (LTEM III)	Rural Industries Skill Training Centre Inc.
Lifetime Productivity Program	Airlie Solutions Pty Ltd, Australian Merino Sire Evaluation, New South Wales Department of Primary Industries, South Australian Research and Development Institute
National Bestprac Program 2011–2013	Rural Directions Pty Ltd
National Wool Survey	Australian Wool Testing Authority
NSW DPI grazing management	New South Wales Department of Primary Industries
NSW DPI whole farm training development	New South Wales Department of Primary Industries
Sheep genetics	Meat & Livestock Australia, Animal Genetics and Breeding Unit
Online Feed on Offer (FOO)	Rural Industries Skill Training Centre Inc.
Phosphorus efficient pasture systems	Meat & Livestock Australia
Phosphorus reactions and fluxes	Meat & Livestock Australia

Table A4.7 *continued*

Project	Research institute
Maximising pasture production under low phosphorus inputs	Victorian Department of Environment and Primary Industries
Production forecasting 2012–13 to 2013–14	Meat & Livestock Australia, Miracle Dog Pty Ltd
Queensland wild dog trapping schools	Agforce Queensland
Reproduction Management Training Package IV	Rural Industries Skill training Centre Inc.
Shearer and wool handler training — AACC Qld 2012–13	Australian Agricultural College Corporation
Shearer and wool handler training — CY O'Connor WA 2012–13	CY O'Connor Institute
Shearer and wool handler training — PET Tasmania	Primary Employers Tasmania
Shearer and wool handler training — regional competitions 2011–13	Various show societies
Shearer and wool handler training — SCAA Victoria 2012–13	Shearing Contractors Association of Australia Shearer Woolhandler Training Inc.
Shearer and wool handler training — TAFE NSW Western Institute	TAFE New South Wales — Western Institute
Shearer and wool handler training — TAFE SA regional 2012–13	TAFE South Australia
Shearer and wool handler training — TAFE Riverina 2012–13	TAFE New South Wales — Riverina Institute
Sheep Connect New South Wales 2012–2015	New South Wales Department of Primary Industries
Sheep Connect South Australia 2011–2014	Primary Industries and Regions South Australia
Sheep Connect Tasmania	University of Tasmania
Sheep CRC2 improved parasite management	Cooperative Research Centre for Sheep Industry Innovation
Sheep CRC2 Information Nucleus — design and analysis	Cooperative Research Centre for Sheep Industry Innovation
Sheep CRC2 Information Nucleus — operations	Cooperative Research Centre for Sheep Industry Innovation
Sheep CRC2 postgraduate training	Cooperative Research Centre for Sheep Industry Innovation
Sheep CRC2 reproductive efficiency	Cooperative Research Centre for Sheep Industry Innovation
Sheep genetics/Merino Select 2010–2015	Meat & Livestock Australia
Sheep scouring	Meat & Livestock Australia
The Sheep's Back 2011–2014	Icon Agriculture, Trustee of the Richie Family Trust
Wild Dog Coordinator	Agforce Queensland, Victorian Department of Environment and Primary Industries, Primary Industries and Regions South Australia
Wild dog on-ground activities	Australian Bureau of Agricultural and Resource Economics and Sciences
Wild dogs skills western division NWS	New South Wales Department of Trade and Investment

Table A4.8 Fisheries Research and Development Corporation (Aquatic Animal Health Subprogram) animal health research projects

Project	Research institute
Strategic planning, project management and adoption	CSIRO
Characterisation of abalone herpes-like virus infections in abalone	CSIRO; Tasmanian Department of Primary Industries, Parks, Water and Environment; University of Adelaide
Surveys of ornamental fish for pathogens of quarantine significance	University of Sydney
Research methods to manage pathogenic microbiological and biological organism within a redclaw (*Cherax quadricarinatus*) egg incubator hatchery to improve survival and reliability	James Cook University, AquaVerde redclaw hatchery and farm
Investigation of an emerging bacterial disease in wild Queensland gropers, marine fish and stingrays with production of diagnostic and epidemiological tools to reduce the spread of disease to other states in Australia	Queensland Department of Agriculture, Fisheries and Forestry
Improved fish health management for integrated inland aquaculture through better management practices (BMPs)	Victorian Department of Environment and Primary Industries
Investigations into the genetic basis of resistance to infection of abalone by the abalone herpes-like virus	CSIRO
Development of improved molecular diagnostic tests for *Perkinsus olseni* in Australian molluscs	CSIRO, Department of Fisheries Western Australia
Investigation of inclusions in Australian prawns	Department of Fisheries Western Australia
Determining the susceptibility of Australian species of prawns to infectious myonecrosis	CSIRO
Pacific oyster mortality syndrome (POMS) — understanding biotic and abiotic environmental and husbandry effects to reduce economic losses	University of Sydney
Aquatic Animal Health Technical Forum	CSIRO
Pacific oyster mortality syndrome (POMS) — risk mitigation, epidemiology and OsHV-1 biology	University of Sydney
Exercise Sea Fox: testing aquatic animal disease emergency response capabilities within aquaculture	Department of Primary Industries and Regions South Australia
Development of a laboratory model for infectious challenge of Pacific oysters (*Crassostrea gigas*) with ostreid herpesvirus type 1	New South Wales Department of Primary Industries
Determination of susceptibility of various abalone species and populations to the various known AbHV genotypes	CSIRO
Identifying the cause of oyster oedema disease (OOD) in pearl oysters (*Pinctada maxima*), and developing diagnostic tests for OOD	Macquarie University, Department of Fisheries Western Australia
The Neptune Project — a comprehensive database of Australian aquatic animal pathogens and diseases	Queensland Museum
Viral presence, prevalence and disease management in wild populations of the Australian black tiger prawn (*Penaeus monodon*)	CSIRO

Table A4.9 Meat & Livestock Australia animal health research projects

Project	Research institute
Refinement and validation of a polymerase chain reaction (PCR) test to replace worm egg count and faecal culture larval differentiation	CSIRO
Perennial ryegrass toxicity: increased understanding, awareness and potential mitigation strategies; identification of metabolites associated with severe cases of perennial ryegrass toxicosis	University of Melbourne, Reed Pasture Science
Efficacy of Gudair™ vaccination for control of ovine Johne's disease in flocks	University of Sydney, Animal Health Australia
Bovine and ovine Johne's disease — basic and applied research for improved diagnosis and prevention	University of Sydney, Animal Health Australia
Improvement of Australia's foot-and-mouth disease preparedness and response capability	CSIRO, Animal Health Australia
Anthrax: enhanced diagnostics, molecular epidemiology and disease ecology	Victoria Department of Environment and Primary Industries
Importance and epidemiology of mastitis in the Australian sheep flock	University of Melbourne
Selection of novel tick vaccine candidates using vaccination-challenge studies in cattle	Cooperative Research Centre for Beef Genetic Technologies; Queensland Department of Agriculture, Fisheries and Forestry
In vitro culture of buffalo fly and infections with *Wolbachia*	University of Queensland; Queensland Department of Agriculture, Fisheries and Forestry
Molecular methods for detection of calf scour pathogens	University of Sydney
Impact of bacteria and coccidia on scouring and productivity in sheep	Murdoch University, South Australian Research and Development Institute, University of Melbourne
Bovine anaemia caused by *Theileria orientalis*: buparvaquone tissue residue depletion	New South Wales Department of Primary Industries, Agrisearch Analytical
Sheep measles (*Taenia ovis* cysts) prevalence and predisposing factors	Charles Sturt University
Development of a commercial vaccine for barber's pole worm for sheep and goats	Moredun Research Institute, Department of Agriculture and Food Western Australia, CSIRO, Veterinary Health Research
Integrated parasite management for the control of sheep helminths	University of New England; Charles Sturt University; Melbourne University; Tablelands Livestock Health & Pest Authority; Department of Agriculture and Food Western Australia; Queensland Department of Agriculture, Fisheries and Forestry
Indospicine — elucidating the risk of residues in meat	University of Queensland
Besnoitiosis in Australian wildlife and significance to cattle	University of Adelaide
Detection of cows carrying a persistently pestivirus (bovine viral diarrhoea virus, BVDV)–infected foetus	University of Adelaide
Assessment of the bluetongue virus vector potential of selected *Culicoides* species in southern Australia	CSIRO
Cross-reactive vaccine for ovine footrot	Monash University
Endemic diseases scoping project	AusVet Animal Health Services
Photosensitisation in sheep grazing *Biserrula pelecinus*	Charles Sturt University

Table A4.10 Rural Industries Research and Development Corporation animal health research projects

Project	Research Institution
Optimising genetics, reproduction and nutrition of dairy sheep and goats	Monash University
Optimising mulloway farming through better feed and hatchery practices	Southern Cross University
Valuable behavioural phenotypes in Australian farm dogs	University of Sydney
Boosting redclaw industry productivity with improved nutrition and feed management	James Cook University
Alpaca immunoglobulins phase 2	Bairnsdale Animal Hospital
Improving the welfare and humaneness of commercially harvested kangaroos	New South Wales Department of Primary Industries
Improving the production efficiency, welfare and processing of commercial ducks	University of Sydney
Subunit vaccine against infectious bursal disease virus	CSIRO
Surveillance and pathotyping of circulating IBDV strains	CSIRO
Characterisation of avian nephritis virus (ANV) in commercial poultry	University of Melbourne
Egg incubation and broiler chicken leg weakness	University of Sydney
Parallel development of novel vaccine vectors (pilot study)	University of Melbourne
Vitamin K and broiler bone development	University of Queensland
Co-funding contribution National Welfare RD&E Capacity Building Project	Australian Pork Ltd
APL co-funding for cross-sectoral project: measures of animal welfare	Australian Pork Ltd
Controlling virulent ILTV field recombinants using vaccination	University of Melbourne
National tunnel ventilation workshops	University of Georgia (United States)
Assessment of factors influencing behaviour and welfare of birds in FR systems	University of Melbourne
Genetic variation of *Varroa jacobsoni* and pathology of microbial pathogens	CSIRO
Use of sniffer dog in detection of American foulbrood in beehives	Queensland Department of Agriculture, Fisheries and Forestry
Sexually transmitted diseases as threats for Australian honeybees	University of Western Australia
T2M — inter-specific matings between *A. cerana* and *A. mellifera*	University of Sydney
Upgrading knowledge on pathogens (particularly viruses) of Australian honeybees	CSIRO
AFB Future Management Workshop, 14–15 March 2013	Plant Health Australia
Development of an Australian Bee Health and Management website	Plant Health Australia

Table A4.10 *continued*

Project	Research Institution
Spikes in Hendra spillover: early warning through the bat urinary metabolome	CSIRO
Development of improved diagnostics and therapeutics for Hendra virus infections	CSIRO
Longitudinal cohort study of horse owners	University of Western Sydney
Models that predict risk for Hendra virus transmission from flying fox to horses	James Cook University
Models to predict Hendra virus prevalence in flying fox populations	Griffith University
Early detection of Hendra virus infection by microRNA profiling	CSIRO
Additional research required in relation to the development of the horse vaccine	CSIRO


MaJaPa

Appendix 5


NLIS Ltd

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
Animal Health Surveillance Quarterly	www.animalhealthaustralia.com.au/elibrary
AQUAPLAN	www.daff.gov.au/animal-plant-health/aquatic/aquaplan
AQUAVETPLAN	www.daff.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 Dairy Farmers	www.australiandairyfarmers.com.au
Australian Egg Corporation Limited	www.aecl.org
Australian Food and Grocery Council	www.afgc.org.au
Australian Government Department of Agriculture	www.daff.gov.au
Australian Government Department of Health	www.health.gov.au
Australian Harness Racing	www.harness.org.au
Australian Honey Bee Industry Council	www.honeybee.org.au
Australian Horse Industry Council	www.horsecouncil.org.au
Australian Livestock Export Corporation (LiveCorp)	www.livecorp.com.au
Australian Lot Feeders' Association	www.feedlots.com.au

Australian National Quality Assurance Program	www.anqap.com
Australian Government Department of Foreign Affairs and Trade (Australian Aid)	http://aid.dfat.gov.au
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 Wildlife Health Network	www.wildlifehealthaustralia.org.au
Australian Wool Innovation Limited	www.wool.com/en/home
Australia's animal health laboratory network	www.daff.gov.au/animal-plant-health/animal/system/lab-network
Biosecurity in Australia	www.daff.gov.au/biosecurity
AUSVETPLAN	www.animalhealthaustralia.com.au/programs/emergency-animal-disease-preparedness/ausvetplan
Biosecurity risk analysis	www.daff.gov.au/ba
Cattle Council of Australia	www.cattlecouncil.com.au
Cooperative Research Centre for Beef Genetic Technologies	www.beefcrc.com
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
Dairy Australia	www.dairyaustralia.com.au
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	www.dpi.vic.gov.au
Department of Fisheries Western Australia	www.fish.wa.gov.au
Department of Primary Industries and Regions South Australia	www.pir.sa.gov.au
Department of Primary Industries, New South Wales	www.dpi.nsw.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 Science, University of Melbourne	www.vet.unimelb.edu.au
Faculty of Veterinary Science, University of Sydney	www.sydney.edu.au/vetscience
Farm Biosecurity	www.farmbiosecurity.com.au
Fisheries Research and Development Corporation, Aquatic Animal Health	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 pests & 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.daff.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

Ernest Chong

Acronyms and abbreviations


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AAWS	Australian Animal Welfare Strategy
ABLV	Australian bat lyssavirus
ACIAR	Australian Centre for International Agricultural Research
AHA	Animal Health Australia
AHC	Animal Health Committee
ANQAP	Australian National Quality Assurance Program
ANZSDP	Australian and New Zealand Standard Diagnostic Procedure
ASEL	Australian Standards for the Export of Livestock
AUSVETPLAN	Australian Veterinary Emergency Plan
AWC	Animal Welfare Committee
AWHN	Australian Wildlife Health Network
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
DFAT	Department of Foreign Affairs and Trade
EAD	emergency animal disease
EADRA	Emergency Animal Disease Response Agreement
EADRP	emergency animal disease response plan
EID	emerging infectious disease
ELISA	enzyme-linked immunosorbent assay
ESCAS	Exporter Supply Chain Assurance System
FAO	Food and Agriculture Organization of the United Nations
FMD	foot-and-mouth disease
FRDC	Fisheries Research and Development Corporation

FSANZ	Food Standards Australia New Zealand
HACCP	hazard analysis and critical control points
HPAI	highly pathogenic avian influenza
IRA	import risk analysis
LEADDR	Laboratories for Emergency Animal Disease Diagnosis and Response
NAHIS	National Animal Health Information System
NAHTSC	National Animal Health Training Steering Committee
NAIWB	National Avian Influenza Wild Bird
NAMP	National Arbovirus Monitoring Program
NAQS	Northern Australia Quarantine Strategy
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
OBPR	Office of Best Practice Regulation
OIE	World Organisation for Animal Health
OsHV	ostreid herpesvirus
PCR	polymerase chain reaction
PEQ	post-entry quarantine
PISC	Primary Industries Standing Committee
PNG	Papua New Guinea
POMS	Pacific oyster mortality syndrome
QA	quality assurance
Queensland DAFF	Queensland Department of Agriculture, Fisheries and Forestry
R&D	research and development
RABQSA	Registrar Accreditation Board and the Quality Society of Australasia
RAWS	Regional Animal Welfare Strategy
RIS	regulatory impact statement
RSPCA	Royal Society for the Prevention of Cruelty to Animals
SCAAH	Sub-Committee on Aquatic Animal Health
SCAHLS	Sub-Committee on Animal Health Laboratory Standards
SCEAD	Sub-Committee on Emergency Animal Diseases
SCoPI	Standing Council on Primary Industries
SEACFMD	South East Asia and China Foot and Mouth Disease program
SPS	sanitary and phytosanitary
SPS Agreement	World Trade Organization Agreement on the Application of Sanitary and Phytosanitary Measures
SWF	screw-worm fly
TAFE	Technical and Further Education
TSE	transmissible spongiform encephalopathy
TSEFAP	Transmissible Spongiform Encephalopathies Freedom Assurance Program
WHO	World Health Organization
WSPA	World Society for the Protection of Animals
WTO	World Trade Organization

Glossary

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acaricide	Pesticides used to control acarids such as mites and ticks.
antimicrobial	Antibacterial agents (including ionophores) but not including antiprotozoals, antifungals, antiseptics, disinfectants, antineoplastic agents, antivirals, immunologicals, direct-fed microbials or enzyme substances.
biosecurity	The exclusion, eradication or effective management of risks posed by pests and diseases to human and animal health, horticultural industries, ecological systems and the economy.
camelids	Members of the biological family Camelidae, including camels, alpacas, llamas and dromedaries.
Culicoides	A genus containing at least 123 species of biting midge — very small insects, visible to the naked eye, with a wing length of about 0.9 mm. Particular *Culicoides* species carry and spread bluetongue and Akabane viruses by taking blood meals from hosts such as cattle and sheep. The distribution and population of *Culicoides* are affected by factors such as climate (rainfall, wind), light and proximity of livestock.
emergency animal disease	A disease that, when it occurs, requires an emergency response, because it would have a national impact if it was not controlled.
emerging (disease)	A new infectious disease resulting from a change in an existing pathogenic agent, a known disease occurring in a new area or population, or a previously unrecognised pathogen or disease.
endemic (disease)	A disease that is known to occur over a long period of time within a population or a geographic range.
enteric	Intestinal; to do with the intestines (gut).
epidemic	An unexpected and substantial increase in the incidence of a disease.
epidemiological	Relating to the study of disease and its causes in a population.
epidemiologist	A scientist who studies the transmission and control of epidemic diseases.
epidemiology	Science of the distribution of disease in populations, with investigations into the source and causes of 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 that can infect humans. Plural: zoonoses.

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