Wildlife Health Australia

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Wildlife Health Australia (WHA)[2] is the peak body for wildlife health in Australia. WHA was established as the Australian Wildlife Health Network (AWHN) 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)[3] — including submissions by WHA subscribers, state and territory WHA coordinators, researchers, and zoo and sentinel clinic veterinarians. In July to September 2015, 132 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.

Wild bird mortality events — Newcastle disease and avian influenza exclusion

WHA received 54 reports of wild bird mortality or morbidity from around Australia in July–September 2015. 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.

2 www.wildlifehealthaustralia.com.au

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

Table 2 Wild bird disease investigations reported into eWHIS, July–September 2015

Bird order	Common name for bird order[a]	Events reported[b]
Anseriformes	Magpie geese, ducks, geese and swans	1
Caprimulgiformes	Frogmouths, nightjars, owlet-nightjars, swifts	1
Charadriiformes	Shorebirds	1
Columbiformes	Doves and pigeons	3
Falconiformes	Falcons	1
Passeriformes	Passerines or perching birds	5
Pelecaniformes	Pelicans	5
Psittaciformes	Parrots and cockatoos	36
Strigiformes	Typical owls and barn owls	1

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).

b Disease investigations may involve single or multiple bird orders (e.g. mass mortality event).

Avian influenza (AI) was excluded by polymerase chain reaction (PCR) testing for influenza A in 14 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 42 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).

In Victoria, an Australian raven (*Corvus coronoides*) presented to the Australian Wildlife Health Centre at Healesville Sanctuary in August. The very thin bird displayed marked ataxia and was euthanased. Histopathology indicated severe chronic nonsuppurative necrotising panencephalitis. AI, West Nile virus and avian paramyxovirus 1 (APMV-1) were excluded by PCR at CSIRO Australian Animal Health Laboratory. There was no evidence of flaviviruses (Japanese encephalitis serogroup) based on immunohistochemistry, and virus isolation was negative. Investigation of wild birds presenting with similar clinical or histological findings is encouraged, including laboratory testing to rule out specific diseases of concern (e.g. AI, APMV and flaviviruses).

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 are discussed above. Sources for targeted wild bird surveillance data include state and territory government laboratories, universities and samples collected through the Northern Australia Quarantine Strategy.

Between July 2014 and June 2015, pathogen-specific, risk-based surveillance occurred at sites in New South Wales, Queensland, Victoria, Tasmania, South Australia, the Northern Territory and Western Australia. Samples were collected from 7244 birds, with the majority collected from waterbirds (ducks and waders). No highly pathogenic AI viruses have been identified. However, surveillance activities continue to find evidence of a wide range of subtypes of low pathogenic AI viruses, including low-pathogenic H5 and H7, as well as H2-H4, H6 and H8-H11. The findings support the need for continuing surveillance activities in wild birds and reiterate the need for poultry producers to

Table 1 Number of disease investigations reported into eWHIS, July–September 2015[a]

Bats[b]	Birds	Marsupials	Feral animals	Snakes and lizards	Freshwater turtles	Monotremes	Marine mammals	Marine turtles
54	54	19	1	0	1	0	2	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.

remain alert and ensure that appropriate biosecurity arrangements and effective risk reduction measures for AI are in place at their premises. The NAIWB Surveillance Program will continue in 2015–16.

During the quarter, pathogen-specific, risk-based surveillance occurred at sites in New South Wales, Queensland and Tasmania with faecal environmental swabs collected from 581 waterbirds. Results are pending.

Bellinger River snapping turtle mortality event

Reported in collaboration with Barbara Moloney and Sarah Britton, NSW Department of Primary Industries; and Sarah Matthews, the University of Sydney.

Investigations into a severe mortality event involving Bellinger River snapping turtles (*Myuchelys georgesi*) commenced following a report from local kayakers on 18 February 2015 of approximately 50–70 dead freshwater turtles[4]. Over the course of the investigation and since 14 February 2015, an estimated 432 *M. georgesi* have been observed dead or dying. Live affected turtles were described as slow moving and unable to see. *M. georgesi* is a unique species of freshwater turtle found only in small sections of the Bellinger and Kalang rivers. A 2007 survey[5] estimated the total population of this species to be between 1500 and 4500 individuals. *M. georgesi* relies largely on its sight for feeding and the onset of blindness prevented normal foraging. Smaller numbers of other turtle species, including *Emydura macquarii* and *Chelodina longicollis*, are present in these rivers but none of these species have been observed affected. In the lead up to the mortality event, river conditions had been different. A severe heat episode in early December 2014 reportedly elevated water temperatures, and severely low water levels were followed by two minor floods, one in late December 2014 and another in late January 2015.

Initial presenting signs included swollen eyes and the turtles were thin. Many animals had a slight clear nasal discharge and some presented with hind limb paresis. On gross necropsy, animals were thin, had bilateral swollen eyelids and anterior uveitis, and some animals had tan foci on the skin of the ventral thighs. Histopathologically, inflammation extended from the eyelids, peri orbital tissues and sinuses, sometimes extending along the olfactory–optic nerve into the meninges. On histology, there was evidence of fibrinonecrotising splenitis and nephritis and multisystemic fibrinoid vasculopathy. All lesions appeared to be acute. PCR and other tests, including virus isolation, excluded a range of potential infectious aetiologies, including ranavirus, adenovirus, paramyxovirus (ferlavirus), herpesvirus, mycoplasma, chlamydia and *Trichomonas*. Water samples collected from four Bellinger River sites (two upstream and two downstream of the affected area) by the NSW Environment Protection Agency found no evidence of hydrocarbons or pesticides, including organochlorines, organophosphates and pyrethroids.

The Australian Registry of Wildlife Health at Taronga Conservation Society Australia conducted gross and histological examinations of affected animals and coordinated the diagnostic investigation that spanned multiple state agencies and academic institutions. In July 2015, scientists at the Elizabeth Macarthur Agricultural Institute detected a novel virus in tissues of affected turtles. Extensive testing showed very high levels of the virus in the tissues of animals with the most severe lesions, suggesting a major role for this virus. Further work is being undertaken to characterise the virus, determine its significance in the pathogenesis of disease and develop further testing capabilities.

When the disease was first detected, the upper catchment area of the Bellinger River (within the New England National Park) was closed[6]. Affected turtles were removed from the river to minimise the potential for disease transmission to other watercourses. Public information signs were installed at 17 sites along the river, providing biosecurity and hygiene advice to members of the public using canoes and kayaks, swimming or fishing in the river. NSW Department of Primary Industries and Wildlife Health Australia circulated specific biosecurity messaging, alerting veterinarians to be aware of any reports of similar findings in freshwater turtles.

Image courtesy Karrie Rose, Australian Registry of Wildlife Health

With the limited distribution of *M. georgesi*, the high level of morbidity (at least 25% of the known population) and a case fatality rate approaching 100%, the NSW Scientific Committee[7] made a Preliminary Determination to list the species as Critically Endangered under the *Threatened Species Conservation Act 1995*. A small number of healthy *M. georgesi* were removed from the river in autumn 2015 for a captive breeding program and have remained healthy.

M. georgesi are inactive during the cooler months from April to September. Preliminary surveys are planned for the spring to assess the extant turtle population.

The response, investigation and management of this event involved multiple government and nongovernment agencies and organisations, including Australian Registry of Wildlife Health, Bellingen Shire Council, CSIRO Australian Animal Health Laboratory, Elizabeth Macarthur Agricultural Institute, NSW Department of Primary Industries, NSW Environment Protection Authority, NSW Health, NSW Local Land Services, NSW Office of Environment and Heritage, NSW National Parks and Wildlife Service, NSW Regional Operations Group and Heritage Division, Taronga Conservation Society Australia, Wildlife Health Australia and multiple university researchers, private veterinarians and international experts.

See the Bellinger Shire Council website[8] for further information or the NSW Department of Primary Industries website[9] for Bellinger River snapping turtle response documents.

4 Moloney B, Britton S and Matthews S (2015). *Bellinger River snapping turtle mortality event 2015: epidemiology report*. October 2015. NSW Department of Primary Industries, Orange, New South Wales. www.bellingen.nsw.gov.au/sites/bellingen/files/public/images/documents/bellingen/Environment/BRST_Mortality_Event_DPI_Epidemiology_Report_2015_Final%20Copy.pdf

5 Spencer R-J, Georges A and Welsh M (2007). *The Bellinger River Emydura: ecology, population status and management*. Unpublished report to NSW National Parks and Wildlife Service by Institute of Applied Ecology, University of Canberra, Canberra.

6 NSW OEH (2015). *Bellinger River turtle deaths: factsheet March 2015*. NSW Office of Environment & Heritage, Sydney, New South Wales. www.dpi.nsw.gov.au/__data/assets/pdf_file/0011/553358/factsheetbellinger-river-turtle-deaths.pdf

7 NSW Scientific Committee (2015). *Preliminary determination—Bellinger River snapping turtle*, 28 August 2015. NSW Scientific Committee, Hurstville, New South Wales. www.environment.nsw.gov.au/resources/threatenedspecies/determinations/PDBellRiverSnapTurtle.pdf

8 www.bellingen.nsw.gov.au/news/bellinger-river-snapping-turtle-deaths-latest-news

9 www.dpi.nsw.gov.au/biosecurity/animal/wildlife-and-feral-animals

Eastern grey kangaroo mortalities — starvation

More than 300 unwell and dead juvenile eastern grey kangaroos (*Macropus giganteus*) were reported by rangers and wildlife carers in New South Wales and the Australian Capital Territory during July, August and early September 2015. Reports were received from across a large geographical area, including locations to the north (Mulligans Flat Woodland Reserve and Bywong), east (Wamboin, Queanbeyan and Bungendore) and south-west (Tidbinbilla Nature Reserve, Namadgi National Park and Gudgenby Homestead) of Canberra.

The majority of affected kangaroos were subadult juveniles (up to 15 kg, 18–21 months of age). Clinically, kangaroos were thin and weak with poor coat condition and pale mucous membranes. Affected animals failed to move when approached. Individuals brought into rehabilitation died despite supportive care. Haematology and biochemistry results from seven affected animals in the Australian Capital Territory found all animals to be anaemic (some regenerative) with mild-to-marked elevations in creatine kinase, and many hypoproteinaemic and hypoalbuminaemic.

Gross post mortem and histological examinations revealed a range of findings including reduced or no subcutaneous, abdominal or thoracic adipose tissue to severe chronic emaciation, anaemia, hypoproteinaemia, loss of muscle mass, reduced bone marrow cellularity, and reduced or no colloid in follicles of the thyroid. Gastrointestinal parasite burdens — some known to be associated with clinical signs of anaemia and hypoproteinaemia — were noted. Parasite species included *Globocephaloides trifidospicularis* associated with clinical signs of anaemia, hypoproteinaemia and oedema (facial swelling); *Labiosimplex* spp.; *Rugopharynx australis*; *Cloacina* spp.; *Paramacropostrongylus toraliformis*; *Pharyngostrongylus kappa*; *Alocostoma clelandi*; *Macropoxyuris* spp.; *Eimeria* spp.; and an unidentified protozoan species associated with villous atrophy and inflammation. Gastrointestinal parasites are not an unusual finding in this age class of animals. Further histological examinations performed by NSW Department of Primary Industries at the Elizabeth Macarthur Agricultural Institute and the Australian Registry of Wildlife Health found no evidence of babesiosis, phalaris toxicity or toxoplasmosis.

The cause of the mortalities is considered multifactorial; influences include over population, under nutrition, cold stress and parasitic burden, with starvation related to restricted food availability the key driving factor. In areas where mortalities were recorded, there had been a shortage of feed due to low temperatures and low rainfall over winter. The detrimental health effects of common gastrointestinal parasites normally found in kangaroos are exacerbated when food is limited.

Seasonal mortalities of subadult eastern grey kangaroos have been previously observed during July, August and early September over the past 20 years in the Australian Capital Territory. Similar seasonal die-offs have been reported in Victoria and New South Wales[10]. Reports describe the complex interaction of climatic conditions and poor pasture growth, culminating in stress-related mass mortalities. The mortalities impose a natural population regulatory effect and serve to protect the population when food resources are restricted.

A number of agencies and organisations have been involved in the response and investigation into the 2015 events, including ACT Parks and Conservation, Australian Registry of Wildlife Health, CSIRO, NSW Department of Primary Industries, NSW Office of Environment and Heritage, NSW Wildlife Information, Rescue and Education Service Inc (WIRES), Tidbinbilla Nature Reserve and Wildlife Health Australia.

10 Dawson, TJ (2012). *Kangaroos*. Chapter 3—Population structure, dispersal and mortality. pp. 59–60. CSIRO Publishing, Collingwood, Victoria.

Australian bat lyssavirus

Reports to WHA for the July–September quarter included 54 bats tested for Australian bat lyssavirus (ABLV) from New South Wales, Northern Territory, Queensland, Victoria and Western Australia. Bat submissions were made for a variety of reasons:

- 16 cases involved contact or suspected contact with the potential for ABLV transmission to humans; of these
  - 6 were also associated with trauma (e.g. barbed wire entanglement)
  - 2 involved contact with a pet dog or cat
  - the remainder had no further history reported
- 28 cases involved contact with a pet dog (23 bats) or cat (4 bats) or both (1 bat)
- 2 bats displayed neurological signs (aggression, abnormal vocalisation, hindlimb paralysis, nystagmus), one of which also had evidence of trauma
- 3 cases were associated with trauma (e.g. barbed wire or fishing line entanglement)
- 1 bat was found dead
- 4 bats had no further history reported at this time.

During the quarter, one black flying fox (*Pteropus alecto*) from Queensland was confirmed positive for ABLV by PCR testing for pteropid ABLV ribonucleic acid (RNA). The flying fox was found on the ground at a farmer's market in Brisbane. Potentially dangerous human contact was reported and an experienced public health official provided appropriate counselling and information.

More information on ABLV testing of bats in Australia is available in *ABLV Bat Stats*.[11]

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

Photo: Animal Health Australia