AUSTRALIAN REGISTRY OF WILDLIFE HEALTH

ANNUAL REPORT

APRIL 2024 – MARCH 2025

TARONGA
CONSERVATION SOCIETY AUSTRALIA
Australian Registry of Wildlife Health

Australian fauna continue to be heavily impacted by our rapidly changing climate. Floods, storms, drought, fire, and changing land use practices act to impart stress and incite movement among wildlife populations, resulting in an upward trajectory of emerging infectious and non-infectious diseases. Wildlife are accepted as the most significant reservoirs of new infectious agents that may pose a biosecurity threat to biodiversity, primary industries and human health. Wildlife are also sentinels for environmental biological and anthropogenic toxins and are prone to negative welfare outcomes of malicious intoxication events. These factors, along with the threat of local and global forms of High Pathogenicity Avian Influenza illustrate the compelling need for rapid and effective investigation of wildlife morbidity and mortality events.

Taronga's Australian Registry of Wildlife Health (the Registry) provides a service to the NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW), NSW Department of Primary Industries & Regional Development (DPIRD) and the NSW community through a wildlife disease diagnostic service that is vital for wildlife conservation and biosecurity threat identification, management, and reduction. This report summarises the key activities and outcomes associated with the Registry's diagnostic service between 1 April 2024 and 31 March 2025.

TARONGA CONSERVATION SOCIETY AUSTRALIA

Australian Registry of Wildlife Health

REGISTRY WEBSITE

- arwh.org
- Common Diseases of Urban Wildlife downloadable materials
- Conference calendar
- 2024 Short Course lecture videos
- HPAI Resources

SOCIAL MEDIA

- Australian Registry of Wildlife Health Facebook page
- 1009 Members
- 88 posts during reporting period

PRINT MEDIA

- Community generated
- Local and national newspapers
- Local and national radio interviews

EDUCATION & TRAINING

WILDLIFE DISEASE ASSOCIATION PRE-CONFERENCE WORKSHOP

This year the international Wildlife Disease Association conference took place in Canberra, 1-6 December 2024, with a separate but concurrent program delivered online. The Registry conducted a pre-conference workshop at the Taronga Institute of Science and Learning. The wildlife health and disease focused workshop took place 29 November through 1 December 2024. Many of the workshops necropsy supplies were provided through partnership with the charitable organisation MediDivert which saves unused human hospital 'waste' from landfill by redirecting them to the veterinary industry.

HPAI PREPAREDNESS TRAINING

In late 2024, the Registry, in partnership with NSW DPIRD, generated training resources, take-home notes, preparedness packs and delivered four training workshops over five days, spanning two cities. Key learning objectives included increasing knowledge regarding: HPAI, human health protection while handling wildlife, PPE donning and doffing, site decontamination, disinfection, disposal of animal remains, sample collection and shipping. Workshops were conducted at Taronga Zoo Sydney and Taronga Western Plains Zoo in Dubbo to train 104 NPWS, BCS, EPA, DPIRD, Local Lands Services, Marine Parks personnel. Feedback from participants was excellent, especially the practical components. Training resources will be used to generate online modules and expanded workshops will be delivered to veterinary personnel in late 2025.

OTHER EDUCATION AND TRAINING ACTIVITIES

- Wildlife Necropsy and Sampling Workshop for Local Land Services Veterinarians, workshop for Northern Rivers Wildlife Workshop, convened, Ballina, Australia, 25 June 2024.
- Microchip training for National Parks and Wildlife Services, 17 April 2024.
- Necropsy and sampling training, University of Sydney, 18 April 2024.
- Wildlife necropsy and sampling workshop for Local Land Services veterinarians, Camden, 9 May 2024.

DIAGNOSTIC SERVICES

Between 1 April 2024 and 31 March 2025, the Registry conducted ante- and post- mortem examinations of 530 individual specimens, representing 123 individual events. The Registry's caseload was substantially higher than the previous project year, where 320 specimens were examined.

Wildlife submissions emanated predominantly from coastal NSW, but there were increasing submissions from inland NSW (Figure 1). Birds are the most submitted taxonomic group of wildlife, yet there was reasonable representation across mammals and reptiles, while amphibians were under-represented in the reporting period (Table 1). Diagnostic testing related to Notifiable Animal Diseases spanned a broader range of pathogens compared with previous years, and findings are summarised in Table 2.

Wildlife is examined when events fall within a documented set of terms of reference, and they are submitted through the Emergency Animal Disease Hotline, or other forms of direct communication with National Parks and Wildlife Service Rangers, Saving our Species Program teams, Environment Protection Authority Officers, District Veterinarians, the Environmental Forensics Laboratory, wildlife veterinarians and rehabilitators, and members of the NSW community.

Unusual or mass mortality events, included:

- morbidity and mortality of Bellinger River Snapping Turtles,
- active surveillance of annual post-migration shearwater deaths for possible High Pathogenicity Avian Influenza (HPAI) incursion,
- neurological seabirds and felids presented on remote, offshore, Australian territories,
- haemorrhagic enteritis and pneumonia in grey-headed flying foxes,
- paralysis in flying-foxes that may or may not be associated with flying-fox paralysis syndrome,
- many rainbow lorikeet mortalities not consistent with Lorikeet Paralysis Syndrome,
- examination of 144 loggerhead turtle eggs and hatchlings,
- eastern grey kangaroos with an unidentified syndrome,
- Risso's dolphin mortalities,

- two stranded young striped dolphins,
- a beaked whale mortality,
- focal platypus mass mortality,
- blind and neurological eastern grey kangaroos and emus in far western NSW,
- multiple bird mass mortalities – many botulism and other intoxication events, including
    - a large and ongoing mortality involving ibis and pelicans with botulism,
    - multiple very large mass mortalities involving cockatoos and corellas,
    - silver gull mass mortalities,
    - Menindee Lakes bird mortalities

The Registry provided advice on an additional 68 wildlife morbidity and mortality events across the state during the reporting period although no samples were received.

Registry service demands expanded dramatically in association with the Freeman's Reach HPAI outbreak in May 2024, with an additional surge throughout November associated with the annual shearwater migration and malicious poisonings. Malicious poisonings now represent a significant proportion of the Registry's caseload, and our investigations are vital to providing high quality data and samples for toxicological analyses.

In addition to the increased caseload, shifting priorities across the community and state government agencies have prompted investment in HPAI surveillance and preparedness state-wide. The Registry has contributed to HPAI preparedness through training, surveillance, interagency coordination, professional advice, and community consultation. The Registry contributes to HPAI surveillance through direct sampling and indirectly via liaison among members of the public, wildlife rehabilitators, private veterinarians, district veterinarians, and staff managing the EAD Hotline.

*Table 1. Ante- and post-mortem examinations carried out by the Registry from 1 April 2024 to 31 March 2025, by taxonomic group. (*one shark was also examined)*

	Amphibian	Mammal	Bird	Reptile	TOTAL
Terrestrial	2	65	151	4	222
Marine		15	52	175	242
Freshwater			32	33	65
TOTAL	2	80	235	161	529*

Table 2. Notifiable disease testing carried out 1 April 2024 - 31 March 2025 by NSW DPIRD, WA DPIRD and ACDP

	Number of tests	Number positive
Australian bat lyssavirus	2	0
Avian Influenza H5	14	0
Avian Influenza H7	7	0
Avian Influenza H9	7	0
Avian Paramyxovirus	4	0
Bellinger River Virus	3	0
Botulinum C toxin gene qPCR	45	21 (plus 4 Indeterminate)
Botulinum D toxin gene qPCR	45	3 (plus 1 Indeterminate)
Botulinum E toxin gene qPCR	36	0
***Chlamydia* PCR**	53	0
Chlamydia psittaci	20	0
Epizootic Haematopoietic Necrosis Virus RT-PCR	7	0
Infectious laryngotracheitis	1	0
Influenza A RT-PCR	560	0

Influenza A TaqMan	8	1
Japanese Encephalitis Virus ELISA	14	0
Japanese Encephalitis Virus qPCR	97	0
***Leptospira* PCR**	2	1
Lyssavirus IFAT	5	0
Lyssavirus PCR	5	0
Murray Valley Encephalitis Virus ELISA	14	0
Murray Valley Encephalitis Virus qPCR	99	0
Newcastle Disease RT-PCR	511	0
Pan-Lyssavirus	2	0
Pan-Nidovirus	69	54
Pigeon Paramyxovirus RT-PCR	24	0
Ranavirus	12	0
Viral RT-PCR	3	0
West Nile Virus ELISA	15	1
West Nile Virus RT-PCR	4	0
Ziehl-Neelsen stains for *Mycobacteria* (by cytology)	21	1 (confirmed by MALDI-TOF)*

*confirmed as *Mycobacterium chelonae*

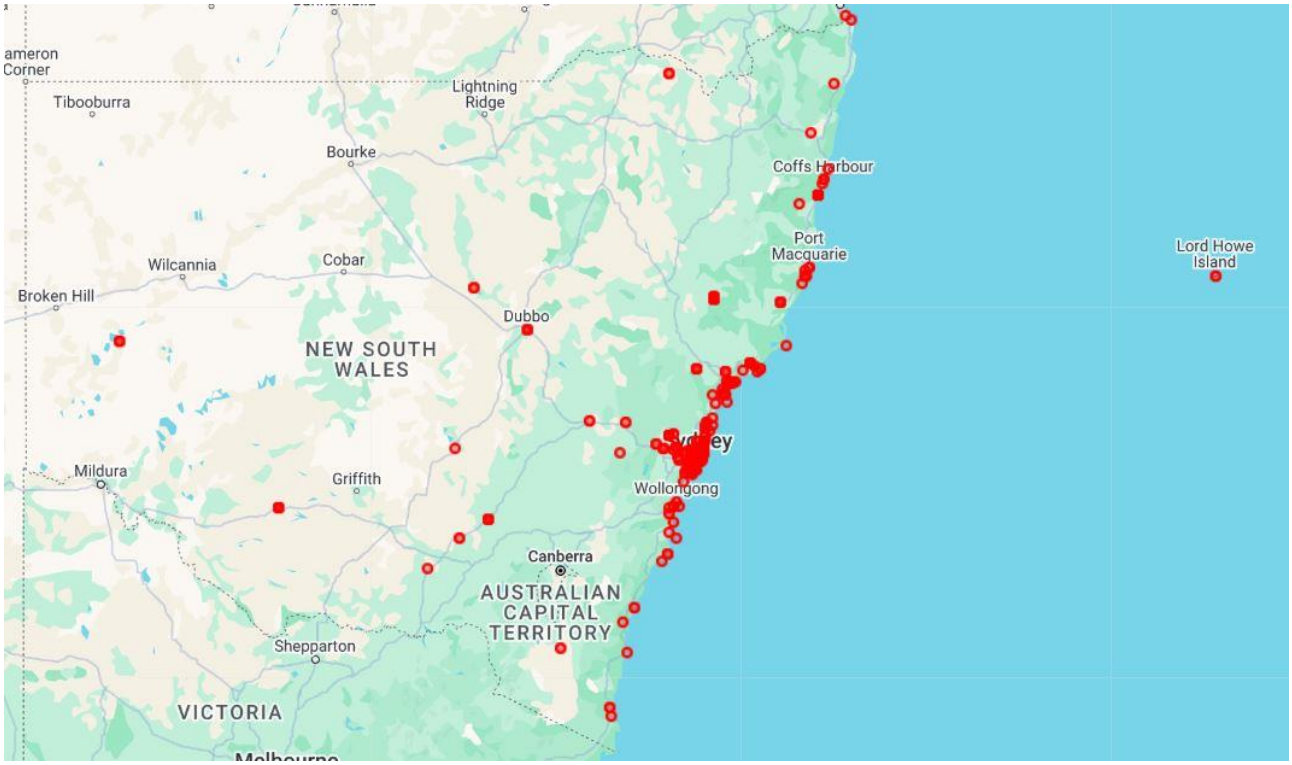

Figure 1. Wildlife specimen submission locations across NSW, 1 April 2024 - 31 March 2025.

DIAGNOSTIC RESEARCH & DEVELOPMENT

ONLINE REGISTRY UPGRADES

The Online Registry has been enhanced to include a web-based submission process, allowing contributors to submit cases, digital images and electronic files via a QR code or url. These submissions are moderated prior to uploading into existing or new case in the Registry. A Workflow tool has been developed to assist with trimming, sorting samples, uploading images, finalising and reporting out cases individually or in batches. A new user interface for the Online Registry will be tackled next, with the aim of simplifying data entry, systems administration and maintenance and enhancing data mapping and reporting features.

RETROSPECTIVE & PROSPECTIVE ANALYSES FOR EMERGING ARBOVIRUSES OF PUBLIC HEALTH RELEVANCE IN NSW WILDLIFE

Project partners: NSW Health*, NSW Department of Primary Industries, Taronga's Wildlife Hospitals, University of Wollongong, University of New South Wales, University of Sydney, and CSIRO

The research program includes two discrete projects, one retrospective and one prospective, each focusing on wildlife surveillance to support the human health risk assessment of Japanese encephalitis virus (JEV) and Murray Valley encephalitis virus (MVEV). Research questions include the geographic, temporal and host species distributions on these viruses in NSW. Each project will involve testing targeted wildlife samples, using PCR or serology, for evidence of exposure to JEV, MVEV and avian influenza (AI). A total of 761 samples (serum, tissues, and blood) were sent to the Elizabeth Macarthur Agricultural Institute (EMAI) in June 2024, for analysis. Evidence of exposure to targeted arboviruses were not detected in any koala, silver gulls, shearwaters, other water birds, or various mammal samples. Potential exposure (serological reaction) was detected in one sandy (flesh-footed) shearwater, a common wombat, a brush-tailed possum, a long-nosed bandicoot, and two grey-headed flying foxes. Additional serological testing is being explored with collaborators and a stakeholder meeting was held to determine priorities for the upcoming season. A final report for this project will be delivered in September 2025.

*Funded by Health Protection NSW (NSW Health) under a Federation Funding Agreement to support the surveillance and control of targeted mosquito borne viruses.

TAKING ONE HEALTH TO THE OCEANS: INVESTIGATING UNSOLVED CETACEAN MORTALITY EVENTS

Project partners: Wildlife Health Australia, NSW National Parks and Wildlife Service, Australian Centre for Disease Preparedness

There is a growing need to better understand the health threats to marine fauna, particularly those posed by infectious disease. Based on the demands of multiple NSW agencies to use wildlife health data to manage the NSW Marine Estate, the Registry prepared a project plan and sought external funding to conduct targeted testing of archived and prospective cetacean samples. This Wildlife Health Australia, One Health-funded project aimed to investigate potential underlying factors that could contribute to unusual stranding events. A total of 102 retrospective samples from 53 cetaceans from Registry archives were sent to the Australian Centre for Disease Preparedness for screening for influenza A viruses, morbilliviruses, and *Brucella* sp., as well as *Coxiella burnetti* at EMAI. All tissues were negative except one adult, female pygmy killer whale (*Feresa attenuata*) that was found stranded at Cronulla in 2011. Multiple co-morbidities were detected microscopically in this animal, including fungal meningoencephalitis, likely due to *Aspergillus fumigatus*, likely corresponding to viral-induced immunosuppression. Blast analysis showed highest nucleotide similarity (99.5%) to *Morbillivirus ceti* strain MQ913P (GenBank Acc.MG845552). The virus also shared 99.5% nucleotide similarity to

cetacean morbillivirus associated with unusual mortality events in South Australian bottlenose dolphins in 2013 (Kemper et. Al., 2016). The results indicate that the infectious agents of interest are historically rare in cetaceans found in New South Wales, but current interest in emerging diseases warrants ongoing investigations. A final report was shared with WHA and relevant stakeholders and a peer-reviewed manuscript is in preparation.

PUBLICATIONS

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Fenton, H., Hall, J., Dobson, N., Rose, K. Wang J. (2024) "Taking One Health to the Oceans: Investigating Unsolved Cetacean Mortality Events", Report to Wildlife Health Australia One Health Fund.

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UPCOMING EVENTS

In 2025 the Registry will deliver HPAI preparedness training workshops targeting veterinarians and vet nurses across NSW following a successful grant application. The veterinary focused training will require the creation of additional curriculum to address relevant legislation, clinic biosecurity, wildlife handling, triage, and humane euthanasia, which were not components of previous HPAI workshops. Following these workshops, resources will be refined and used to create an online training module available through NSW DPIRD.

We wish to thank the membership for their contributions towards the Registry over the past year. We encourage anyone with wildlife health data and/or materials to consider contributing to the Registry as a living archive to support research, education and disease surveillance.

The Registry is a conservation research program of Taronga Conservation Society that operates through a network of goodwill among academics, zoos, wildlife managers, wildlife rehabilitators, state and commonwealth government agencies, and the memberships of the Australian Society for Veterinary Pathologists and Wildlife Disease Association Australasia.