Wildlife Health Australia

Silvia Ban, Keren Cox-Witton and Tiggy Grillo
Wildlife Health Australia

Wildlife Health Australia (WHA)[7] is the peak body for wildlife health in Australia. WHA was established as the Australian Wildlife Health Network in 2002 as an Australian Government initiative to coordinate wildlife health surveillance information across Australia, to support Australia's animal health industries, human health, biodiversity, trade and tourism. WHA collates information from multiple sources into a national database — the Wildlife Health Information System (eWHIS)[8] — including submissions by WHA subscribers, state and territory WHA coordinators, researchers, and university, zoo and sentinel clinic veterinarians.

During the quarter, 230 wildlife disease investigation events were reported in eWHIS (Table 3 and Figure 12), and samples were collected from 948 wild birds for avian influenza (AI) surveillance.

This report details some of the disease and mortality events in free-living wildlife recorded in eWHIS this quarter. WHA thanks all those who submitted information for this report.

Wild bird mortality event summary — Newcastle disease and avian influenza exclusion

WHA received 81 reports of wild bird mortality or morbidity investigations from around Australia during the quarter. Investigations may involve a single animal or multiple animals (e.g. mass mortality event). A breakdown of the bird orders represented is presented in Table 4. Reports and samples from sick and dead birds are received from members of the public, private practitioners, universities, zoo wildlife clinics and wildlife sanctuaries. AI was excluded by polymerase chain reaction (PCR) testing for influenza A in 18 of the events as part of Australia's general (sick and dead bird) AI surveillance program. AI exclusion testing was

Table 3 Number of disease investigations reported into eWHIS, January to March 2018[a]

Mammals					Birds[c,d]	Reptiles
Bats[b]	Marsupials	Marine mammals	Feral mammals	Monotremes		
118	17	4	5	1	81	4

a Disease investigations may involve a single animal or multiple animals (e.g. mass mortality event).
b Most bat disease investigations are single bats submitted for Australian bat lyssavirus testing.
c Additional sampling for targeted avian influenza surveillance is presented elsewhere in this report.
d Includes free-ranging birds (native or feral species) and a small number of events involving birds from zoological collections and captive breeding programs.

7 www.wildlifehealthaustralia.com.au/Home.aspx

8 www.wildlifehealthaustralia.com.au/ProgramsProjects/eWHISWildlifeHealthInformationSystem.aspx

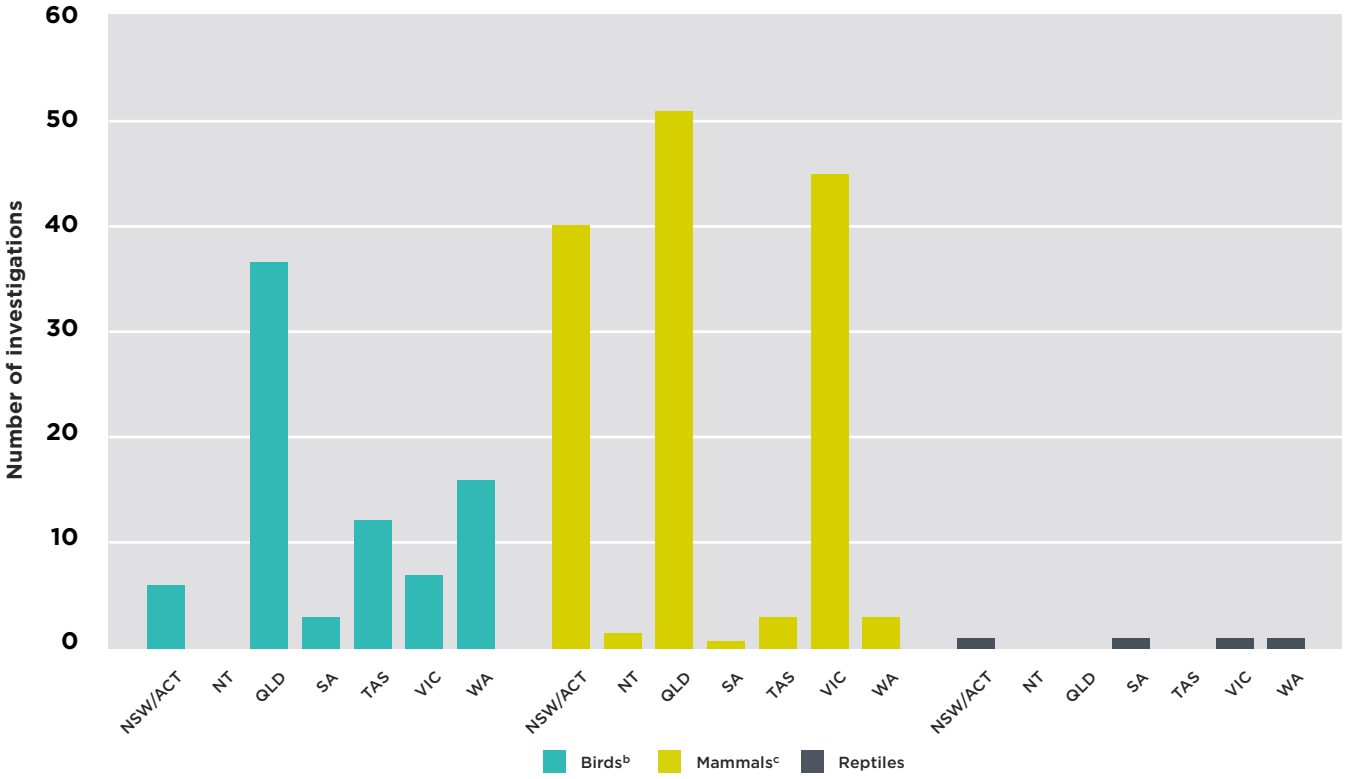

Figure 12 Number of disease investigations reported, by jurisdiction, into eWHIS, January to March 2018[a]

a Shows the number of disease investigations or events reported into eWHIS, where each investigation may involve one or multiple animals.
b Birds includes free-ranging birds (native or feral species) and some events involving birds from zoological collections and captive breeding programs.
c Investigations involving mammals include individual bats submitted for Australian bat lyssavirus testing.

Table 4 Wild bird disease investigations reported into eWHIS, January to March 2018

Bird order	Common name for bird order[a]	Events reported[b]
Anseriformes	Magpie goose, ducks, geese and swans	7
Caprimulgiformes	Frogmouth, nightjars, owlet-nightjars, swifts	1
Charadriiformes	Shorebirds	3
Passeriformes	Passerines or perching birds	27
Psittaciformes	Parrots and cockatoos	39
Sphenisciformes	Penguins	2
Strigiformes	Typical owl and barn owls	2
Suliformes	Gannets, boobies and cormorants	2

a Common names adapted from: del Hoyo and Collar, 2014, *HBW and BirdLife International Illustrated Checklist of the Birds of the World. Volume 1 — Non-passerines*, Lynx Editions, Barcelona. (Courtesy of the Australian Government Department of the Environment and Energy.)
b Disease investigations may involve a single or multiple bird orders (e.g. mass mortality event). This quarter, two wild bird events involved multiple bird orders. One involved the bird orders Anseriformes and Charadriiformes, and the other event involved Passeriformes and Psittaciformes.

not warranted in the remaining 63 events, based on clinical signs, history, prevailing environmental conditions or other diagnoses. Also, avian paramyxovirus was excluded in 9 events by PCR testing specifically for Newcastle disease (ND) virus or pigeon paramyxovirus type 1 (PPMV-1), or both.

Methyl carbamate toxicity in lorikeets — avian influenza and avian paramyxovirus 1 excluded

In January 2018, 12 dead rainbow lorikeets (*Trichoglossus haematodus*) were found in Beckenham, Western Australia over a period of 2 days. One live bird found at the same location presented with respiratory distress and mucoid material found at its beak. On clinical examination, this bird had a full crop and exhibited tremors. The bird was slow to retract its wings following wing extension and had a weak foot grip. No further deaths were observed.

Five dead birds were submitted by the Department of Biodiversity, Conservation and Attractions (DBCA) to the Western Australia Department of Primary Industries and Regional Development Diagnostic Laboratory Services (DDLS) for a diagnostic investigation. Of these, two were desiccated, one was autolysed, and several had signs consistent with predation, which likely occurred secondary to the cause of illness. Of the two birds suitable for histology, there were no findings to indicate a cause of death. However, acetylcholinesterase (AChE) activity in the brain measured from three birds showed reduced levels; 2.49, 2.93 and 1.07 µmol/min/g tissue, consistent with organophosphate, carbamate or quaternary ammonium compound exposure.[9] In general, AChE activity levels range between 10 and 20 µmol/min/g in brain tissue taken from healthy birds. Further testing of the birds' gut contents by gas chromatography–mass spectrometry (GC–MS) detected methomyl, as well as a metabolite of methomyl. GC–MS is a non-quantitative test that detects the presence of a substance in a given sample but cannot determine its concentration.

The birds were also tested for AI and ND via PCR testing on tracheal swabs, yielding negative results.

Methyl carbamate pesticides have been used as insecticides, nematicides, molluscicides, and parasiticides. In this class, the active constituents bendiocarb, carbofuran, methiocarb, methomyl, carbaryl, pirimicarb and propoxur are registered for use in Australia. Carbamate toxicity in non-target species occurs due to inhibition of AChE and is usually more amenable to treatment than organophosphate toxicity, given AChE carbamylation is unstable, so regeneration of active AChE occurs more quickly than with the phosphorylated enzyme.[10] Carbamate poisoning has been confirmed in four wild bird mortality events reported to eWHIS. The events involved cockatoos (*Cacatua* sp. unspecified; methomyl detected), sulphur-crested cockatoos (*Cacatua galerita*; bendiocarb detected), galahs (*Eolophus roseicapilla*, methomyl detected) and one event involving multiple bird species, with methomyl detected in house sparrows (*Passer domesticus*) and Australian magpies (*Cracticus tibicen*).

This quarter, toxicology analyses were also performed in Western Australia in three further wild bird mortality events; two involving silver gulls (*Chroicocephalus novaehollandiae*) and one involving magpies (*Cracticus tibicen*). In all events, there was no evidence of AChE suppression, and toxin screening tests were negative. There was one suspect toxicity event in Victoria involving Indian mynas (*Acridotheres tristis*), sulphur-crested cockatoos (*Cacatua galerita*) and common starling (*Sturnus vulgaris*) and one suspect toxicity event in Queensland involving a little corella (*Cacatua sanguinea*). Bird mortality events may be suspected to be due to exposure to chemical toxins based on strong circumstantial evidence, including known exposure to toxins, clinical presentation and relevant environmental findings.

Investigation and reporting of wild bird mortality events associated with poisonings can provide useful data and a better understanding of the circumstances and susceptibilities of native birds affected. WHA continues to liaise with the Australian Pesticides and Veterinary Medicines Authority program on the investigation of wildlife incidents. For more information, including a summary of avian poisoning events reported to WHA, see the WHA 'Pesticide toxicity in Australian native birds' fact sheet.[11]

Avian influenza surveillance

Australia's National Avian Influenza Wild Bird (NAIWB) Surveillance Program comprises two sampling components: pathogen-specific risk-based surveillance by sampling of apparently healthy, live and hunter-killed wild birds; and general surveillance by investigating significant unexplained morbidity and mortality events in wild birds, including captive and wild birds within zoo grounds (with a focus on exclusion testing for AI virus subtypes H5 and H7).

Samples from sick or dead birds were discussed earlier. Sources for targeted wild bird surveillance data include state and territory government laboratories, universities and samples collected through the Northern Australia Quarantine Strategy (NAQS).

During the quarter, pathogen-specific, risk-based surveillance occurred at sites in Queensland, South Australia, Tasmania and Victoria. Cloacal and faecal environmental swabs were collected from 948 waterbirds, with 948 tested for AI. Results are pending.

Flying-foxes and entanglement

Flying-foxes are vulnerable to trauma due to entanglement, particularly in the summer months when netting is commonly applied to fruit trees. Entanglement in fruit tree netting was the most common reason for presentation at two wildlife hospitals in Victoria, with 196 flying-foxes (36.8%) affected from 2000 to

9 WHA 2017, *Pesticide Toxicity in Australian Native Birds*. Fact Sheet, June 2017, Wildlife Health Australia. www.wildlifehealthaustralia.com.au/FactSheets.aspx

10 APVMA (2017) 'Australian Pesticides and Veterinary Medicines Authority. https://apvma.gov.au

11 WHA 2017, *Pesticide Toxicity in Australian Native Birds*. Fact Sheet, June 2017, Wildlife Health Australia. www.wildlifehealthaustralia.com.au/FactSheets.aspx

2014.[12] From January to March 2018, almost 40% of all bats tested for Australian bat lyssavirus (ABLV) had suffered trauma. Of these, almost half were found entangled in fruit tree netting or barbed wire fencing.

This is only a snapshot of all bats that suffer entanglement as the dataset only captures the small proportion that are submitted for ABLV testing, often due to potentially infectious contact with humans during the rescue. Nonetheless, these figures highlight the animal welfare consequences, as well as the public health implications, of entanglement. Rescuing flying-foxes from netting and fences poses a risk of bites and scratches to people, and therefore a risk of transmission of ABLV. To prevent entanglement of flying-foxes and other animals, wildlife-safe netting of appropriate material and mesh size can be used, and plain wire can be used to replace the top strand of barbed wire fences.[13,14]

Australian bat lyssavirus

Reports to WHA for the quarter included 117 bats tested for ABLV from the Australian Capital Territory, New South Wales, Northern Territory, Queensland, Victoria and Western Australia.

Bat submissions were made for a variety of reasons:

- 50 cases involved contact with the potential for ABLV transmission to humans; of these
  - 19 were also associated with trauma (e.g. netting or barbed wire fence entanglement, fracture)
  - 6 displayed neurological signs (e.g. nystagmus, behavioural changes, paralysis, change in vocalisation)
  - 6 involved contact with a pet cat
  - 1 displayed other (non-neurological) signs
  - the remainder had no further history reported
- 24 cases involved contact with a pet dog (17) or cat (6) or both (1)
- 24 cases were associated with trauma (e.g. fracture, electrocution, netting or barbed wire fence entanglement)
- 8 bats displayed other (non-neurological) signs (e.g. emaciation, dehydration, heavy parasite load)
- 3 bats displayed neurological signs (e.g. aggression, depression, frothing, seizures, shaking head)
- 8 bats had no further history reported at this time

Of those described above, 10 insectivorous bats were submitted by Queensland bat carers as part of an ongoing surveillance project conducted by the Queensland Department of Agriculture and Fisheries, and all tested negative for ABLV.

Cases with positive confirmations

During the quarter, three flying-foxes were confirmed positive for ABLV by fluorescent antibody test or PCR testing for pteropid ABLV ribonucleic acid (RNA), or both.

An orphaned spectacled flying-fox (*P. conspicillatus*) pup from Far North Queensland was brought into care with a wound on its leg. Its condition deteriorated, and it was euthanased. At necropsy there was a thigh ulcer penetrating to the deep femoral muscles and periosteum. Histopathology revealed very mild inflammatory changes in the brain.

An adult female black flying-fox (*P. alecto*) from south-east Queensland was found hanging low in a tree in a front yard. On examination, it was found to be agitated and had minor trauma to the wing membrane. It subsequently became aggressive and died. A small subdural haemorrhage posterior to the right orbit was detected at necropsy, but there were no significant histological findings in a range of tissues including the brain.

A little red flying-fox (*P. scapulatus*) from north-eastern New South Wales was submitted for ABLV testing due to potentially infectious human contact. The flying-fox was found on the ground but was able to climb. It was partially paralysed in one leg and had a change in vocalisation described as a 'chirping' noise.

An experienced public health official provided medical advice in the last two cases, where there was potentially infectious human contact.

More information on ABLV testing of bats in Australia is available in ABLV Bat Stats.[15] ABLV is a nationally notifiable disease in Australia. Cases of suspect ABLV infection or exposure should be reported to the Emergency Animal Disease Watch Hotline on 1800 675 888.

National Significant Disease Investigation Program in Wildlife

The National Significant Disease Investigation (NSDI) Program, managed by Animal Health Australia (AHA), subsidises veterinary practitioners who investigate and report on significant disease incidents in livestock and wildlife. WHA administers the national NSDI Program funds for wildlife investigations. The NSDI Program allows veterinarians to fully investigate significant or unusual wildlife disease events that would

12 Scheelings TF, Frith SE (2015) Anthropogenic factors are the major cause of hospital admission of a threatened species, the grey-headed flying fox (*Pteropus poliocephalus*), in Victoria, Australia. *PLoS One* 10: e0133638

13 QDEHP (2016) Netting fruit trees – Netting safely for wildlife. Queensland Department of Environment and Heritage Protection. www.ehp.qld.gov.au/wildlife/livingwith/flyingfoxes/netting_fruit_trees.html - netting_safely_for_wildlife

14 Wildlife Friendly Fencing Project. www.wildlifefriendlyfencing.com/WFF/Home.html

15 www.wildlifehealthaustralia.com.au/ProgramsProjects/BatHealthFocusGroup.aspx

otherwise be limited due to financial constraints. Notifiable diseases are excluded before a disease investigation begins, where indicated.

Examples of wildlife events investigated under the NSDI Program in 2017:

- Mass mortality events in crested terns (*Thalasseus bergii*), Australian magpies (*Cracticus tibicen*) and Australian ravens (*Corvus coronoides*)
- Neurological signs in some species, including a black flying-fox (*Pteropus alecto*), a carpet python (*Morelia spilotes variegata*), tawny frogmouths (*Podargus strigoides*), a rainbow lorikeet (*Trichoglossus haematodus moluccanus*), Australian ravens and a crested pigeon (*Ocyphaps lophotes*).
- Diarrhoea and sudden death of ringtail possums (*Pseudocheirus peregrinus*) in care (see AHSQ Vol. 22 Issue 2).
- Brushtail possums (*Trichosurus vulpecula*) with renal changes and dermatitis.
- Mortality and ocular lesions in Tasmanian pademelons (*Thylogale billardierii*).
- Ill-thrift in koalas (*Phascolarctos cinereus*).
- Epistaxis in western grey kangaroos (*Macropus fuliginosus*).
- Ear lesions in swamp wallabies (*Wallabia bicolor*).
- Bar-shouldered doves (*Geopelia humeralis*) with feather changes and diarrhoea.

For more information on the NSDI Program, including how to apply for disease investigation funding, see:

- Wildlife Health Australia website[16]
- Animal Health Australia website.[17]

16 www.wildlifehealthaustralia.com.au/ProgramsProjects/NSDIProgramFunding.aspx

17 www.animalhealthaustralia.com.au/what-we-do/disease-surveillance/national-significant-disease-investigation-program