Wildlife Health AUSTRALIA

Photo: © Eric J Woehler

High Pathogenicity Avian Influenza (HPAI) and Wildlife in Australia

A RISK MITIGATION TOOLBOX FOR WILDLIFE MANAGERS WITH A FOCUS ON H5 HPAI (H5 BIRD FLU)

Version 2.0 March 2026

Table of Contents

High Pathogenicity Avian Influenza (HPAI) and Wildlife in Australia

Risk mitigation toolbox for wildlife managers with a focus on H5 HPAI (H5 bird flu)

If sick or dead wildlife are observed, or you suspect an animal is infected with H5 HPAI:

- **AVOID** – keep yourself and others safe. Do not make direct or indirect contact with sick or dead wildlife or their immediate environment. Do not handle or remove sick or dead wild birds or mammals unless instructed to do so by government authorities.
- **RECORD** – make a note of what you observe, including: number of animals affected, species/type of animal, location (GPS reading), date and time. Take photos or videos if safe to do so.
- **REPORT** multiple sick or dead wildlife via the Emergency Animal Disease Hotline on 1800 675 888. Avian influenza is a nationally notifiable disease.

The advice in this document is focussed on the increased risk to Australia from H5 HPAI. Other strains of HPAI have not caused such widespread disease in wild birds and mammals, but the general principles within these documents can be applied to other HPAI strains, while also considering and adjusting for any known differences in epidemiology.

PART A INTRODUCTION AND BACKGROUND

1 Introduction to the toolbox

1.1 Aim and purpose of this toolbox

The toolbox is intended as a guidance document to assist managers of wildlife populations in Australia develop plans to mitigate the risk of high pathogenicity avian influenza (HPAI). It aims to:

- enhance early detection of HPAI in wildlife
- enhance biosecurity measures for wildlife managers to reduce the risk of introduction, establishment and spread of HPAI
- reduce the risk to human, animal and environmental health posed by HPAI in wildlife
- prepare wildlife managers for the response to and recovery from an outbreak of HPAI in wildlife.

This toolbox provides guidance in line with Australia's existing emergency management arrangements and other guidance material (as described in Section 2.5). It is not intended to provide definitive advice or to replace direction from government authorities, individual site assessments or veterinary advice. Every location is different, and this document cannot predict all eventualities for all situations.

It is important to note that any decisions before or during an emergency response need to be made in line with current legislation and government legal orders or advice. It is up to wildlife managers to ensure they are following the most up-to-date jurisdictional legislation, legal orders and guidance relating to biosecurity, wildlife protection and conservation, animal welfare, emergency management and workplace health and safety. Wildlife managers should contact the government authorities in their jurisdiction to clarify legal responsibilities and refer to the AUSVETPLAN documents.

The advice in this document is focussed on the increased risk to Australia from H5 HPAI (also referred to as H5 bird flu). It includes the serious and highly contagious H5N1 clade 2.3.4.4b strain which has been spreading globally since 2021. Other strains of HPAI have not caused such widespread disease in wild birds and mammals, but the general principles within these documents can be applied to other HPAI strains, while also considering and adjusting for any known differences in epidemiology.

1.2 Why should managers of wildlife populations use this toolbox?

HPAI presents risks to animal, human and environmental health, and these can be reduced by risk mitigation plans. Since 2021, H5 HPAI has caused significant illness and deaths in wild birds, mammals (both wild and domestic) and poultry in all geographical regions except Oceania (which includes Australia and New Zealand). The current global situation means an

increased level of risk to Australia via the movements of infected wild birds from other areas into Australia (see Section 2.2 and 2.4). **Given the increased risk to Australia, there is a need for enhanced preparedness and risk mitigation planning across various stakeholder groups and levels of government, including managers of wildlife populations.** The Australian Government is currently investing in enhancing national preparedness and response capability, with activities underway across state and territory governments, industries and the non-government sector. You can find further information and resources here.

The urgent need for risk mitigation plans is supported by the Scientific Task Force on Avian Influenza and Wild Birds statement on H5N1 High pathogenicity avian influenza in wild birds - unprecedented conservation impacts and urgent needs and the WOAH/FAO Network of Expertise on Animal Influenza (OFFLU) statement Global overview of the spread and impact of H5 clade 2.3.4.4b high pathogenicity avian influenza virus in wildlife, 2020-2024. Both highlight the need for collaborative programs in preparedness and response for HPAI.

1.3 Who should use this toolbox?

This document is designed for use by all **managers of free-ranging wildlife populations in Australia**, including national and jurisdictional environmental and biosecurity agencies, local governments, non-profit organisations, native title holders, and private landholders.

Components of the guidelines may also be useful to individuals or groups that interact with free-ranging wildlife, such as wildlife care and rehabilitation centres, researchers, environmental scientists, bird banders, conservation groups and veterinarians.

The toolbox provides strategies for **HPAI in wild birds as well as wild mammals**.

Only **free-ranging** wildlife will be specifically considered by these guidelines. A risk mitigation toolbox targeted to wildlife care providers (such as wildlife hospitals and rehabilitators) is also available on the Wildlife Health Australia (WHA) website, and shares common information with these guidelines.

The management of HPAI risk for wildlife held in captivity permanently (e.g. in zoos, fauna parks, wildlife parks), semi-permanently (e.g. captive breeding programs) or for domestic animals will not be considered specifically, although the principles and processes may be of some relevance to these situations. See Appendix 5 for biosecurity resources relevant to domestic animals and wildlife held in captivity.

1.4 How should this document be used?

This document contains three parts (Figure 1):

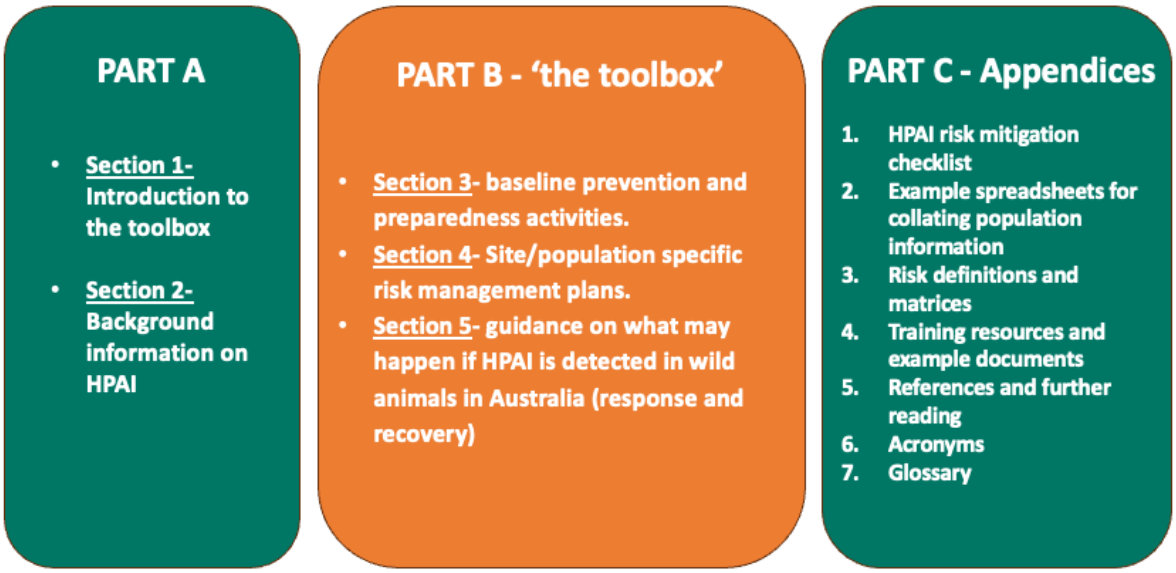

Figure 1: Structure of this document

Wildlife population managers should work through Part B, 'the toolbox' in a stepwise fashion (as shown in Figure 7) and use the resulting information to develop a HPAI risk mitigation plan tailored to their site and consider other relevant preparedness activities such as outreach and training activities, and equipment and facility considerations. Wildlife managers should consult with their relevant jurisdiction's biosecurity, environment and human health departments during the development of these plans.

Text within grey boxes (example below) indicates actionable items, which are consolidated as an overall checklist in Appendix 1. Ideally, risk mitigation plans should be implemented alongside (and where appropriate, integrated in to) any other existing management plans or procedures for the sites and populations.

Text within these boxes indicates items that wildlife population managers should consider in their HPAI risk mitigation planning and preparedness.

2 Background information on HPAI

2.1 What is HPAI?

Avian influenza (AI), also known as bird flu, is a viral disease caused by influenza A virus. Strains of AI are categorised as either low pathogenicity (LPAI) or high pathogenicity (HPAI) depending on the potential disease caused in poultry. Influenza A viruses are also categorised according to the serological subtypes of their surface glycoproteins, haemagglutinin (HA) and neuraminidase (NA). To date, 17 HA (H1–16, H19) and 9 NA (N1–9) subtypes are recognised in birds and are found in different combinations (Figure 2).

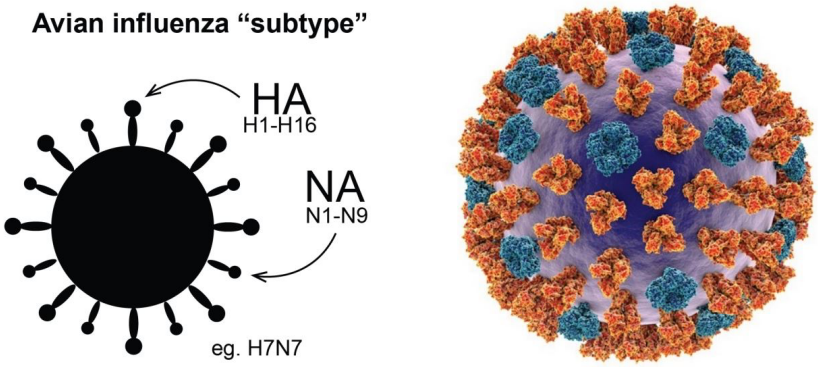

Figure 2: AI viruses are classified according to the serological subtypes of their surface glycoproteins (courtesy of Michelle Wille)

Avian influenza viruses (AIVs) constantly evolve, resulting in the ongoing emergence of new lineages and strains that are classified based on sequence analysis and distribution of the viruses in hosts, geographic locations and time.

Around the world, including in Australia, LPAI viruses occur naturally in wild birds, notably waterfowl (ducks, geese and swans) and shorebirds. LPAI viruses typically do not cause severe disease. Some specific LPAI subtypes (subtypes H5 and H7) can evolve to HPAI following spillover and circulation in poultry. HPAI infections typically cause severe disease in poultry and may also impact other species including wild birds, humans and other mammals. See Section 2.2 for information on H5 HPAI and how it is different from other HPAI strains and Section 2.4 on how HPAI outbreaks could occur in Australia.

Although AIVs do not normally infect humans, some subtypes have been associated with disease in humans ranging from mild illness to severe disease and death. Human infections are generally associated with close contact with infected animals or their environments (see Australian Centre for Disease Control (CDC) website).

AIVs are most often transmitted via direct contact with respiratory secretions and faecal material, predation or scavenging, and indirect exposure to contaminated environments or objects (e.g. clothing, boots, equipment, etc.). Likely pathways of transmission of AIVs through wildlife populations and environments with a focus on H5 HPAI are illustrated in Figure 3.

AI is a nationally notifiable disease, meaning that it must be reported to government biosecurity authorities (see Section 3.2). For more information on AI in wildlife, see the Wildlife Health Australia (WHA) Fact Sheet.

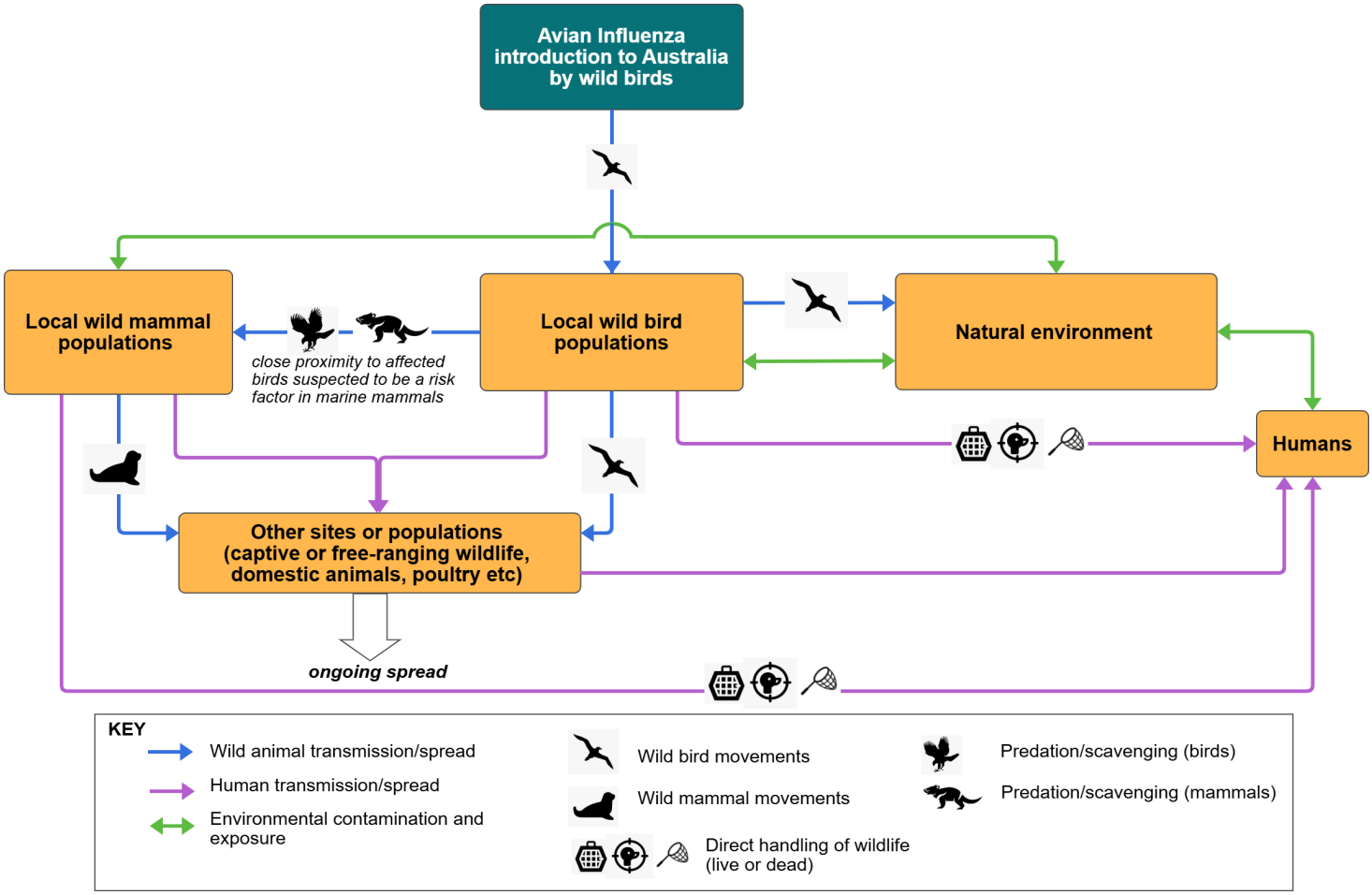

Figure 3.: Likely pathways for the introduction, transmission and spread of avian influenza (with a focus on H5 HPAI) to, from and within wild populations following introduction via wild bird.

2.2 Current global status - the emergence of H5 HPAI strain 2.3.4.4b

Currently, the AIVs of most concern worldwide belong to the H5 subtypes of the "A/goose/Guangdong/1/96" lineage. This lineage has been present in various parts of Asia for the past three decades, evolving constantly and causing HPAI outbreaks in both wild birds and poultry overseas, mostly in Asia and Europe. **In 2021, a new strain from this lineage emerged, H5 HPAI strain 2.3.4.4b. The emergence of this strain of H5 HPAI has been a 'game changer', causing a global panzootic characterized by a significant increase in the frequency and geographic range of HPAI outbreaks in both wild birds and poultry overseas. H5 HPAI has now caused unprecedented outbreaks of HPAI in wild birds, mammals (both wild and domestic) and poultry in all geographical regions except Oceania (which includes Australia and New Zealand).**

At least 560 species from more than half of all bird orders have been affected by H5 HPAI worldwide, with over half being newly reported species since 2021. More than 100 mammalian species have also been affected, with over half being newly reported species since 2021. See the WHA Technical Issues Update for more information and the FAO's list of species in which H5 HPAI has been detected. Figures 4-6 illustrate the significant increase in frequency, geographic range and range of bird species and mammals impacted by HPAI in recent years.

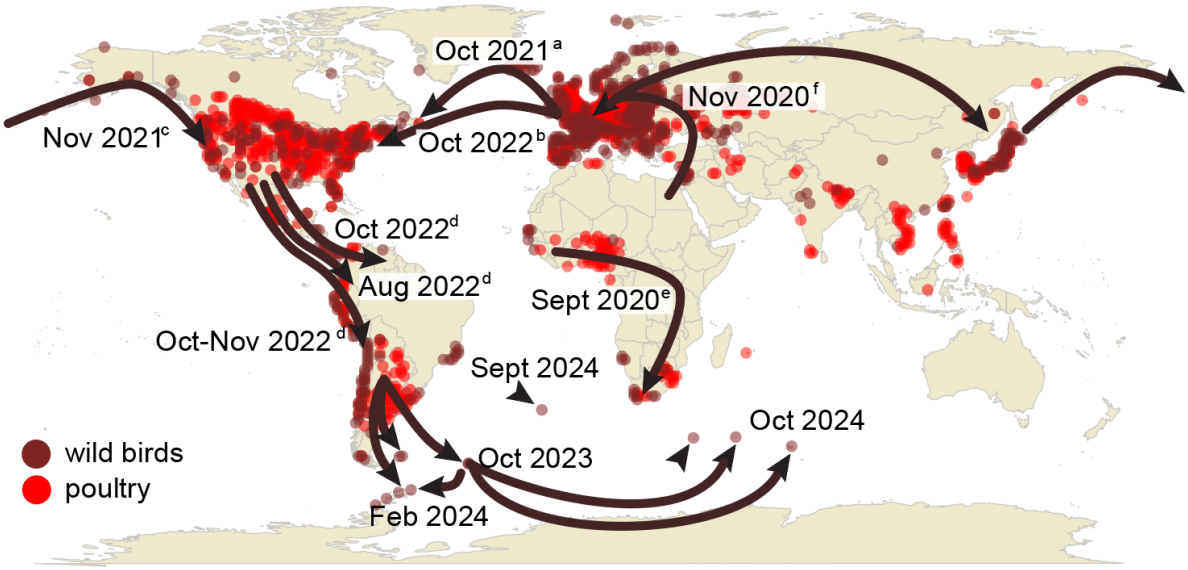

Figure 4: H5 HPAI outbreaks in poultry and wild birds in recent years. Arrows and dates indicate the approximate timeline of geographic spread (courtesy of Michelle Wille).

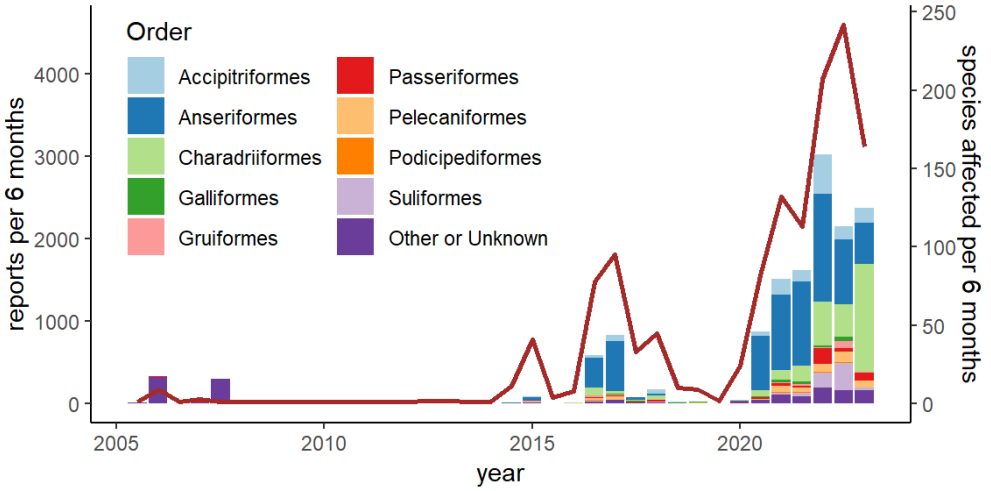

Figure 5: Total number of wild bird HPAI cases reported (stacked bars) and number of species involved (brown line) as a function of time (half yearly periods). The different colours denote the order to which the various species of birds belong. Data from World Animal Health Information System. From Klaassen and Wille (2023).

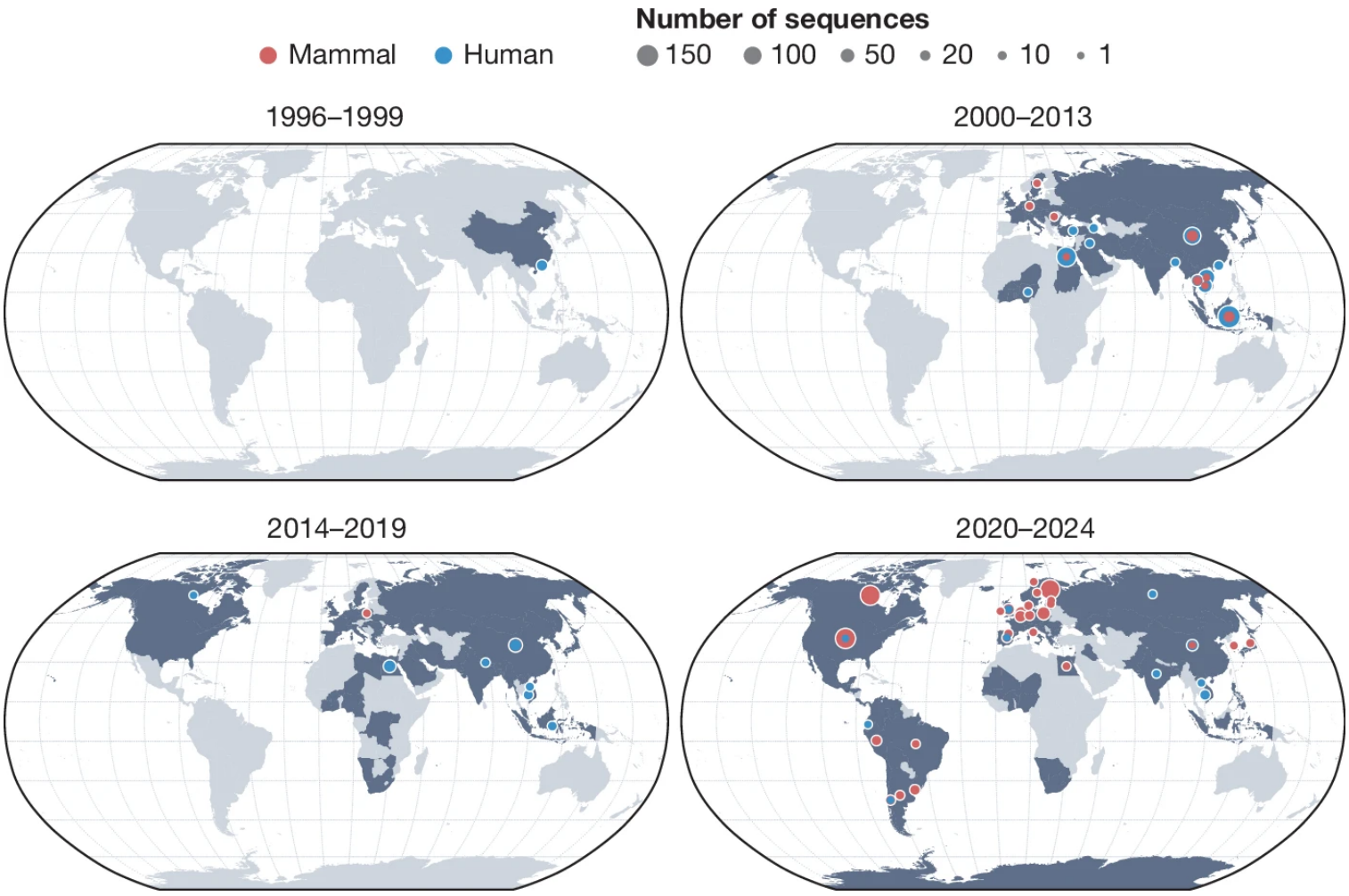

Figure 6: H5 HPAI virus detections since 1996. From Peacock et al., 2004

2.3 Occurrence of HPAI in Australia

H5 HPAI viruses have not been detected in animals in Australia.

In Australian poultry enterprises, multiple outbreaks of H7 HPAI strains have occurred between 1976 and 2025. Most recently, in 2024 and 2025, premises across Victoria, NSW and ACT were affected by outbreaks caused by three separate H7 HPAI strains. Outbreaks in poultry in Australia were most likely due to LPAI viruses being transmitted to poultry from wild birds, followed by mutation to HPAI.

HPAI has never been detected in free-ranging Australian wild birds. However, during a 1985 HPAI outbreak, H7 HPAI was detected in a feral Eurasian starling (*Sterna vulgaris*) trapped inside an affected poultry shed.

LPAI viruses are considered part of the natural viral community in wild birds in Australia, with almost all LPAI subtypes (H1-13, H15-16) having been detected. LPAI viruses have been identified in Australian Gruiformes, Pelecaniformes, Procellariiformes, Anseriformes and Charadriiformes.

The National Avian Influenza Wild Bird Surveillance (NAIWB) program collects and screens samples from Australian wild birds for AI viruses and the data generated are used to monitor and understand AI in wild birds in Australia. Sequence analysis of AIVs detected in wild birds through the NAIWB program contributes to tracking Australian virus evolution and dynamics, maintaining currency of diagnostic tests, and maintaining a virus sequence library allowing comparison of Australian and overseas strains.

2.4 Risk of HPAI to Australia

The risk of HPAI to Australia is dependent on the likelihood of entry, establishment and spread of the virus, as well as the potential consequences of this to Australia, including impacts on animal, human and environmental health.

HPAI could occur in Australia by the following means:

- transfer of local LPAI viruses from asymptomatic waterfowl to susceptible poultry flocks via close contact, including direct contact or contamination of poultry feed and water by wild bird droppings or secretions, followed by mutation to HPAI in poultry
- introduction into Australia from overseas (followed by transmission to location animal populations) via
    - seasonal migration of HPAI infected wild birds on established flyways.
    - nomadic movements of HPAI infected wildlife within the Australo-Papuan (year-round) or Antarctic/sub-Antarctic regions (seasonal)
    - the importation of HPAI virus-contaminated poultry products, equipment or other materials. Strict biosecurity controls for importation mitigate this risk.

A formal HPAI incursion risk assessment for the risk (likelihood and consequence) of HPAI H5N1 clade 2.3.4.4b incursions into Australia via wild birds was undertaken in 2023. This risk assessment found an **increased risk to Australia, due to the increase in the likelihood of entry into Australia via wild bird movements, and anticipated increased consequences if it were to enter, including consequences to poultry industries, wild bird and mammal populations, and potentially humans.**

AviFluMap is an online mapping and modelling tool designed to support assessments of the risk of H5 HPAI to Australia's wild bird populations. It includes information on H5 HPAI events across the globe since 2021, maps of bird migratory paths to and from Australia, modelling of Australian bird species susceptibility to H5 HPAI based on known event data, and a mapping tool demonstrating known congregations of key bird species within Australia. Managers are encouraged to explore the tool in considering the risks to the populations they manage.

2.5 HPAI response arrangements in Australia

The Australian approach to managing emergencies recognises four phases of emergency management: **prevention, preparedness, response and recovery**. At the current time, where HPAI has not been detected in Australia, activities should focus on **prevention and preparedness**. **Response and recovery** activities are those that occur if HPAI were to be detected in wildlife in Australia.

Response to avian influenza outbreaks in Australia is described in the nationally-agreed AUSVETPLAN Response Strategy: Avian Influenza. The National Management Agreement – H5 HPAI in wildlife (the H5 NMA) was established in 2025 as a national arrangement for responding to incursions of HPAI in wildlife, where eradication or containment of the disease is unlikely.

There are several other AUSVETPLAN manuals of relevance to HPAI for managers of wildlife populations including:

- AUSVETPLAN Operational Manual: Wild Animal Response Strategy (WARS) describes the overall framework for the management strategies and control procedures for wildlife during an EAD incident in Australia.
- AUSVETPLAN Operational Manual: Decontamination provides guidelines for the decontamination of premises where animals infected with emergency animal disease (EAD) agents have been held.
- AUSVETPLAN Management Manual: Control Centres Part 1 and 2 describes how EAD incidents are managed across animal authorities at national, state and local levels, including how decisions are made, the roles and responsibilities of the groups involved, and coordination of the scientific, logistic, managerial and financial resources.

Broad decisions on response and recovery activities will be made at a national level by government authorities, depending on the specifics of the outbreak. Implementation of these activities, including on-the-ground response activities, is the responsibility of the relevant government authorities in each jurisdiction.

The role of managers of wildlife populations is to support these activities and provide information to decision-makers in government authorities as required through the established EAD response framework.

The EAD response arrangements and roles and responsibilities of various groups during a response to disease in wildlife are described in greater detail in Emergency Wildlife Disease Response Guidelines.

Wildlife manager engagement with government authorities in their jurisdiction **before** an HPAI outbreak is recommended. Sharing a completed risk management plan and other preparedness activities with jurisdictional authorities will help promote understanding and integration of wildlife manager knowledge and expertise into overall incident management planning where appropriate.

☐ **Ensure that managers of wildlife populations have a basic understanding of how emergency animal diseases such as HPAI are managed in Australia and the role managers of wildlife populations might play during an HPAI response. Consider:**

- ⇨ **training, such as the EAD foundation course (see Appendix 4)**
- ⇨ **engagement with government authorities in the relevant jurisdiction.**

2.6 Diagnostic testing for notifiable animal diseases in Australia

HPAI is a notifiable disease, therefore laboratory testing and diagnosis for HPAI is the responsibility of the biosecurity agency in each jurisdiction. While wildlife manager activities are important for detecting and reporting signs of disease in wildlife (see Section 3.2), sample collection and **diagnostic testing for notifiable diseases (including HPAI) must not be undertaken without the oversight and approval of the biosecurity agency in the relevant jurisdiction**.

Point of care diagnostic testing (or pen-side testing) refers to the use of test kits in the field (outside of authorised laboratories), to test animals for specific diseases. The use of point of care testing for animals is regulated by the animal biosecurity authority in each jurisdiction. There are no point of care diagnostic tests for HPAI currently approved for use in Australia. See the Department of Agriculture, Fisheries and Forestry for more information.

☐ **Ensure that wildlife managers are aware that they must not undertake diagnostic testing for HPAI without the oversight of the biosecurity agency in the relevant jurisdiction. Consider:**

- ⇨ **training**
- ⇨ **engagement with the biosecurity agency in the relevant jurisdiction.**

PART B HPAI RISK MITIGATION TOOLBOX

Figure 7 summarises the recommended stepwise approach to using the risk mitigation toolbox (RMT). At all points of development, ongoing communication with the relevant staff, agencies and other key stakeholders is an important component of effective risk management.

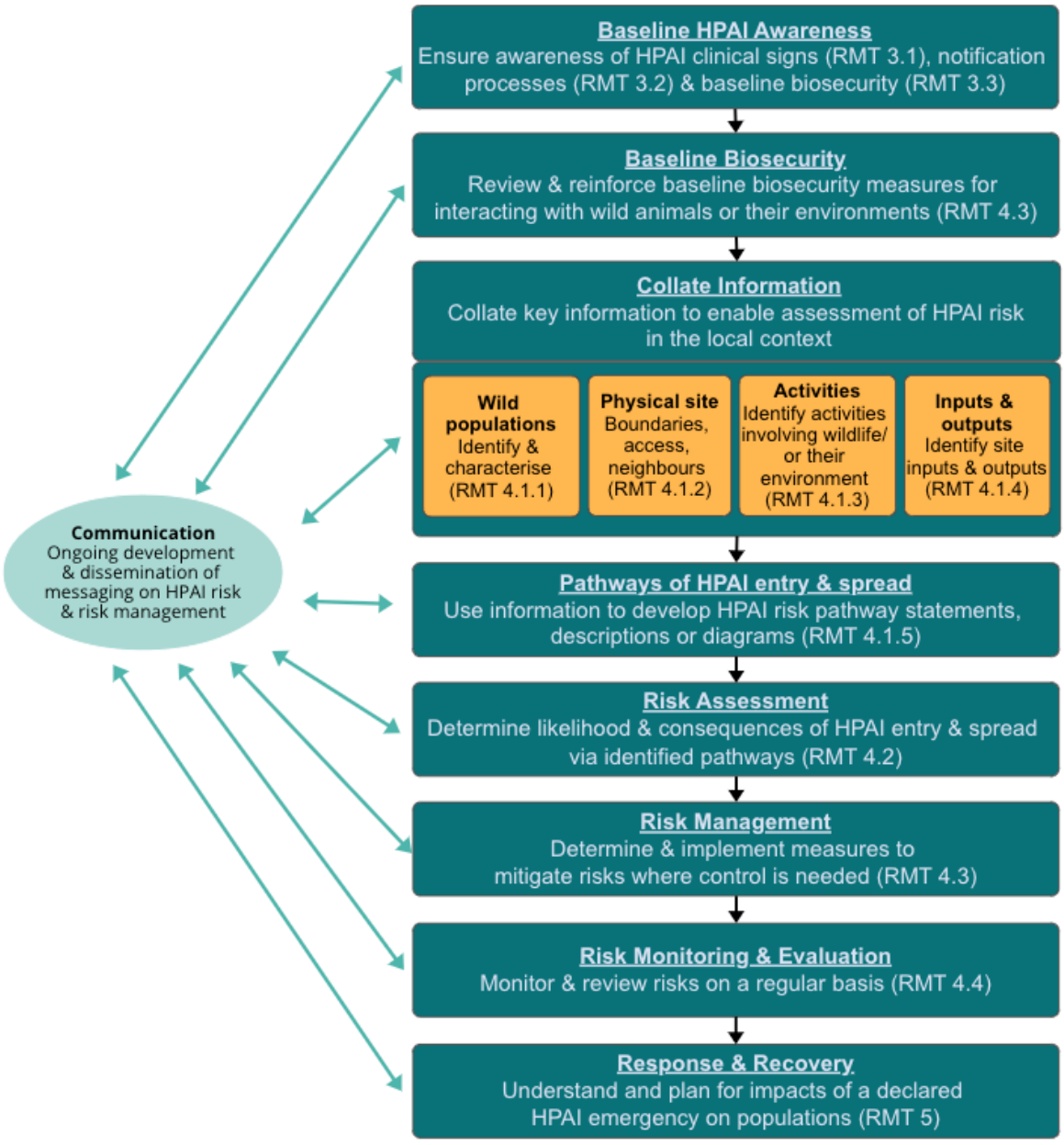

Figure 7: The recommended stepwise approach to using the toolbox.

3 Prevention and preparedness for HPAI: baseline strategies

The following information sets out baseline strategies that should be employed during all interactions with wildlife to reduce the likelihood and consequence of HPAI entry and spread:

- Be aware of clinical signs of HPAI (Section 3.1).
- AVOID, RECORD and REPORT signs of HPAI (Section 3.2).
- Practice good baseline biosecurity (Section 3.3).

These strategies should be employed at all times, even when HPAI is not present in Australia.

3.1 Be aware of clinical signs of HPAI

A wide range of wildlife species can be infected with H5 HPAI. Overseas, the most commonly affected bird groups have been waterfowl, shorebirds, seabirds and birds of prey. However, **it should be assumed that all bird species are potentially susceptible to H5 HPAI virus.** A wide range of mammals can be infected with H5 HPAI, particularly those that prey or scavenge on birds, and marine mammals. See the FAO's list of species in which H5 HPAI has been detected.

Infection with H5 HPAI in birds and mammals can lead to a wide range of clinical signs including:

- Neurological (incoordination, paralysis, seizures, tremors, abnormal posture, twisted necks, head tilt, circling, inability to stand or fly, behavioural abnormalities);
- Respiratory (conjunctivitis, nasal, ocular or oral discharge, cloudy eyes, coughing, sneezing, difficult or abnormal breathing, swelling of the head);
- Gastrointestinal (diarrhoea);

Some species may not show any signs of disease or show only very mild signs. In some cases, wildlife may die suddenly without displaying any signs or be found dead (including the potential for mass mortality events). See Appendix 4 for links to videos of wild birds affected by HPAI.

☐ **Ensure all stakeholders that interact with the wildlife populations are familiar with the clinical signs of HPAI. Consider:**

- ⇨ **staff training (see Appendix 4)**
- ⇨ **communications materials for visitors to the site**
- ⇨ **documenting clinical signs as part of the site HPAI risk mitigation plan.**

3.2 What should I do if I see sick or dead wildlife?

3.2.1 AVOID, RECORD and REPORT signs of HPAI

- **AVOID** – keep yourself and others safe. Do not make direct or indirect contact with sick or dead wildlife or their immediate environment. Do not handle or remove sick or dead wild birds or mammals unless instructed to do so by government authorities.
- **RECORD** – make a note of what you observe, including: number of animals affected (dead and sick), species/type of animal, location (address or GPS reading), date and time signs were first noticed and/or reported. Take photos or videos if safe to do so. A sample reporting form for disease incidents is available on the WHA website.
- **REPORT** multiple sick or dead wild animals via the **Emergency Animal Disease Hotline** on 1800 675 888. **Avian influenza is a nationally notifiable animal disease, meaning that anyone who suspects an animal might be infected has a legal responsibility to report it to their jurisdiction.**

☐ **Ensure that managers of wildlife populations and staff are aware of what to do if sick or dead wildlife are observed (AVOID, RECORD and REPORT), and what information to collect when reporting signs of disease. Consider:**

⇨ **staff training**

⇨ **documenting disease reporting procedures as part of the site HPAI risk mitigation plan, including:**

- **contact details for the Emergency Animal Disease Hotline**
- **when should signs of disease be reported**
- **what information should be collected and reported.**

3.2.2 What will happen following reporting of signs of disease?

The biosecurity agency in the jurisdiction in which the event is occurring will determine whether further investigation is needed and whether any other activities are required. Samples may be sent to the laboratory to investigate HPAI as the cause of disease. Managers of wildlife populations will be advised on the next steps and should await further direction.

Whether further investigation is undertaken will consider multiple factors including the number of sick or dead animals, species affected, clinical signs, and ability to collect appropriate samples for laboratory testing. There may be circumstances in which a decision is made not to undertake AI sampling and testing e.g., if related investigations are underway in the vicinity, if no suitable samples can be obtained, or if samples cannot be obtained safely. Even if testing is not undertaken, all reports help to inform understanding of the disease and how to manage it.

☐ **Ensure that site HPAI risk mitigation plans make it clear that following reporting of suspicion of HPAI in wildlife, managers and staff should wait for further direction from the biosecurity agency in the jurisdiction in which the event is occurring before undertaking any further activities.**

3.3 Practice good baseline biosecurity

During routine activities, operate with an increased awareness of potential risks of disease in wildlife. If you suspect animal/s may be infected with HPAI at any time, immediately follow the notification processes in Section 3.2, before proceeding with any, or further, activities. Do not handle or remove animals suspected to have HPAI unless instructed to do so by government authorities.

To prevent spread of disease and protect the health of wildlife, domestic birds and humans, good hygiene and biosecurity practices should be maintained when visiting sites, moving between sites and when handling wildlife. This includes measures prior to arrival, during activities and after departure. These practices should be undertaken even when HPAI is not present in Australia and when animals appear to be healthy. The biosecurity and hygiene practices listed in this section should always be followed when interacting with wildlife populations and are considered "baseline biosecurity measures".

Measures should be tailored to the specific site and wildlife populations following a risk assessment (see Section 4). In the event that HPAI is present in Australia, or animals are displaying signs of disease, heightened biosecurity and hygiene practices may be needed (see Section 5.4).

3.3.1 Prior to interaction with wildlife populations

Interacting with wildlife populations may encompass a wide range of activities, ranging from observation of animals at a distance, to catching, handling and collecting samples from animals. Irrespective of the nature of the planned activity, prior to interacting with the wildlife population, the animals should be observed for signs of sickness or death. This should ideally be done at a distance, with binoculars or drones. If signs of sickness or death are observed, the activity should be avoided, and the disease reported as outlined in Section 3.2.

3.3.2 During interaction with wildlife populations

- Use appropriate personal protective equipment (PPE) depending on the activity being undertaken.
- If the activity involves handling wildlife:
    - Wear appropriate PPE (e.g. disposable waterproof gloves, facemasks and eye protection), and ensure PPE is removed properly to avoid self-contamination (see Appendix 5 for resources).

- Particular attention should be given to hand washing after handling wildlife, after contact with potentially contaminated materials and after removal of gloves. Hands and arms should be washed with abundant soap and warm water, then dried thoroughly, even if gloves are used. Hand sanitizer (gel with 60 to 90% ethanol concentration) can be applied to reinforce disinfection but should not replace proper handwashing.
- Avoid rubbing eyes or touching the mouth, eating, drinking, or smoking while working with animals or their products.
- Where practicable, handle animals in a well-lit and well-ventilated area to minimise the possibility of inhaling dried faecal or other material.
- Use new or appropriately cleaned and disinfected equipment and PPE for handling of each animal, especially for species which do not congregate or live in close proximity to each other.

3.3.3 After interaction with wildlife populations

- Clothing, shoes, vehicles and equipment (e.g. used for capture, handling, marking, holding [e.g. transport boxes/bags]) should be thoroughly cleaned after use, followed by disinfection. There are a range of cleaning and disinfectant agents that are effective against AI viruses. These agents are listed in AUSVETPLAN Operational Manual: Decontamination. The WOAH & IUCN Wildlife Health Specialist Group Avian Influenza and Wildlife: Risk management for people working with wild birds document also contains succinct information on cleaning and disinfectant agents for HPAI.
- Waste material (e.g. disposable equipment or PPE) should be disposed of appropriately.
- Anyone who has handled wildlife should avoid contact with domestic birds and poultry for 48 hours and should avoid visiting multiple field sites in one day.
- Maintain a log of visits to wildlife populations, including the date and time of the visit, what activities were undertaken and who was involved.

For further information see the National Wildlife Biosecurity Guidelines and AVA Guidelines for Veterinary Biosecurity.

☐ **Ensure that managers of wildlife populations, staff and visitors to the site are aware of baseline biosecurity and hygiene measures for HPAI and have the resources to implement them. Consider:**

- ⇨ **staff training** (see Appendix 4)
- ⇨ **communications materials for visitors to the site**
- ⇨ **developing a site standard operating procedure (SOP) for interacting with wildlife populations, specific to the activities typically undertaken at the site**
- ⇨ **ensuring availability of appropriate PPE, soap and disinfectants, equipment washing facilities and disposal sites for waste materials**
- ⇨ **maintaining a log of visits to wildlife populations.**

4 Prevention and preparedness for HPAI: site or population specific risk management plan

This section sets out a suggested framework for developing a site or population specific risk management plan for HPAI, including undertaking a simple risk assessment. Alternatively, wildlife population may prefer to use any established risk assessment processes. For further information on undertaking risk assessments and risk management plans, see the WHA's National Wildlife Biosecurity Guidelines , the World Health Organisation's Joint Risk Assessment Operational Tool and the International Union for Conservation of Natures Manual of Procedures for Wildlife Disease Risk Analysis.

The HPAI risk for a particular site or population will not be static, and may change following changes to the animal populations, the AI strains circulating in the area at the time, environmental factors, and changes to activities undertaken at a site. Most importantly, the HPAI risk for wildlife populations in Australia will change significantly from its current level if H5 HPAI were to enter Australia**. It is recommended that site or population risk management plans should be developed based on the current situation (where HPAI is not present in Australia) and frequently reviewed and updated as required.**

AviFluMap (https://hpairisk.deakin.edu.au/) is an online mapping and modelling tool designed to support wildlife managers and biosecurity stakeholders in assessing to the risk of H5 HPAI in Australia's wild bird populations and will be useful for many components of the HPAI site or population specific risk management plan. Jurisdictional environment or biosecurity agencies may have also undertaken risk assessments and management plans and should be consulted in the development of site or population specific risk management plans for HPAI.

4.1 Establishing the context

This section identifies key features of the population and the site that will inform the likelihood of entry of HPAI, as well as the consequence if it does enter.

4.1.1 Identify and collate information on the populations at risk

Animal populations at the site at risk of HPAI should be identified and documented. As described in Section 3.1, all wild bird species should be assumed to be susceptible to HPAI. A wide range of wild mammals are also susceptible, particularly marine mammals and mammals that prey or scavenge on birds.

For each wild bird and mammal population at the site, it is important to maintain current documentation of key information as outlined below. This will enable thorough evaluation of risk and may also assist with prioritisation of effort and resources in the event of an HPAI incursion. A template spreadsheet (Appendix 2) is provided to assist with collating this information.

Types of information that should be collected includes (see spreadsheet for details):

- basic population information: species, numbers, age structure, location
- ecological and health knowledge of the population, including:
    - **movement patterns** of the population into, within and out of the site
    - known environmental or seasonal **stressors**
    - **history of mortality** and illness events (including causes if known)
    - baseline mortality levels and seasonality (a **mortality log** is useful)
- other features of the population of relevance when assessing HPAI risk, including:
    - **conservation status** of the species and any species-specific recovery plans currently applicable under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or relevant jurisdictional legislation.
    - any **population management interventions** currently in place
    - whether that species is known to have been affected by HPAI (see FAO species list)
    - where that species demonstrates **behaviours that increase their risk of infection** with HPAI, such as colony nesting, communal feeding, communal roosting, scavenging or having close association with seabirds or waterfowl
    - **value of the population** (or individual animals in the population) to First Nations communities, or to tourism, research or the local community
    - **public interest** in individual animals, the specific population or the species in general.

4.1.2 Document details about the site

The following key natural and built features of the site should be documented to inform disease risk pathways, as well as informing response activities set out in Section 5:

- site boundaries, including any natural or built barriers at the perimeter of, or within the site
- site access, into and out of the site, and around the site, including public and private roads, maintenance tracks, walking trails
- details of neighbouring properties, with a focus on the proximity to:
    - commercial or backyard poultry
    - zoos, wildlife parks or captive breeding facilities
    - nationally and internationally important places listed under the EPBC Act, such as Ramsar wetlands.
    - human water supply and water catchment facilities

4.1.3 Document all activities that are undertaken at the site that interact with the animals or their environment

All activities undertaken at the site, when and where they are undertaken and approximate numbers of people are involved should be documented (note this is also required in Section 5.3). Activities might include:

- tourism
- general public access to public spaces e.g. beaches, lakes.
- bird banding
- population monitoring or management activities
- research and environmental studies
- pest animal control activities
- wildlife translocations
- recreational wildlife hunting
- culturally significant activities or practices for First Nations people.

4.1.4 Document population/site inputs and outputs

In a wildlife population, pathogens such as HPAI may enter or leave via a number of routes. Any animal, human, biological product, vehicle, equipment or other product entering (an **input**) or leaving a facility or a geographic location (an **output**) should be seen as a possible route for disease transmission. Figure 8 summarises inputs and outputs from the site and populations that are possible pathways of HPAI transmission.

An example spreadsheet of how this information can be captured is shown in Appendix 2. This spreadsheet is also provided as a separate attachment on the WHA website.

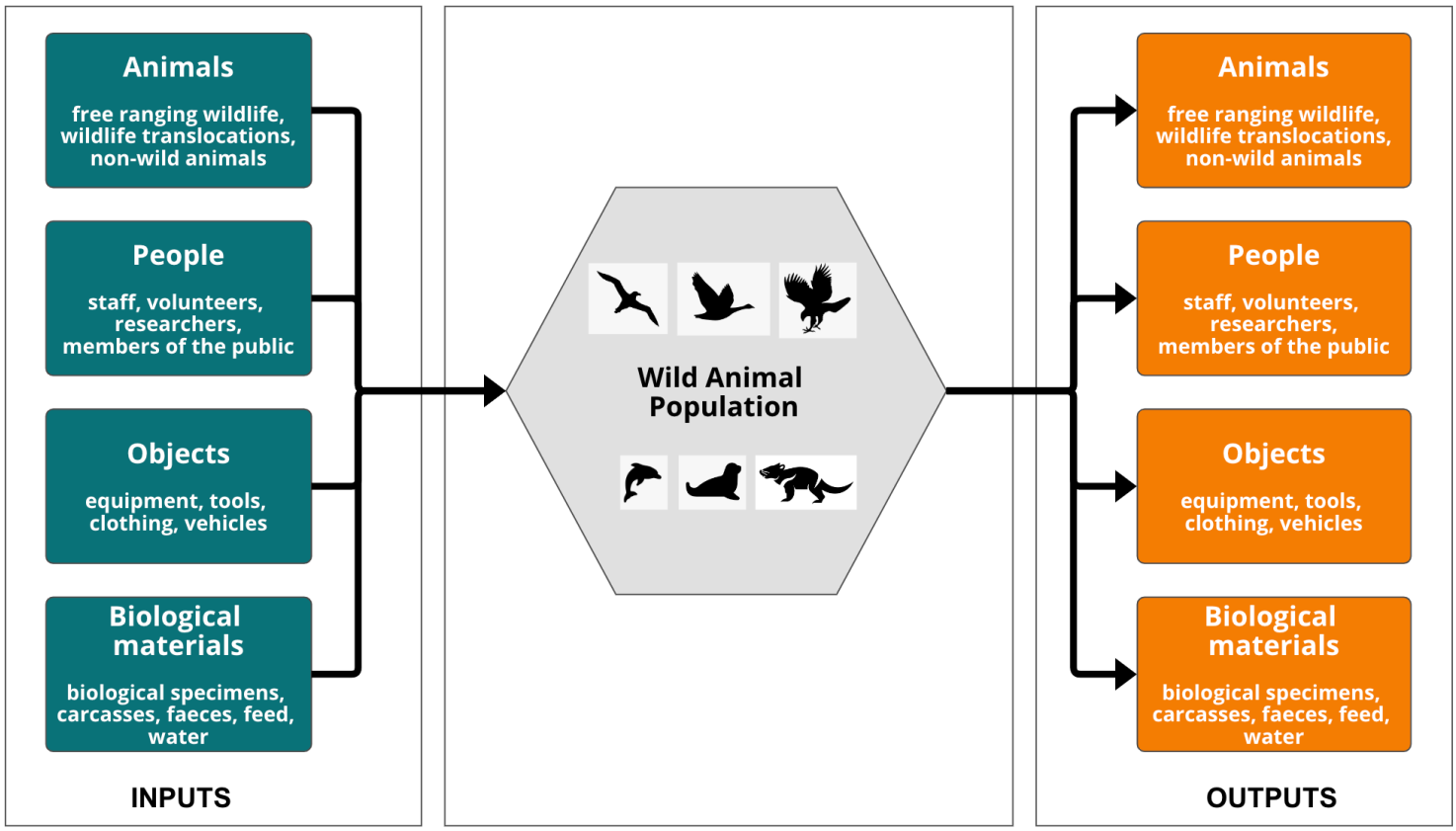

Figure 8: Inputs and outputs of HPAI to and from wildlife populations

4.1.5 Document disease risk pathways (disease entry to the population and spread to other populations)

All of the potential pathways of HPAI entry into the population and spread from the population should be documented. The information on inputs and outputs collected in 4.1.4 should help to identify key pathways. It may be useful to compile a list of HPAI risk pathway statements, for example:

Example 1:

Population: Herald petrel

Site: Raine Island

Input or Output: Input

Details: Seabird surveys are undertaken three times per year to monitor breeding numbers. Surveys are undertaken by a team of three people, who view the birds at a distance using binoculars. HPAI could enter the population through teams wearing boots that are contaminated with HPAI virus, which could then contaminate the local environment on Raine Island and cause infection in the Herald petrel population.

Example 2:

Population: Australian sea lions

Site: Coast of South Australia

Input or Output: Input

Details: Australian sea lions could become infected by HPAI through contact with migratory wild birds that are infected with HPAI.

Example 3:

Population: Black swan

Site: Herdsman Lake (metropolitan Perth)

Input or Output: Output

Details: Black swans are nomadic and leave the site to other water bodies within and outside of the Perth metropolitan area. The movements do not follow a set migratory pattern, and are usually due to rainfall or drought conditions. Black swans infected with HPAI at Herdsman Lake could transmit HPAI infections to other animals after leaving the site.

4.2 HPAI risk assessment

Using the information gathered in Section 4.1, for each of the disease risk pathways described above, consider the likelihood and consequence of that HPAI transmission pathway occurring, and assign an overall risk rating (see Appendix 3 for example likelihood and consequence definitions, and risk overall matrices). There will be **many factors** that impact on the likelihood and consequence of the risk pathways occurring, and in many cases not all of the information to make an assessment may be available. It is recommended that wildlife population managers conduct as thorough an HPAI risk assessment as possible, to help identify key risk pathways and populations.

For the example scenarios in 4.1.4, some example questions to consider when assigning risk ratings are included as follows:

Example 1:

Likelihood: What is the likelihood that the boots worn by field teams are contaminated with HPAI virus? What is the likelihood that the virus from the boots comes into contact with the Herald petrel population?

Consequence: If the Herald petrel population were to become infected with HPAI, what would be the impact, including impact to individual animal health, health of the population and ecosystem, and potential impact on other species in the area that share an environment with this population?

Example 2:

Likelihood: What is the likelihood that migratory wild birds arrive in the coast of South Australia infected with HPAI? What is the likelihood that the Australian sea lion population has contact with infected migratory birds?

Consequence: If Australian sea lion populations were to become infected with HPAI, what would be the impact, including impact to individual animal health, health of the population and ecosystem, and potential impact on other species in the area that share an environment with this population?

Example 3:

Likelihood: What is the likelihood that Black swans infected with HPAI leave Henderson Lake? What is the likelihood that Black swans interact with other animal populations (wild and non-wild) after leaving Henderson Lake? Are there important wild or non-wildlife populations (including poultry farms) nearby?

Consequence: What is the consequence if other animal populations (wild and non-wild) become infected with HPAI?

4.3 Risk control measures

Consider measures that could be put in place to reduce the risk. Measures could reduce either the likelihood or consequence components to risk, or both. The baseline strategies discussed in Section 3 should be considered in light of the risk assessment, and some of the measures in Section 5 may also be appropriate (e.g. 5.3, 5.4 and 5.10).

It will not always be possible to eliminate risk when working with wildlife, but everyone should work to an agreed acceptable level of risk (or a safe or minimum risk level). An acceptable level of risk is the maximum overall exposure to risk that can be accepted, based on the benefits and costs involved. This may be determined by the authorities, by an organisation or by an individual.

4.4 Monitoring and evaluation

Once the risk assessment has be undertaken and any risk control measures determined and implemented, they should be monitored and reviewed on a regular basis. Monitoring and evaluation aim to make sure that risks have not changed, that control measure are being properly implemented, that the control measures are continuing to appropriately minimise the risk, that no additional control measures need to be implemented and that the controls are not causing any new problems. **A key trigger for review of the risk assessment will be if H5 HPAI were to enter Australia**.

☐ **Undertake a site/population specific HPAI risk assessment, which is reviewed and updated frequently as required, and particularly if H5 HPAI bird flu arrives in Australia.**

☐ **Consult with relevant jurisdictional environmental departments during the development of the risk assessment.**

5 Response and recovery from HPAI in wildlife

As described in Section 2.5, the pre-agreed national response arrangements following a detection of HPAI in Australia are set out in *AUSVETPLAN Response Strategy: Avian Influenza.* This section of the toolbox describes **potential** approaches to **response and recovery activities**, following a detection of HPAI in Australia, focusing on likely impacts for wildlife sites or populations and their operations, and is based on current national guidance and policy.

Response and recovery aims and activities may change over the course of the outbreak, particularly if it is determined that the disease is not able to be eradicated from Australia or contained.

Activities may be relevant even if no HPAI has been detected at a particular site. Action items for wildlife managers listed in this section are designed to support decision making and on the ground response activities **if they are required** under the response framework as discussed in Section 2.5.

5.1 Investigation- ecological and epidemiological

If HPAI is detected in a population, an investigation (ecological and epidemiological) may be undertaken by government authorities. These investigations may help to determine how the animals came to be infected, identify other sites or populations that may be infected or at risk of infection and inform appropriate response activities for that population. The investigation may include consultation with relevant stakeholders such as wildlife managers, ecologists, biologists or Traditional Owners.

☐ **Ensure that the site manager is able to rapidly provide information to government authorities to support an ecological and epidemiological investigation.**

⇨**This information will be collected during the risk assessment process in Section 4.**

⇨**Ensure that visitor and activity logs are maintained.**

5.2 Investigation- other populations or sites at risk

If HPAI is detected in a population or particular site, an investigation may be undertaken by government authorities to determine whether other animals in the vicinity may be at risk of infection, including other wildlife populations, or captive and domestic animals. Additionally, this investigation might consider risks to other nearby sites such as nationally and internationally important places listed under the EPBC Act and human water supply and water catchment facilities. This will help inform decisions around whether risk mitigation actions are needed at those sites.

☐ **Ensure that the site manager is able to rapidly provide information to government authorities about other populations or sites in the vicinity that may be at risk.**

⇨**This information will be collected during the risk assessment process in Section 4.**

⇨**Ensure that visitor and activity logs are maintained.**

5.3 Restrictions on activities

There may be need for prohibition, reduction or restrictions on visitors and activities at the site, as directed by government authorities. Restrictions may be implemented to reduce the risk to human, animal or environmental health, such as reducing the likelihood of disease introduction or spread or reducing stressors to animal populations. See Section 4.1.3 for examples of activities that interact with animals or their environments.

There may be regular activities undertaken at the site that are essential to the health and welfare of the wildlife population, such as maintenance activities. Government authorities will ultimately determine any restrictions on activities, but wildlife managers should consider what activities they would regard as being essential, and the associated rationale, so that they are able to provide this advice to government authorities if required. Permits or restriction exemptions may be required for certain activities if deemed appropriate by government authorities.

☐ **Ensure that any restrictions on visitors and activities at the site can be quickly and effectively implemented if required. Consider:**

⇨documenting the usual visitors and activities undertaken at the site, when and where they are undertaken and how many people are involved (as set out in Section 4)

⇨maintaining contact lists of stakeholders that usually visit the site to ensure that any restrictions can be easily communicated

⇨identifying any essential activities that site managers think should not be subject to restriction and the reason why

⇨documenting the entry and exit points to the site and populations and how general access may be restricted (e.g. locking gates, barriers).

5.4 Enhanced hygiene and biosecurity measures

In the event that HPAI has been detected in Australia, there may be a recommendation or requirement for enhanced biosecurity and hygiene measures in addition to the baseline measures in Section 3.3. Remember not to handle or remove sick or dead wildlife unless instructed to do so by government authorities.

Enhanced measures may include:

- increased vigilance in implementing the baseline measures as determined in Section 3.3
- enhanced cleaning and disinfection beyond the baseline measures, such as cleaning and disinfection of boots, clothes, vehicles and field equipment prior to arrival at a site as well as after departure (the range of cleaning and disinfectant agents that are effective against AI viruses are listed in AUSVETPLAN Operational Manual: Decontamination)
- enhanced PPE, such as disposable overalls, rubber/polyurethane boots, safety goggles, heavy duty rubber gloves, facemasks with increased protection levels or full-face respirators. Personnel using enhanced PPE will require specific training in its use. For more information on how to stay safe when handling wildlife suspected or confirmed to be infected with H5 HPAI, see Australian Centre for Disease Control (CDC) website, Advice for people in contact with wild birds (e.g., hunters and wildlife carers), CDNA national guidelines for avian influenza – protecting people who work with birds and wildlife, and the Bird flu toolkit for people who work with birds.

☐ **Ensure that any enhanced biosecurity and hygiene measures can be quickly and effectively implemented if required. Consider:**

- **⇨ developing a site-specific standard operating procedure (SOP) for baseline hygiene and biosecurity measures for interacting with wildlife populations (as per Section 3.3)**
- **⇨ documenting potential options for enhanced cleaning and disinfection that could be realistically implemented at the site**
- **⇨ documenting local suppliers of appropriate PPE and disinfectants.**

5.5 Enhanced disease surveillance

Response activities may include enhanced disease surveillance as directed by government authorities for early detection of disease and to monitor its spread. Disease surveillance strategies that could be undertaken by government authorities include:

- implementing a regular schedule of observation of populations for signs of disease
- collection of samples from any dead animals, even if HPAI is not suspected as the cause of death
- catching and sampling healthy animals
- collecting samples from the environment (e.g. soil, faeces, water).

☐ **Ensure that any enhanced disease surveillance measures required by government authorities can be quickly and effectively implemented if required. Consider:**

- **⇨ maintaining a register of personnel with experience in catching and sampling the wildlife species at the site**
- **⇨ establishing SOPs for catching wildlife species at the site.**

5.6 Euthanasia or culling of wildlife

Australia's policy is that no destruction or culling of free-ranging healthy native wildlife will occur as part of a response to HPAI, because it is not practical or environmentally sound and may be counterproductive in stopping spread of the disease. This is reflected in advice from the joint CMS and FAO's Scientific Task Force on Avian Influenza and Wild Birds.

Euthanasia of sick wildlife may be undertaken based on considerations of individual animal welfare, consistent with the animal welfare legislation in the relevant jurisdiction. Procedures for welfare-based euthanasia should take into account restrictions imposed on general activities (Section 5.3) and removal of carcasses (Section 5.8).

☐ **Ensure that communications and procedures clearly state that culling of healthy native wildlife will not ensue following detection of HPAI, irrespective of the species. Consider:**

- ⇨**staff awareness and training**
- ⇨**documenting this policy as part of the site HPAI risk mitigation plan.**

☐ **Policy and procedures should be in place for euthanasia of individual sick wildlife if required to mitigate animal welfare risks. Consider:**

- ⇨**documenting this policy and procedures as part of the site HPAI risk mitigation plan**
- ⇨**ensuring appropriate PPE is available and staff are trained in its use.**

5.7 Vaccination of wildlife

Australia's current preferred policy is to control an outbreak of HPAI without the use of vaccination. However, vaccination may be considered under certain circumstances, such as to protect rare, protected and valuable native birds, or in poultry if the outbreak has become widespread (see AUSVETPLAN Avian Influenza and AHC Policy Decision- Use of Avian Influenza Vaccines for the Protection of Rare, Protected and Valuable Avian Species).

Although vaccination has not been required in previous Australian HPAI outbreaks, it has proven useful in some overseas HPAI outbreaks to supplement other biosecurity and control measures. **Nonetheless, broadscale vaccination of free-ranging wild birds is not considered appropriate, feasible or practicable.**

Decisions around implementing vaccine programmes will be made by government authorities. A policy has been endorsed (Avian Influenza Vaccination Policy for Rare, Protected and Valuable Avian Species) to provide guidance on vaccination in the event of an incursion or a significant threat of incursion of a strain known to be a high risk to priority native bird species, particularly threatened species. This policy outlines eligible populations and the requirements for record keeping and outcome monitoring. Mammals are not covered by this policy. Any vaccination under this policy requires approval from the relevant Chief Veterinary Officer.

In response to the threat of H5 HPAI, the Australian Government has procured inactivated H5 HPAI vaccines and is currently undertaking trials to provide safety data for its use in Australian bird species (non-poultry). See the Preparing for H5 avian influenza: Vaccination of priority native bird species factsheet. A small number of authorised pilot studies have also been conducted in a limited number of native and non-native wild bird species held in captivity in Australia, providing further data on safety and efficacy. As of March 2026, further vaccination pilot studies are being considered by Animal Health Committee. See Avian influenza vaccination pilot studies in non-poultry species for more information.

Overseas, vaccination in wildlife continues to be explored given the ongoing threat of H5 HPAI. Advice from the joint CMS and FAO's Scientific Task Force on Avian Influenza and Wild Birds is that vaccination could be considered for key localised wild bird populations, however there are a number of constraints to the use of vaccination as a risk mitigation tool for HPAI in free-ranging wildlife. WOAH has produced a guidance document on Considerations for emergency vaccination of wild birds against HPAI in specific situations to assist decision-makers. Overseas experiences of vaccination in wildlife include the California Condor Recovery Program, the Bird flu vaccination trial in Aotearoa New Zealand, Hawaiian Monk Seal trials and King Penguin trials.

☐ Be aware that the broadscale vaccination of birds in the wild is not considered appropriate, feasible or practicable. Consider:

⇨staff awareness

⇨documenting this policy as part of the site HPAI risk mitigation plan.

5.8 Environmental modification, environmental disinfection, animal dispersal or containment

Containing or dispersing wild animals and the destruction, broadscale disinfection or modification of habitat are ineffective measures for HPAI control and are not considered as appropriate measures under Australia's response policies to avian influenza. This is also reflected in advice from joint CMS and FAO's Scientific Task Force on Avian Influenza and Wild Birds, who recommend that habitat destruction or disinfection of environments should not be considered as HPAI control measures in wildlife populations, as these are likely to disperse wildlife populations and potentially assist in spreading the virus further. Attempts to disperse or contain animals may also potentially assist in virus spread and is not practical for HPAI susceptible species.

☐ Ensure that communications and procedures clearly state that environmental modification, environmental disinfection, wildlife dispersal or wildlife containment are not considered effective or appropriate for HPAI control, irrespective of the species. Consider:

⇨staff awareness and training

⇨documenting this policy as part of the site HPAI risk mitigation plan.

5.9 Removal of carcasses

Carcasses of animals infected with HPAI can act as a source of environmental contamination and infection to other animals that may be in close proximity to, or who scavenge on the carcass. HPAI infected carcasses may also present a risk to human health, which will be of particular importance in publicly accessible areas e.g., beaches. Removing carcasses,

however, introduces new risks and challenges such as: disturbing animals, which may be of particular concern in breeding colonies; contributing to spread of infection via people, equipment and vehicles if not undertaken in a biosecure manner; difficulties disposing of carcasses in a biosecure manner, particularly if there are large numbers; human health risks with handling carcasses; logistical and resourcing challenges of accessing large numbers of carcasses.

As described in the National Principles for wildlife carcass management - H5 bird flu event, decisions around carcass management actions for a specific site or population should be made through a risk assessment, and may include: leaving carcasses where they are to naturally decompose; disposing of carcasses where they are found; or removing carcasses and disposing of them elsewhere. Those responsible for risk assessments and decision making on carcass management may vary depending on the individual context and will be guided by government authorities in each jurisdiction.

☐ Ensure that wildlife managers are aware of carcass management options and their role and responsibility in carcass management decision making and actioning. Consider:

- **⇨ staff awareness, including familiarity with the National Principles for wildlife carcass management - H5 bird flu event**
- **⇨ engagement with the biosecurity agency in the relevant jurisdiction.**

☐ Document features of the site and wildlife populations that may be useful when making decisions around removal of infected carcasses as set out in the National Principles for wildlife carcass management - H5 bird flu event. In particular, consider:

- **⇨Could people and vehicles easily access sites to remove carcasses?**
- **⇨What scavengers are present in the area that are likely to scavenge on carcasses?**
- **⇨Do members of the public have access to the site? If so, can their access be restricted?**
- **⇨What would the risk to the population be of significant disturbance of the site, such as accessing the site with people, vehicles and interacting closely with the population and habitats to remove carcasses?**

5.10 Managing biodiversity conservation impacts

H5 HPAI is causing unprecedented mortality of wild birds and mammals overseas, to the extent that it is threatening certain populations of animals. The advice from joint CMS and FAO's Scientific Task Force on Avian Influenza and Wild Birds is that governments should see HPAI as a conservation issue and consider this in contingency planning. There are many prevention and preparedness activities currently underway in Australia to protect at risk species and important natural spaces, and wildlife managers should consult with their

relevant jurisdiction's environment agency to keep up to date with these activities and their outcomes.

☐ **Document the likely biodiversity conservation impacts of an HPAI outbreak and plan for ways to reduce this impact. Consider:**

- **⇨ways to reduce pressures on the wider environment to improve wildlife resilience to disease**
- **⇨ the need for enhanced protection of wild habitats and provision of additional or alternative breeding sites**
- **⇨developing a system and SOP for recording numbers of animal deaths, species and locations, to ensure that the impact on a population can be measured effectively**
- **⇨ any other means of supporting species recovery.**

☐ **Engage with relevant jurisdiction's environment agencies to stay up to date with current HPAI prevention and preparedness activities relevant to your site or population.**

PART C APPENDICES

Appendix 1 HPAI risk mitigation checklist

	TOOLBOX REF.	Y	N	N/A	COMMENT e.g. what do you currently do, what document currently exists?	FOLLOW UP ACTION REQUIRED? Describe what action is required.
HPAI AWARENESS, TRAINING AND OUTREACH						
Do you have a **basic understanding of how emergency animal diseases such as HPAI are managed in Australia** and what role managers of wildlife populations might play during an HPAI response?	2.5	☐	☐	☐		
Have you **engaged with your relevant jurisdictional biosecurity, environment and human health departments** to discuss HPAI prevention, preparedness and response? Please read the entire toolbox and complete the checklist before reaching out.	2.5 4 5.4 5.9 5.10	☐	☐	☐		
Are you, your staff and anyone regularly interacting with the wildlife populations that you manage, **familiar with the clinical signs of HPAI** in wildlife?	3.1	☐	☐	☐		

	TOOLBOX REF.	Y	N	N/A	COMMENT e.g. what do you currently do, what document currently exists?	FOLLOW UP ACTION REQUIRED? Describe what action is required.
Are you and your staff aware of **how to report** suspicious signs of HPAI including what to do if sick or dead wildlife is observed, who to report signs to and what information to collect?	3.2	☐	☐	☐		
Are you and your staff aware that you must not undertake **diagnostic testing** for HPAI without the oversight of the biosecurity agency in the relevant jurisdiction?	2.6	☐	☐	☐		
Are you, your staff and anyone regularly interacting with the wildlife populations **aware of baseline biosecurity procedures** to follow when interacting with wildlife populations, including measures before, during and after the interaction?	3.3	☐	☐	☐		
Do you have **outreach material** such as signage, fliers or website material available to people that may not interact regularly with the wildlife populations (such as members of the public, tourists) to raise awareness about HPAI (including clinical signs, biosecurity measures, disease reporting)?	3.1 3.2 3.3	☐	☐	☐		
Are you and your staff aware of the **response activities that are <u>not</u> currently supported** by Australia's AI response frameworks? Specifically: euthanasia or culling of wildlife; wildlife dispersal or containment; environmental modification; environmental decontamination; broadscale vaccination of wild birds.	5.6 5.7 5.8	☐	☐	☐		

	TOOLBOX REF.	Y	N	N/A	COMMENT e.g. what do you currently do, what document currently exists?	FOLLOW UP ACTION REQUIRED? Describe what action is required.
Are you and your staff aware of **carcass management options**, and your role and responsibility in carcass management decision making and actioning.	5.9	☐	☐	☐		
Have you engaged with your **relevant jurisdictional government agencies** to stay up to date with current HPAI prevention and preparedness activities relevant to your site or population?	5.10	☐	☐	☐		
PLANS AND PROCEDURES						
Do you have a documented **site/population specific HPAI risk assessment?**	4	☐	☐	☐		
Do you have a **documented plan or procedure for how to report suspicion of HPAI** in wildlife, including: • clinical signs that should raises suspicion for HPAI • contact details relevant to your jurisdiction • what to do if sick or dead wildlife is observed • information to be collected for reporting • actions to take following reporting	3.1 3.2	☐	☐	☐		

	TOOLBOX REF.	Y	N	N/A	COMMENT e.g. what do you currently do, what document currently exists?	FOLLOW UP ACTION REQUIRED? Describe what action is required.
Do you have a **documented plan or procedure for baseline biosecurity measures,** to be undertaken by anyone interacting with wildlife populations, that is tailored to the types of interaction that take place?	3.3 5.4	☐	☐	☐		
Have you documented potential ways in which **biosecurity measures could be enhanced** beyond baseline in the event of an HPAI outbreak?	5.4	☐	☐	☐		
Do you have **established procedures for catching the wildlife species found at the site**, in the event that this is required for HPAI surveillance? Do you have a **register of personnel** that are skilled and experienced in undertaking this procedure?	5.5	☐	☐	☐		
Do you maintain a **detailed visitor and activity log**, that documents visitors and activities undertaken at the site, when and where they are undertaken and who is involved?	3.3 5.1 5.2 5.3	☐	☐	☐		
Do you **maintain contact lists of stakeholders** that usually visit the site to ensure that in the event of an HPAI outbreak, any restrictions on activities can be easily communicated?	5.3	☐	☐	☐		

	TOOLBOX REF.	Y	N	N/A	COMMENT e.g. what do you currently do, what document currently exists?	FOLLOW UP ACTION REQUIRED? Describe what action is required.
Have you identified and documented **any activities undertaken at the site that you would regard as being essential to the health and welfare of the animals at the site?**	5.3	☐	☐	☐		
Have you identified and documented the **entry and exit points** to the site and populations and how vehicle or pedestrian access could be restricted in the event of an HPAI outbreak (e.g. locking gates, barriers)?	5.3	☐	☐	☐		
Do your HPAI preparedness plans and procedures make it clear that euthanasia or culling of healthy wildlife, animal dispersal or containment, environmental modification, environmental decontamination and broadscale vaccination of wild birds **do not form part of the planned response** to an outbreak of HPAI in Australia.	5.6 5.7	☐	☐	☐		
Do you have established procedures for **euthanasia of individual sick wildlife** if required to mitigate animal welfare risks?	5.6	☐	☐	☐		

	TOOLBOX REF.	Y	N	N/A	COMMENT e.g. what do you currently do, what document currently exists?	FOLLOW UP ACTION REQUIRED? Describe what action is required.
Have you documented **information to assist with decision making around carcass removal** in the event of an outbreak of HPAI, including: • Could people and vehicles easily access sites if carcasses were to be removed? • What scavengers are present in the area that are likely to scavenge on carcasses? • Do members of the public have access to the site? If so, can their access be restricted? • What would the risk to the population be of significant disturbance of the site, such as accessing the site with people, vehicles and interacting closely with the population and habitats to remove carcasses?	5.9	☐	☐	☐		
Do you have systems and procedures that will be able to **record the number of animal deaths** (including species affected and their geographical location), in order to accurately measure the impact of HPAI on a population?	5.10	☐	☐	☐		

	TOOLBOX REF.	Y	N	N/A	COMMENT e.g. what do you currently do, what document currently exists?	FOLLOW UP ACTION REQUIRED? Describe what action is required.
Have you considered measures that could be taken to **minimise the biodiversity and conservation impacts** of an HPAI outbreak?	5.10	☐	☐	☐		
EQUIPMENT AND FACILITIES						
Do you **have PPE, soap and disinfectants, equipment washing facilities and disposal sites for waste materials** appropriate to the **baseline biosecurity** measures for your site? If not, do you have a system whereby people interacting wildlife populations supply these items themselves?	3.3	☐	☐	☐		
Have you identified **suppliers** of PPE and disinfectants?	5.4	☐	☐	☐		

Appendix 2 Example spreadsheets for collating population information

These images demonstrate the layout of a spreadsheet for recording i) information on wildlife populations at risk and ii) site or population inputs and outputs. An electronic version is available on the Wildlife Health Australia website: High Pathogenicity Avian Influenza Information.

i) *Wildlife populations at risk*

HPAI Populations at Risk

Site Information: **Date:**

Contributors (initials):

SPECIES				POPULATION INFORMATION			
Common Name	Scientific Name	Conservation status	Recovery plan? (Y/N)	Total number of individuals	Total number of populations	Age structure (Ad:Sub:Juv)	Other population information

POPULATION ECOLOGY & HEALTH						
Movements into and out of the site	Known environmental or seasonal stressors	Previous illness events?		Previous mortality events?		Baseline mortality information
		(Y/N)	Details	(Y/N)	Details	

BEHAVIOURS ASSOCIATED WITH AI SPREAD (include specific location details)					ASSOCIATED HUMAN ACTIVITIES & INTERESTS			
Colony nesting?	Communal feeding?	Communal roosting?	Scavenger?	Close association with seabirds or waterfowl?	Research activities	Tourism involvement	Population management interventions	Public & political interest
(Y/N; location)	(Y/N; location/s)	(Y/N; location/s)	(Y/N)	(Y/N)				

Appendix 2 (continued):

ii) Site or population inputs and outputs

HPAI Site Assessment - Inputs and Outputs			Date:		
Site Information:			Initials of contributors:		
INPUTS			**OUTPUTS**		
	Y/N			Y/N	DETAILS
ANIMALS					
Migratory birds			Migratory birds		
Marine mammals			Marine mammals		
Other free-ranging wildlife			Other free-ranging wildlife		
Translocations			Translocations		
Domestic poultry			Domestic poultry		
Domestic birds			Domestic birds		
Domestic carnivores			Domestic carnivores		
Domestic mammals (other)			Domestic mammals (other)		
PEOPLE					
Staff			Staff		
Volunteers			Volunteers		
Researchers			Researchers		
General public			General public		
Other			Other		
OBJECTS					
Equipment			Equipment		
Tools			Tools		
Clothing			Clothing		
Vehicles			Vehicles		
Other			Other		
BIOLOGICAL MATERIALS					
Biological specimens			Biological specimens		
Carcasses			Carcasses		
Faeces			Faeces		
Feed			Feed		
Water			Water		
Other			Other		

Appendix 3 Risk definitions and matrices

The following definitions are provided as an example of ways in which likelihood, consequence and overall risk could be evaluated for the entry and spread of HPAI to a given population. The matrix in Table 3 demonstrates how the likelihood and consequence can be combined to give an overall risk estimate.

Table 1: Likelihood definitions

Likelihood level	Definition
Negligible	Almost certain not to occur except in exceptional circumstances
Low	Unlikely to occur
Moderate	May occur
High	Likely to occur

Table 2: Consequence definitions

Description	Definition
Insignificant	No detectable conservation or welfare effects; effect unlikely to be recognised at any level within Australia.
Very minor	Local short-term population loss or economic impact, no significant ecosystem effect; OR mild animal welfare effects; effect is likely to be minor to directly affected parties
Minor	Some localised, reversible ecosystem impact; OR mild animal welfare effects; effect and significant to directly affected parties.
Moderate	Measurable long-term damage to populations and/or ecosystem, but little spread, no extinction; OR more significant animal welfare effects; effects significant within the region, with economic and social effect highly significant to directly affected parties; recognised on a national level.
High	Long-term irreversible ecosystem change, spreading beyond local area; OR significant animal welfare effects; effects highly significant within the region, with serious economic stability, societal values or social well-being limited to a given region; significant at the national level
Catastrophic	Widespread, long-term population loss affecting several species OR local extinction of a species, serious ecosystem effects; OR severe animal welfare effects; effect highly significant nationally, with economic stability, societal values or social well-being seriously affected; highly significant at the national level.

Table 3: Overall risk ratings

		Consequences of HPAI entry and establishment					
		Insignificant	**Very minor**	**Minor**	**Moderate**	**High**	**Catastrophic**
Likelihood of entry and exposure	**Negligible**	Negligible risk	Negligible risk	Negligible risk	Negligible risk	Negligible risk	Very low risk
	Low	Negligible risk	Negligible risk	Low risk	Low risk	Moderate risk	High risk
	Moderate	Negligible risk	Very low risk	Low risk	Moderate risk	High risk	High risk
	High	Negligible risk	Very low risk	Low risk	Moderate risk	High risk	Extreme risk

Note that the following lists are not comprehensive, and include resources, information and advice from official and unofficial sources from Australia and overseas. Information contained in these links has not been assessed for accuracy.

Appendix 4 Training resources and example documents

Training material - Australia's emergency management arrangements

- Animal Health Australia's Emergency Animal Disease foundation course

Training material - clinical signs of HPAI

Links to videos of wildlife affected by HPAI:

SANCCOB social media 1

SANCCOB social media 2

International Bird Rescue social media

Sweet Briar Nature Centre social media

Rocky Mountain Wildlife Alliance social media

Example outreach material and contingency planning documents

- Wildlife Health Australia's H5 bird flu resources
- The Australian Government's resources for H5 avian influenza (bird flu) preparedness
- Northern Australia Biosecurity Strategy - Avian influenza awareness: Keep a TopWatch! (video)
- The interim Australian Centre for Disease Control has a bird flu (communication) toolkit for people who work with birds.
- World Organisation for Animal Health - Animation about how avian influenza threatens wild birds.

Example HPAI training and education

- Australian Registry of Wildlife Health - resources

Appendix 5 References and further reading

Wildlife Health Australia

- The H5 bird flu resources webpage includes a range of information on HPAI in wildlife targeted to different stakeholder groups.
- Biosecurity & Management provides links to relevant documents related to wildlife

Australian Department of Agriculture, Fisheries and Forestry

- The birdflu.gov.au webpage is the key Australian government webpage for information relevant to avian influenza prevention and preparedness
- Outbreak.gov.au provides details on how to prepare for and respond to animal pests and diseases.

Response Documents

- AUSVETPLAN documents are available from the Animal Health Australia website.
- The National Management Agreement – H5 HPAI in wildlife is national arrangement for responding to incursions of HPAI in wildlife, where eradication or containment of the disease is unlikely

Human Health and Personal Protective Equipment

- The Australian Centre for Disease Control (CDC) website
- The Communicable Diseases Network Australia developed the National guideline for avian influenza: protecting people who work with birds and wildlife.
- The Australian Dept of Health and Aged Care Avian influenza in humans
- WOAH & IUCN Wildlife Health Specialist Group Avian Influenza and Wildlife: Risk management for people working with wild birds
- Australian Veterinary Association's Veterinary personal biosecurity & PPE

Environmental Health

- The H5 avian influenza (bird flu) webpage provides information and current activities away in response to the risk of H5 HPAI on Australia's biodiversity.

World Organisation for Animal Health (WOAH)

WOAH monitors and reports animal diseases worldwide, collects and shares animal health data and supports countries in controlling outbreaks. Relevant information includes:

- WOAH website on avian influenza
- WOAH Considerations for emergency vaccination of wild birds against HPAI in specific situations
- WOAH Practical guide for authorised field responders to HPAI outbreaks in marine mammals, with a focus on biosecurity, sample collection for virus detection and carcass disposal

Other resources

- Joint OIE-FAO Scientific Network on Animal Influenza (OFFLU) publications
- Food and Agriculture Organisation of the United Nations (FAO) Global AIV with Zoonotic Potential situation update
- Convention on the Conservation of Migratory Species of Wild Animals Scientific Task Force on Avian Influenza and Wild Birds
- Michelle Wille Avian influenza resources and Highly pathogenic avian influenza panzootic and the threat to wildlife and ecosystems (video)
- AviFluMap – a H5 bird flu model tool for Australia's wild birds.

Appendix 6 Acronyms

AI	Avian influenza
AUSVETPLAN	Australian Veterinary Emergency Plan
CCEAD	Consultative Committee on Emergency Animal Disease
CMS	The Convention on Migratory Species
EAD	Emergency Animal Disease
FAO	Food and Agricultural Organisation of the United Nations
HPAI	High pathogenicity avian influenza
LPAI	Low pathogenicity avian influenza
NAIWB program	National Avian Influenza Wild Bird program
H5 NMA	National Management Agreement – H5 HPAI in wildlife
PPE	Personal protective equipment
WHA	Wildlife Health Australia
WOAH	World Organisation for Animal Health

Appendix 7 Glossary

Biosecurity agency	Any government agency responsible under law for managing biosecurity in Australia or part thereof. This is generally the Department of Primary Industries or Agriculture in each jurisdiction.
H5 HPAI	H5 high pathogenicity avian influenza, which includes the serious and highly contagious H5N1 clade 2.3.4.4b strain which has been spreading globally since 2021. You may also see it referred to as H5 bird flu.
Pathogen	Any organism causing disease.
Spillover	An event during which a *pathogen* which occurs naturally in one species moves into another species; such movement can result in a disease outbreak. For example, LPAI viruses known to occur naturally in wild birds in Australia can spillover to poultry, resulting in outbreaks of disease.
Strain	A distinct category of virus characterised by its genetic lineage and ability to cause disease. For example, the new AI strain

	causing unprecedented outbreaks of disease worldwide is the H5Nx 2.3.4.4b strain, which evolved from the A/goose/Guangdong/1/96 lineage.
Subtype	A categorisation of influenza viruses according to the characteristics of the haemagglutinin (HA) and neuraminidase (NA) surface glycoproteins.
Surveillance	A systematic program of investigation designed to establish the presence, extent or absence of a disease, or of infection or contamination with the causative organism. It includes the examination of animals for clinical signs, antibodies or the presence of the *pathogen*.
Wildlife or wild animal	An animal that is found in the natural environment and does not live under human supervision and control. The species may be native to Australia or an introduced species. An introduced species may be a feral or invasive species.
Wildlife managers	Agencies, organisations or individuals who manage free-ranging wildlife populations in Australia, including national and jurisdictional environmental and biosecurity agencies, local governments, non-profit organisations, native title holders and private landholders.