Wildlife Health Australia

Tiggy Grillo, Keren Cox-Witton, Sam Gilchrist and Silvia Ban, Wildlife Health Australia; and Iain East, Australian Government Department of Agriculture and Water Resources

Wildlife Health Australia (WHA) 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—[Wildlife Health Information System (eWHIS)](www.wildlifehealthaustralia.com.au/ProgramsProjects/eWHISWildlifeHealthInformationSystem.aspx)[7]—including submissions by WHA subscribers, state and territory WHA coordinators, researchers, and university, zoo and sentinel clinic veterinarians. During the quarter, 278 wildlife disease investigation events were reported into eWHIS (Table 1). 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.

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

Wild bird mortality events—Newcastle disease and avian influenza exclusion

WHA received 78 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 2. Reports and samples from sick and dead birds are received from members of the public, private practitioners, universities, zoo wildlife clinics and wildlife sanctuaries. Avian influenza (AI) was excluded by polymerase chain reaction (PCR) testing for influenza A in 16 of the events as part of Australia's general (sick and dead bird) AI surveillance program. AI exclusion testing was not warranted in the remaining 62 events, based on clinical signs, history, prevailing environmental conditions or other diagnoses. In addition, avian paramyxovirus was excluded in 14 events by PCR testing specific for Newcastle disease (ND) virus and/or pigeon paramyxovirus 1 (PPMV-1).

Table 2 Wild bird disease investigations reported into eWHIS, October to December 2016

Bird order	Common name for bird order[a]	Events reported[b]
Anseriformes	Magpie geese, ducks, geese and swans	6
Columbiformes	Doves and pigeons	2
Falconiformes	Falcons	2
Passeriformes	Passerines or perching birds	29
Pelecaniformes	Ibis, herons and pelicans	3
Psittaciformes	Parrots and cockatoos	37

a Common names adapted from: del Hoyo, J & Collar, NJ 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 there was one wild bird event which involved multiple bird orders, which were Columbiformes and Passeriformes.

Table 1 Number of disease investigations reported into eWHIS, October to December 2016[a]

Bats[b]	Birds	Feral animals	Lizards & snakes	Marine mammals	Marine turtles	Marsupials	Monotremes
135	78	8	2	2	1	51	1

a Disease investigations may involve a single animal or multiple animals (e.g. mass mortality event).
b The majority of bat disease investigations are single bats submitted for Australian bat lyssavirus testing.

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.

During the quarter, pathogen-specific risk-based surveillance occurred at sites in Queensland, South Australia and Western Australia, with cloacal and faecal environmental swabs collected from 759 waterbirds. Results are pending.

Salmonella isolated in two mass mortalities of house sparrows and spotted turtle-doves

In October 2016, more than 30 birds were found dead within the grounds of a pet shelter in an inner Melbourne suburb. Daily mortalities of house sparrows (*Passer domesticus*) and at least two dead spotted turtle-doves (*Streptopelia chinensis*) presented dead or moribund over a period of more than 1 month.

Dead birds were submitted to the Victorian veterinary diagnostic laboratory, AgriBio, Bundoora, for investigation. Gross pathology of examined birds included enlarged livers with multifocal pallor and enlarged spleens. AI, avian paramyxovirus and *Chlamydia* spp. were excluded by PCR testing. Histopathological lesions included histiocytic and lymphoplasmacytic hepatitis and splenitis with numerous intracytoplasmic and extracellular gram negative coccobacilli. A *Salmonella* isolate recovered from the liver and faeces of submitted birds (both *P. domesticus* and *S. chinensis*) was referred to the Microbiological Diagnostic Unit Public Health Laboratory (Melbourne University) for identification, where it was identified as *Salmonella enterica* subsp. *enterica* serotype Typhimurium DT160 (*S.* Typhimurium DT160). The Department of Health and Human Services was notified.

This is the first diagnosis of S. Typhimurium DT160 in wild birds in Victoria (and in mainland Australia). S. Typhimurium DT160 is considered enzootic in Tasmania and has been diagnosed in 13 investigations involving house sparrows.[8]

Infected wild birds (e.g. sparrows) have the potential to be sources of infection for humans, domestic animals and native animal and bird species.[9] *S.* Typhimurium has significant zoonotic potential, with a small number of human cases diagnosed in Australia to date.

8 National Wildlife Health Information System (eWHIS) as at 12 October 2016.

9 WHA 2013, Salmonella *Typhimurium DT160 in House Sparrows in Australia*, Fact Sheet, December 2013, Wildlife Health Australia. www.wildlifehealthaustralia.com.au/FactSheets.aspx

Nocardiosis in a pantropical spotted dolphin

An adult female pantropical spotted dolphin (*Stenella attenuata*) was found stranded at Wooyung Beach, New South Wales, on the morning of 12 November. Several attempts to refloat and release the animal were unsuccessful. On the same day, the dolphin was transported for treatment at Sea World marine animal park on the Gold Coast, Queensland. Initial assessment revealed a 2.01 m animal in poor body condition weighing 54.5 kg. The animal was not very responsive.

Blood was collected from the caudal tail fluke and test results showed severe dehydration, moderate inflammation and evidence of renal and hepatic disease. Antibiotics (cefovecin), intravenous fluids and cortisone were administered to the animal but it died shortly after.

A necropsy was conducted the following day. Gross findings included a pyometra (Figure 7) and small abscesses of approximately 5 mm in diameter on the surface of the brain (Figure 8).

Histopathological examination of tissues revealed severe suppurative

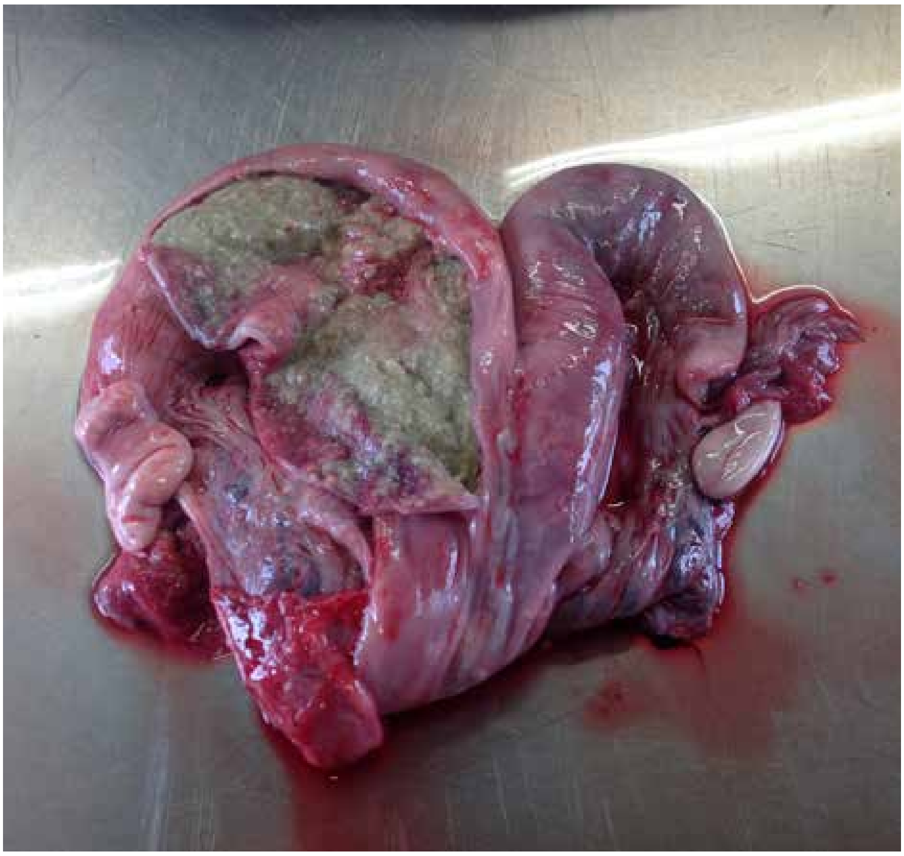


Figure 7 Pyometra in pantropical spotted dolphin

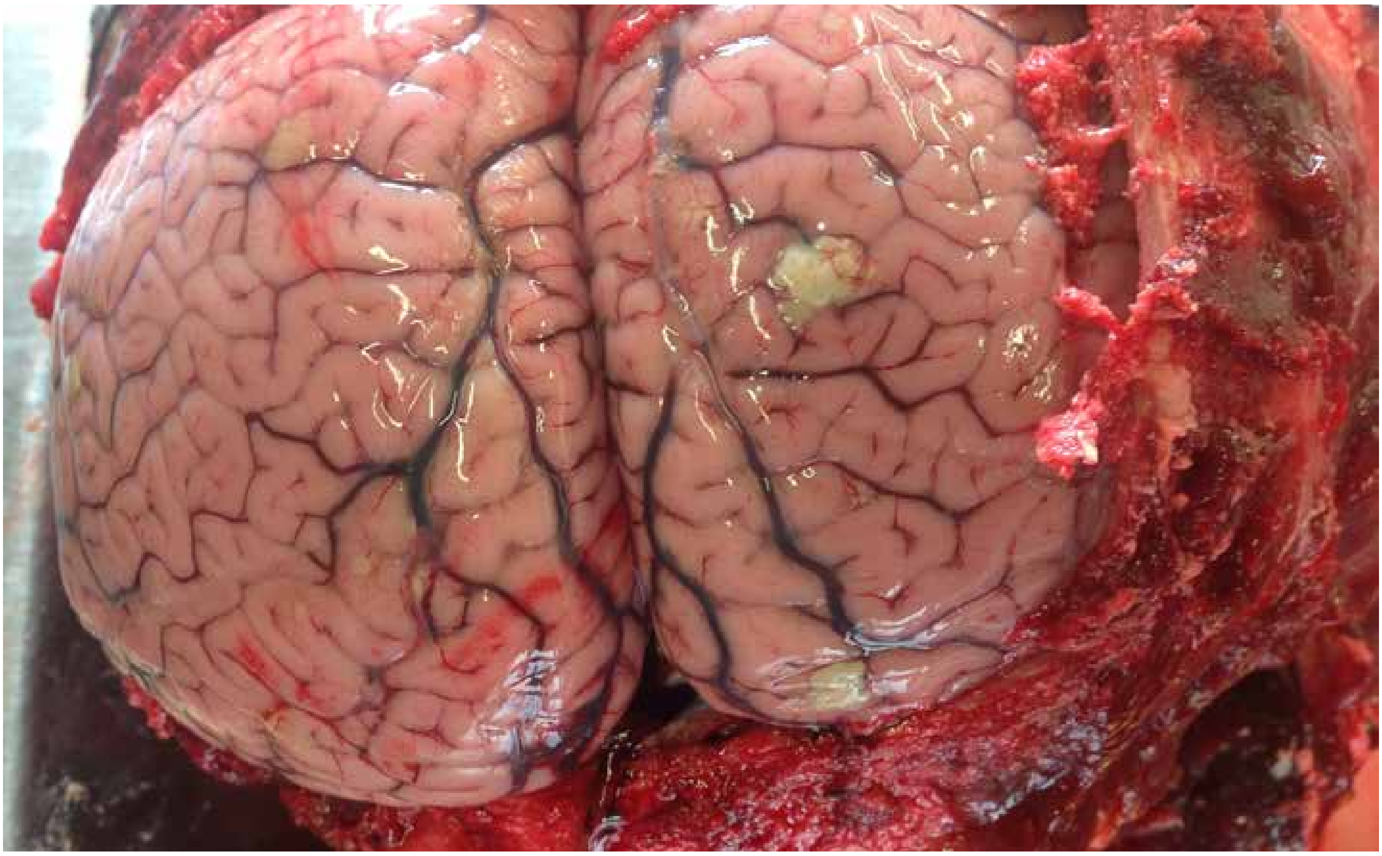


Figure 8 Small abscesses visible on the surface of the dolphin's brain

meningoencephalitis, chronic nonsuppurative pneumonia, suppurative endometritis and mild multifocal interstitial nephritis, consistent with nocardiosis. Bacterial cultures of cerebrospinal fluid, uterine contents, meninges, cerebellum, brain and liver all grew *Nocardia brasiliensis*.

Nocardia spp. are aerobic actinomycete bacteria present in soil, water and marine sediments that can infect animals and humans, causing localised and systemic disease. Infection can occur through inhalation, inoculation through skin lesions and ulcers in the gastrointestinal tract,[10] and very strong wind and heavy rain may increase risk of exposure to the pathogen.[11] Humans, companion animals, livestock and wildlife species are susceptible to infection, with immunocompromised hosts at higher risk of severe and disseminated infections. There are no reports of human-to-animal transmission of *Nocardia* spp.[12]

10 St Leger, JA, Begeman, L, Fleetwood, M, Frasca, S, Garner, MM, Lair, S, Trembley, S, Linn, MJ & Terio, KA 2009, Comparative pathology of nocardiosis in marine mammals, *Veterinary Pathology Online* 46(2): 299–308.

11 Vogelnest, L & Woods, R (Eds) 2008, *Medicine of Australian Mammals*, CSIRO Publishing, Collingwood.

12 Tryland, M, Nesbakken, T, Robertson, L, Grahek-Ogden, D & Lunestad, BT 2014, Human pathogens in marine mammal meat—a northern perspective, *Zoonoses and Public Health* 61(6): 377–394.

Nocardiosis caused by *Nocardia asteroides*, *N. farcinica*, *N. brasiliensis*, *N. cyriacigeorgica* and *N. levis* have been described in cetaceans in captivity and in the wild in other countries.[13] The systemic form is most typically observed, with lungs and thoracic lymph nodes involved, and sometimes the brain; one case of systemic form with mastitis in a beluga whale (*Delphinapterus leucas*) and one report of pulmonary form in a Pacific bottlenose dolphin (*Tursiops aduncus*) have also been described.[14] In Australia, *Nocardia* sp. infection was previously described from an unidentified cetacean species, with encapsulated purulent lesions in the liver and multiple small abscesses in the lung.[15]

Since nocardiosis is more likely to occur in immunosuppressed individuals, investigations of predisposing factors, presence of toxic agents or concurrent infections are recommended.[16] In this case, additional serological tests from the dolphin detected low-to-moderate titres of *Toxoplasma* spp., *Brucella* spp. and cetacean morbillivirus. It was serologically negative for leptospirosis.

13 St Leger et al. 2009 (as above).

14 St Leger et al. 2009 (as above).

15 Ladds, P 2009, *Pathology of Australian Native Wildlife*, CSIRO Publishing, Collingwood.

16 St Leger et al. 2009 (as above).

Toxoplasmosis has been previously diagnosed in Australia in the Australian humpback dolphin (*Sousa sahulensis*)—previously known as the Indo-Pacific humpbacked dolphin (*Sousa chinensis*)—based on clinical signs, gross pathology, serology, bacteriology, histopathology, electron microscopy and immunohistochemistry findings.[17] A number of Australian marine mammal species have been shown to have serological evidence of exposure to *Brucella* sp. but there have been no confirmed cases of clinical brucellosis (e.g. culture positives). Strains of *Brucella* sp. isolated from marine mammals have genetic and biochemical differences from other *Brucella* spp. and are considered new: *B. ceti* from cetaceans and *B. pinnipedialis* from seals.[18]

17 Bowater, RO, Norton, J, Johnson, S, Hill, B, O'Donoghue, P & Prior, H 2003, Toxoplasmosis in Indo-Pacific humpbacked dolphins (Sousa chinensis) from Queensland, *Australian Veterinary Journal* 81(10): 627–632.

18 WHA 2011, *Australian Marine Mammals and Brucella*, Fact Sheet, March 2011, Wildlife Health Australia, Mosman. www.wildlifehealthaustralia.com.au/FactSheets.aspx

Morbilivirus has been detected in several cetacean species in Australia, is known to cause immunosuppression, and concurrent infections have been described.[19,20] The cause of morbidity and eventual mortality of the present case was most likely due to a systemic infection with *N. brasiliensis*, possibly secondary to cetacean morbillivirus infection.

Australian bat lyssavirus

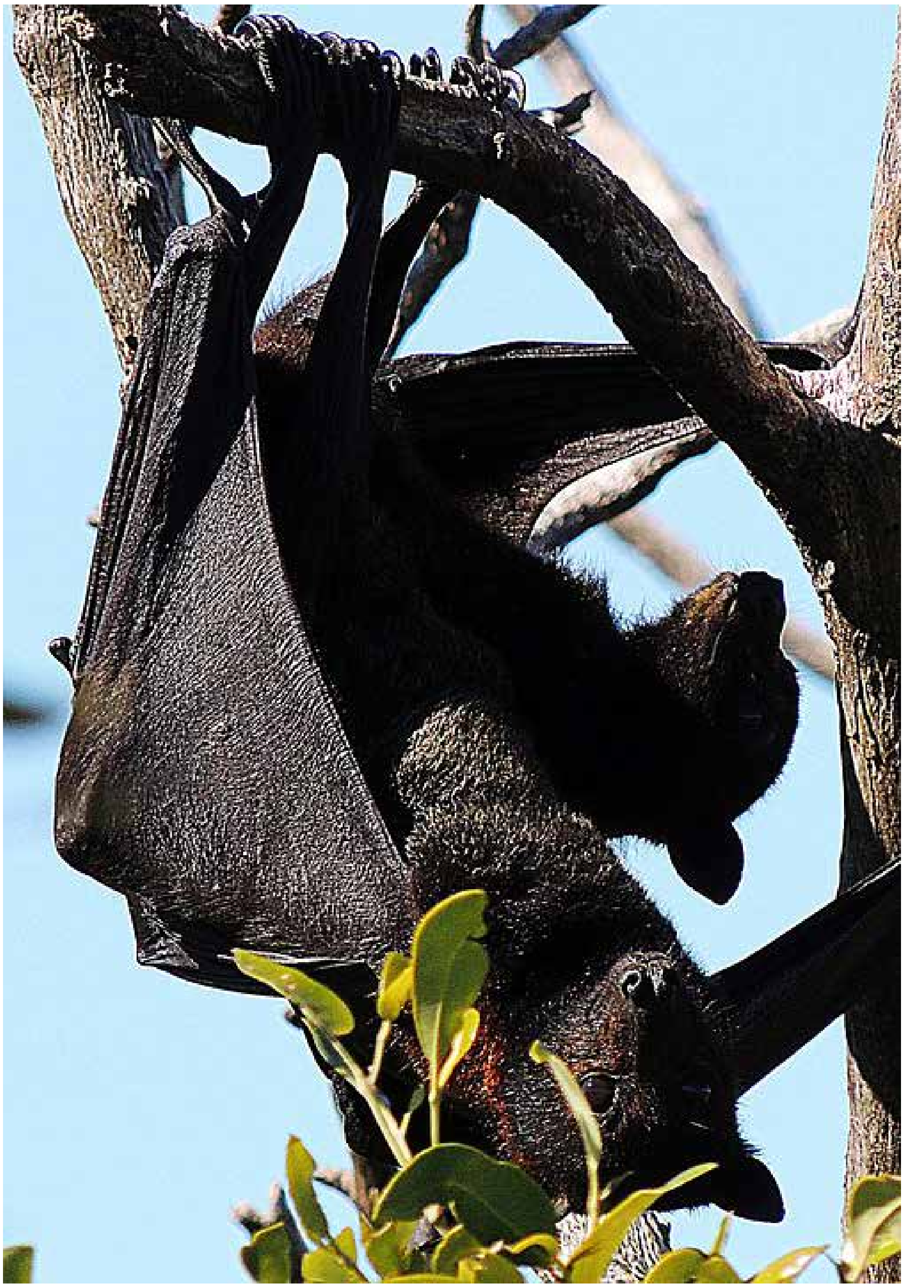
Reports to WHA for the quarter included 135 bats tested for Australian bat lyssavirus (ABLV) from the Australian Capital Territory, New South Wales, Northern Territory, Queensland, South Australia, Victoria and Western Australia.

Bat submissions were made for a variety of reasons:

- 54 cases involved contact with the potential for ABLV transmission to humans; of these
  - 17 were also associated with trauma (e.g. barbed wire fence or netting entanglement)
  - 1 displayed neurological signs (e.g. paralysis)
  - 1 was associated with a cluster of dead bats
  - 1 was found dead
  - the remainder had no further history reported
- 42 cases involved contact with a pet dog (36) or cat (6)
  - 6 bats were found dead
  - 5 cases were associated with trauma
  - 5 bats displayed neurological signs (e.g. aggression, paralysis, tremors)
  - 3 bats were associated with an event involving mass abandonment of pups.
  - 20 bats had no further history reported at this time.

19 WHA 2013, *Cetacean Morbilliviruses in Australian Whales and Dolphins*, Fact Sheet, June 2013, Wildlife Health Australia, Mosman. www.wildlifehealthaustralia.com.au/FactSheets.aspx

20 Kemper, CM, Tomo, I, Bingham, J, Bastianello, SS, Wang, J, Gibbs, SE, Woolford L, Dickason C & Kelly, D 2016, Morbillivirus-associated unusual mortality event in South Australian bottlenose dolphins is largest reported for the Southern Hemisphere, *Royal Society Open Science* 3(12): 160838.



During the quarter, four black flying foxes (*Pteropus alecto*), three from Queensland and one from the Northern Territory, were confirmed positive for ABLV by fluorescent antibody test and PCR for pteropid ABLV ribonucleic acid (RNA).

In the Northern Territory case, the flying fox had been seen around a backyard for a few days with reduced approach (flight) distances before falling to the ground where a pet dog may have been exposed. The dog owners elected to have all possible in-contact dogs and people vaccinated against rabies and the exposed dog was quarantined at home for 2 months.

In one of the Queensland cases, the flying fox presented with neurological signs, including marked aggression and tremors, and poor body condition. The other two flying foxes were rescued from a single colony and submitted for testing due to potentially dangerous human contact. An experienced public health official provided appropriate counselling and information in these cases.

More information on ABLV testing of bats in Australia is available in *ABLV Bat Stats*.[21] 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.

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