Wild Bird News

National Avian Influenza Wild Bird Surveillance Newsletter - June 2023

Black-necked stork — Image Courtesy of Guy Weerasinghe

National Avian Influenza Wild Bird Surveillance Program

In 2006, the National Avian Influenza Wild Bird (NAIWB) Steering Group was formed with the aim of facilitating nationwide coordination and cooperation of surveillance efforts related to avian influenza in wild birds. Wildlife Health Australia takes on the role of overseeing the wild bird surveillance program. The NAIWB surveillance initiatives encompass the entire country and activities are funded by the Australian Department of Agriculture, Fisheries, and Forestry (DAFF). Substantial in-kind support is provided by local governmental bodies, researchers, and various representative institutions.

Surveillance activities include two sampling components: firstly, targeted surveillance, in which environmental faecal swabs, as well as cloaca and/or oropharyngeal swabs, are collected from wild or hunter-shot birds of known avian influenza virus (AIV) reservoir species (e.g. waterfowl, shorebirds) that are apparently healthy. These samples undergo testing to identify the presence of AIVs. The collection of samples is done by diverse initiatives, including programs run by state and territorial government agencies, university research projects, and the Northern Australia Quarantine Strategy.

The second component is general surveillance, with investigation of significant morbidity and mortality events of wild birds, including captive avian populations within zoos. Reports and samples from sick or dead birds are submitted by private veterinary practitioners, universities, zoo wildlife clinics, wildlife sanctuaries and members of the public.

Avian Influenza Virus

To date, 16 haemagglutinin (HA; H1-H16) and 9 neuraminidase (NA; N1-N9) subtypes are recognised in birds. **Waterfowl and shorebirds are the main natural reservoirs and rarely show signs of disease.** Avian Influenza Virus (AIV) can cause significant infectious disease in domestic poultry and can also infect and/or cause disease in a range of other species including other captive birds, wild birds, and humans [1, 2].

Of global concern is the capacity of AIV subtypes H5 and H7 to mutate from Low Pathogenicity (LPAI) into **High Pathogenicity (HPAI) forms which can cause significant losses in both poultry and wildlife, and potentially human health issues.**

AIV in Australia

HPAI H5 viruses have not been detected in Australia. As of June 2023, there have been eight outbreaks due to HPAI H7 viruses in commercial Australian poultry operations between 1976 and 2020 in the states of Victoria, Queensland and New South Wales [3-9].

Mortality due to AIVs have not been reported in feral or native free-ranging birds [10]. However, **LPAI viruses have been detected in wild birds in Australia.**

Given Australia's geographic and ecological isolation, **it is important that assumptions about AIV epidemiology in Australia are not based entirely on studies from Asia, Europe or North America [11, 12].**

More info: WHA FACT SHEET

Data provided in this document should be considered preliminary and may be changed.

Continued global spread of HPAI H5Nx 2.3.4.4b

The first half of 2023 saw the rapid spread of HPAI H5N1 clade 2.3.4.4b through South America, with impacts on a wide range of wild birds and mammals. Mass mortality events were reported in species such as Peruvian pelicans, Peruvian booby, Guanay cormorant, Humboldt penguins and kelp gull [13-16]. These events may have long lasting conservation impacts for these species – for instance, the Peruvian pelican, already classified as an endangered species, is estimated to have lost approximately 36% of the population in Peru as a result of HPAI H5N1 [17]. Genetic studies confirmed virus was introduced from North America [17], which, combined with the rapid spread through the continent, increase concerns regarding the potential of long-distance bird movements in dissemination of this virus. Viral mutation is thought to have facilitated infection of mammals, with reported mortalities particularly impacting marine mammals such as the South American sea lion, with reports of more than 26,000 deaths [17]. The adaptation of this virus to mammal hosts raises the potential for zoonotic risk, although there has only been one human case of avian influenza infection reported in South America to date [18]. Meanwhile, outbreaks in wild birds and mammals continued through Asia, Europe, Africa and North America (**www.wahis.woah.org**).

Despite the elevated risk of HPAI H5Nx 2.3.4.4b incursion to Australia, expanded sampling and testing of more than 800 shorebirds and seabirds in locations around Australia in October to December 2022* did not detect incursion of this virus during the 2022 spring migratory period [19]. While 5.5% (25/453) of birds tested had antibody to Influenza A virus, none showed antibody against H5N1 clade 2.3.4.4b. Supporting this was the absence of this clade from targeted surveillance of Australian wild birds during the first 6 months of 2023, as well as exclusion from investigations into various wild bird mortality events that occurred in this time (see below for more detail).

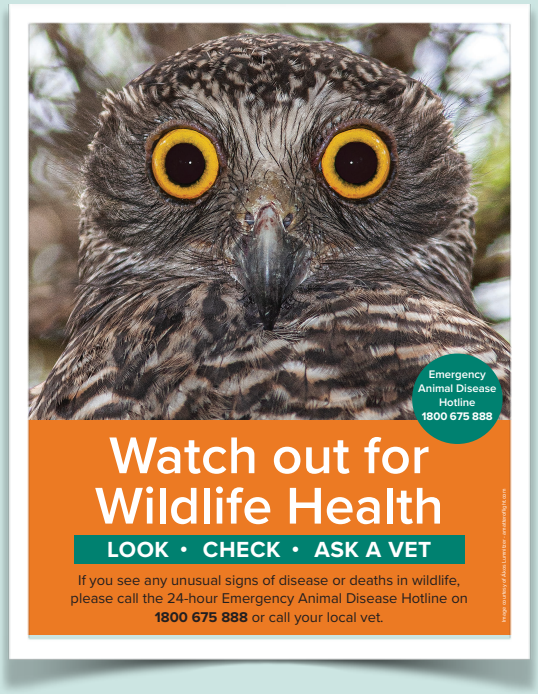
*This work was initiated and conducted by researchers from Deakin University and University of Sydney/WHO Collaborating Centre for Influenza, with funding through ARC DECRA and ARC Discovery Project grants and support from many volunteers assisting with bird capture and handling.

Hooded plover - Image Courtesy of Shana Ahmed

Activities of the NAIWB Steering Group

The NAIWB Steering Group held two teleconference meetings in this period and members undertook a range of activities to support the program:

- Targeted surveillance projects from 2022 were extended to continue sample collection and testing from wild birds through 2023.
- A scoping project was undertaken to explore existing data system advantages and constraints and identify possible solutions to enhance data system flows and agility required to support the NAIWB Surveillance Program objectives. The project was led by WHA and delivered by **Epi-Interactive**, with support from stakeholders within NAIWB Steering Group.
- WHA attended the World Organisation for Animal Health (WOAH) **Training of Focal Points for Wildlife in Asia and the Pacific Workshop**. This workshop supported networking opportunities to enhance wildlife health surveillance, reporting and response capacity.
- Attendance at the **WOAH 90th General Session of the World Assembly of Delegates in May 2023**. NAIWB members from WHA and CSIRO Australian Centre for Disease Preparedness provided input for discussions on the global HPAI situation, including discussion topics on monitoring and surveillance, vaccination, and communication and coordination. A **resolution generated from this session** highlighted the need for collaboration and inclusion of those working with wildlife.
- **Launch of the Australian Wildlife Health Incident Decision Support Tool (WILDDeST)** by WHA. This tool has been provided to Australian government agencies to facilitate structured, standardised, and transparent decision-making for investigation and management of wildlife health incidents, such as mortalities from HPAI.
- Staff from the Northern Australian Quarantine Strategy provided training to rangers from First Nations communities across northern Australia to assist in sample collection for targeted AIV surveillance.



AVIAN INFLUENZA IS A NATIONAL NOTIFIABLE DISEASE AND REQUIRES REPORTING TO THE CHIEF VETERINARY OFFICER (CVO) AT THE APPROPRIATE AUSTRALIAN STATE OR TERRITORY

If you would like information about Avian Influenza testing and sample collection, please seek advice from your local **WHA Coordinator** or call the **Emergency Animal Disease Hotline** (**1800 675 888**).

Targeted surveillance - Jan to Jun 2023

Between January and June 2023, AIV-specific, risk-based surveillance occurred at sites in New South Wales, Northern Territory, Queensland, South Australia, Tasmania, Victoria and Western Australia with cloacal and faecal environmental swabs collected from 2881 apparently healthy and hunter-shot waterbirds. Samples were tested using RT-PCR for AIV M (matrix) gene detection. Influenza A reactors (positives) to the influenza A matrix gene PCR were tested using specific qRT- PCRs for influenza A H5 and H7. Samples for which H5/H7 subtypes were detected by RT-PCR were dispatched to the CSIRO Australian Centre for Disease Preparedness (ACDP) for confirmatory and further testing.

Targeted surveillance - Influenza A virus detections (Jan - Jun 2023)

State / Territory	# Individual Swabs Collected[a]	# Positives[b]	H5 LPAI	H5 HPAI	H7 LPAI	H7 HPAI	Other LPAI HA Subtypes[c]
NSW	546	12	0	0	0	0	H3, H4, H6, H8, H9, H11
NT	137	0					
Qld	734	12	3	0	0	0	H3, H6, H8, H9
SA	394	19	0	0	0	0	H1, H6, H8, H9
TAS	437	49	1	0	0	0	H6, H8, H9, H11
VIC	535	47	7	0	0	0	H1, H3, H4, H6, H8, H9, H10, H11
WA	98	3	0	0	0	0	H3
Total	**2881**	**142**	**11**	**0**	**0**	**0**	

[a] Swabs include faecal environmental and cloacal swabs.

[b] A number of swabs were tested as a pooled sample (up to 3 swabs in one pool). A positive pool represents one AIV positive. A sample is considered AIV positive if either: a) Positive at original lab; b) Indeterminate at original lab and subsequently tested positive; c) Indeterminate at original lab and subtyped at any lab.

[c] When positive AIV samples (not identified as H5 or H7) are submitted for subtyping and successful.

Between January and June 2023, no HPAI viruses were identified, but targeted surveillance continues [12, 20] to find evidence of a wide range of low pathogenicity virus subtypes, including LPAI H5.

There were no detections of H5 lineage 2.3.4.4.

Molecular analysis of AIVs detected through targeted surveillance activities contribute to: tracking Australian virus evolution and dynamics, maintaining currency of diagnostic tests, maintaining a virus sequence library allowing comparison of Australian and overseas strains. This information informs risk to industry and response to detections in poultry.

From January to June 2023, species targeted for sampling were from orders Anseriformes and Charadriiformes.

Other bird orders may have been present during sample collections. The great majority of samples collected during this period were faecal environmental swabs. A small proportion of cloacal from hunter-shot birds were also collected.

Data provided in this document should be considered preliminary and may be changed.

General surveillance - Jan to Jun 2023

Wild bird morbidity and mortality investigation are reported into the Australia's wildlife health information system (eWHIS) via a network of state / territory WHA coordinators (appointed by their respective Chief Veterinary Officer), and WHA environment representatives, the Northern Australia Quarantine Strategy (NAQS), veterinarians at zoo-based wildlife hospitals and sentinel wildlife clinics, university clinics and pathology departments, researchers, other wildlife health professionals and WHA members. General surveillance summary tables (below) are drawn from data entered into eWHIS.

WHA received 89 reports of wild bird mortality or morbidity investigations from around Australia from January to June 2023, which were tested for AIV by PCR for influenza A. Investigations may involve a single animal or multiple animals (e.g. mass mortality event). Reports and samples from sick and dead birds are received from members of the public, private practitioners, universities, zoo wildlife clinics and wildlife sanctuaries.

General surveillance - mortality and morbidity events in which birds were tested for Influenza A viruses (Jan - Jun 2023)

Bird Order	Common Names for Bird Orders[a]	Number of Events AIV Tested via PCR[b]	Number of Events AIV Positive
Accipitriformes	Osprey, hawks and eagles	1	0
Anseriformes	Magpie Goose, ducks, geese and swans	25	7[c]
Charadriiformes	Shorebirds	6	0
Columbiformes	Doves and pigeons	13	0
Falconiformes	Falcons	1	0
Galliformes	Brush turkeys and quails	1	0
Gruiformes	Rails, coots and cranes	4	0
Passeriformes	Passerines or perching birds	7	0
Pelecaniformes	Ibis, herons and pelicans	6	0
Podicipediformes	Grebes	1	0
Psittaciformes	Parrots and cockatoos	20	1[c]
Sphenisciformes	Penguins	7	0
Strigiformes	Owls	1	0
Suliformes	Gannets and cormorants	2	0

[a] del Hoyo J, Collar NJ. HBW and BirdLife International Illustrated Checklist of the Birds of the World Volume 1: Non-passerines. Barcelona, Spain and Cambridge, UK: Lynx Edicions and Birdlife International; 2014.

[b] Disease investigations may involve a single or multiple bird orders (e.g. mass mortality event). Some events may be recorded in multiple lines in this table due to the involvement and AIV testing of multiple species from different Orders. During the reporting period, six events involved AIV testing of birds from multiple Orders - one event involved Pelecaniformes and Anseriformes, the second event involved Anseriformes and Gruiformes, the third event involved Gruiformes and Psittaciformes, the fourth event involved Charadriiformes and Columbiformes, the fifth event involved Anseriformes and Psittaciformes and the sixth event involved Columbiformes and Passeriformes.

[c] Incidental findings of AIV in seven mortality events involving Anseriformes, one which had also an incidental detection in one bird from order Psittaciformes are described in the next pages.

Avian influenza was not confirmed as the cause of any wild bird morbidity or mortality event between January and June 2023 reported to eWHIS.

Data provided in this document should be considered preliminary and may be changed.

NSW AIV incidental detections – Jan to Jun 2023

(events investigated by NSW Department of Primary Industries and Australian Registry of Wildlife Health, Taronga Conservation Society Australia)

In the first event, AIV was incidentally detected in pooled duck samples from a mortality event in the Cobar region in February 2023, involving wild ducks. LPAI H6N1 was identified in two birds and N2 genes detected in a third bird. No pesticides were detected, and a small number of birds had positive exposure tests for the botulism toxin ELISA, but the presence of the toxin was not confirmed upon subsequent testing. All birds had lesions of recent trauma, but no explanation of potential underlying factors to explain it. Although some birds in this event had detectable levels of mercury, this may be associated with bioaccumulation and not likely to explain the event. The cause of this mortality event could not be determined despite extensive testing. LPAI detections are not an unexpected finding in free-ranging waterfowl and is not likely to have been clinically significant.

In the second event, multiple birds were found sick and dead in or near a small lake in Victoria Park, Camperdown, in March 2023 (see **media**). Two flying-foxes were also found face down in the water. Thirteen birds (mostly Pacific black ducks, also a little corella, rainbow lorikeet and a grey teal), the flying-foxes, and water samples were submitted for investigation. Four of eleven birds tested positive for AIV, but tested negative for H5, H7 and H9 subtypes; one duck was identified with N6. These findings are not unusual and likely incidental. Japanese encephalitis, avian orthoavulavirus 1 and West Nile virus were excluded by PCR from birds and Australian bat lyssavirus and Hendra were excluded from bats. Botulinum toxin type C was detected from gastrointestinal content and maggot samples from several birds and botulism was considered the likely cause of death.

The third event occurred at the City of Albury Wastewater Treatment facility where wild duck mortalities were reported over two weeks in March 2023. There are two main wastewater treatment sites in the area (receiving the exact same water) though mortalities only occurred at one site. Staff estimated approximately 75-90 dead ducks with around 4-8 ducks retrieved from the ponds at this site each day. No obvious clinical signs were observed aside from possible lethargy/depression prior to death.

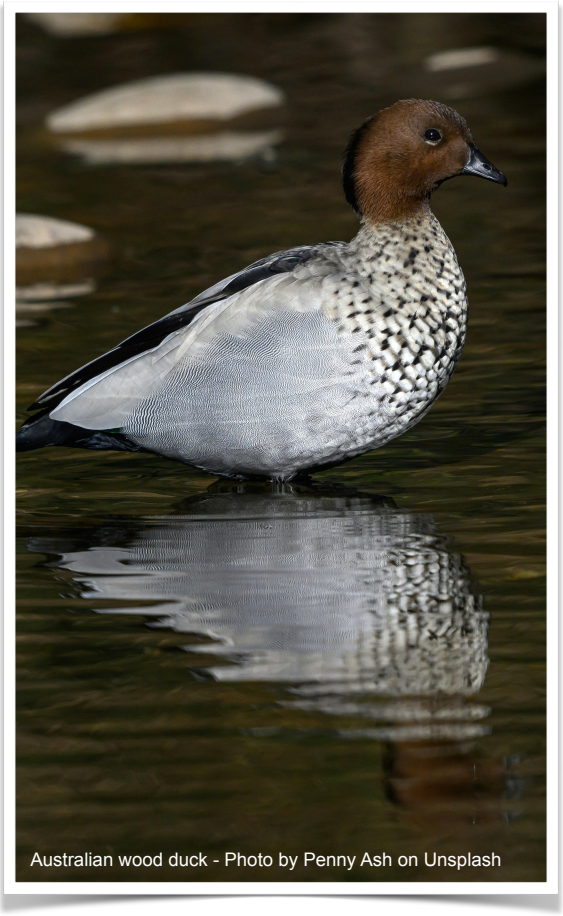

Pacific black duck - Photo by Sesinando on Pexels

Five ducks were submitted for investigation and avian orthoavulavirus 1 and West Nile virus were excluded by PCR. Pooled cloacal swabs from 3 birds tested positive for AIV and negative for H5, H7 and H9 by PCR and considered incidental. Sequencing was attempted at Elizabeth Macarthur Agricultural Institute (EMAI) but unsuccessful. Microscopic findings were mild and non-specific, and the cause of this outbreak remains unknown. No pathology findings were consistent with disease caused by AIV.

The fourth event involved 98 waterbirds found dead in a pond at Sydney Olympic Park in April 2023. Seven Pacific black ducks and one black swan were submitted for investigation. Botulinum C toxin gene was detected by PCR from birds and from maggots. There was no evidence of blue-green algal intoxication from water samples, and water quality analysis revealed high chorine as the only unusual parameter. A cloacal sample from one Pacific black duck tested positive for AIV and negative on H5, H7 and H9 TaqMan assays. Sequencing analysis in this sample identified LPAI H6N2. Post-mortem findings were not consistent with avian influenza in any of the sampled birds; the AIV detection was therefore considered incidental and not unusual given that Pacific black ducks are a known reservoir species for avian influenza. West Nile virus and avian orthoavulavirus 1 were excluded by PCR. Botulism was considered the likely cause of this mortality event.

Other AIV incidental detections (Tas, WA and Vic) – Jan to Jun 2023

In Tasmania, approximately 20 ducks, 12 black swans and 12 eels were involved in a mortality event over two weeks in January 2023. Insects, frogs and tadpoles in the same areas were not affected. Conditions were hot and dry at the time, and many more birds died than were reported. Two swans, one duck and one eel were submitted for investigation. Faecal culture of one of the swans yielded no significant growth (including negative for *Yersinia* and *Salmonella*). Avian orthoavulavirus 1 and Chlamydia were excluded by PCR on all submitted birds. Cloacal and tracheal swabs from one swan were positive for AIV, but negative for H5, H7 and H9 and further subtyping was unsuccessful. The duck was positive for LPAI H11N9. Algal bloom toxins were not detected in water samples and swan liver, gizzard contents and serum were negative for botulinum C and D by qPCR and ELISA. Botulism remains highly suspected, although not confirmed. AIV detections are incidental and unlikely to be related to the mortalities.


Australian wood duck - Photo by Penny Ash on Unsplash

In Western Australia, twelve Australian wood ducks were found sick and dying at Karratha wastewater treatment plant in February 2023. The sick ducks were observed paralysed and unable to move. Four whole dead ducks were submitted for testing to DPIRD Diagnostic and Laboratory Services (DDLS). No gross lesions were observed on necropsy of four birds submitted for investigation. These clinical signs are consistent with botulism commonly detected in water birds at the end of summer. Although liver and gut contents tested negative for botulinum C and D toxin gene PCR and C and D antibodies by ELISA, botulinum toxin is usually present in very low concentrations which makes these tests low in sensitivity. Botulism could not be confirmed as the diagnosis. One duck was positive for Influenza A matrix gene PCR and negative for H5, H7 and H9 TaqMan assays, and positive for avirulent avian orthoavulavirus 1. Immunohistochemistry did not identify virus particles. Detections of low pathogenicity avian influenza and avian orthoavulavirus 1 are not uncommon in wild birds. These findings were considered incidental in this case, neither explaining the deaths of the birds, nor presenting a significant risk to farmed poultry in the area.

AIV was also incidentally detected in two teals from a mortality event due to botulism in central Victoria in February 2023, which involved approximately 800 waterbirds. No significant gross pathology was found on necropsy and these incidental findings are not unusual given that waterfowl (Anseriformes) are an AIV reservoir species. More information about this event was published at **WHA Animal Health in Australia 2023 Report, page 43** and at the **Australian Veterinary Journal**, describing the "**Collaborative wildlife disease outbreak investigation and response at Bells Swamp Victoria, February 2023**"[21].

Incidental findings of LPAI viruses in wild ducks and swans are not unusual given waterfowl (Anseriformes) are an AIV reservoir species.

Disclaimer

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