United States Department of the Interior

FISH AND WILDLIFE SERVICE
Washington D.C. 20240

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From: Assistant Director, Migratory Bird Program

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Subject: Migratory Bird Banding Operations and Considerations during a Confirmed Highly Pathogenic Avian Influenza Outbreak

Uses and Benefits of Migratory Bird Banding

Monitoring of migratory bird populations is foundational to modern, scientific approaches to harvest management of game species and conservation decision-making for all species. Banding of migratory birds is an important component of monitoring which aids in understanding species response to management actions and the environment. For several waterfowl and webless game species, banding data directly inform annual harvest management decisions. Specific management applications of banding data include:

- Description of migration routes and population delineation
- Estimation of harvest rates and survival rates
- Estimation of the vulnerability of age/sex classes to harvest
- Estimation of production rates
- Estimation of population size

In recent years, game bird banding operations have also facilitated national avian influenza surveillance programs in the U.S. and Canada that were designed to provide a system for early detection and warning to public health, wildlife management, and agricultural sectors (Canadian Wildlife Health Cooperative. 2016, U.S. Department of Agriculture, U.S. Department of the Interior, and National Flyway Council 2021)

Most game bird banding operations occur during summer months, prior to hunting seasons, although some banding also occurs during the winter and at migration stop-over/staging sites. Banding of non-game species can occur throughout the year. Banding operations for game birds typically target areas and time-periods when birds naturally aggregate at high density to achieve high capture and marking rates in a cost-efficient manner.

Capture techniques such as bait trapping, rocket-netting over bait, or drive trapping may further aggregate birds until they can be marked and released. Other techniques such as dip-netting at night from boats or mist-netting do not concentrate birds, however, all methods involve exposure of multiple birds to trapping and holding apparatus and handling of multiple birds by humans. All capture techniques induce physiological stress that may reduce immune response.

Avian Influenza

Low pathogenic avian influenza viruses (LPAI) are known to occur in wild bird populations across the globe, including North America, with little population impact. Highly pathogenic avian influenza virus (HPAI), in the past, had been considered of primary concern for domestic bird flocks, and virulence to domestic birds such as poultry is a primary criteria in classifying a virus as low or highly pathogenic. The last significant outbreak of HPAI in North America occurred in 2014-2015 and primarily affected poultry farms in the U.S. and Canada, necessitating depopulations (over 50 million domestic poultry) and causing damages in the billions of dollars. Limited wild bird detections and mortalities were recorded during this event (Veterinary Services Surveillance, Preparedness, and Response Services Animal and Plant Health Inspection Service U.S. Department of Agriculture. 2016).

The current outbreak, caused by a Eurasian HPAI (H5N1) strain, was first detected in December 2021 in wild birds (and subsequently domestic poultry) in Newfoundland. By June 2, 2022, HPAI detections in both domestic poultry and wild birds had been documented in 40 U.S. States and all four North American migratory bird flyways. Data on the extent and distribution of HPAI in both domestic poultry and wild birds in North America can be found at U.S. Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS): 2022 Detections of Highly Pathogenic Avian Influenza in Wild Birds and U.S. Geological Survey National Wildlife Health Center: Distribution of Highly Pathogenic Avian Influenza in North America, 2021/2022.

This HPAI strain appears to affect wild birds differently than previous strains in that it: 1) has caused illness and death in a higher number of bird species (58 Species), 2) has rapidly spread within wild bird populations across a larger geographic region, 3) is associated with higher mortality rates in wild birds.

Banding and Risk to Wild and Domestic Birds

Banding operations that concentrate birds or expose birds to common capture or holding equipment have the potential to increase the transmission of HPAI among wild birds. Limited published data exist currently to adequately assess transmission risk and almost no data exist for the current strain of H5N1 HPAI circulating in North America. Data from a single study conducted in 2007 indicated that ducks captured in baited traps were 2.6 times more likely to show LPAI infection than birds captured by dip-netting from airboats, however, several limitations of this study limit inference about the effect of bait trapping (Soos et al. 2012).

Many banding operations occur in areas where birds are naturally concentrated and, for species like ducks, occur in waterbodies where oral- and fecal-shed virus may be transmitted more easily among individual birds. The extent to which bait trapping or other capture, holding, and processing techniques increase transmission of the virus and the overall population-level impacts are largely unknown.

There are initial indications that wild birds are not uniformly susceptible to the current strain of HPAI. Based on detections to date, certain species of waterfowl (e.g., snow geese) and raptors (e.g. bald eagles) appear to have elevated susceptibility to clinical disease associated with HPAI infection while detections in other birds such as passerines have not been observed or detections have been very rare. This could be due to innate resistance, differences in habitat use and behavior, or simply due to reduced carcass detectability or the taxonomic focus of surveillance programs.

With respect to domestic bird flocks, any activity that increases the probability of contact between wild and domestic birds, or that potentially exposes domestic flocks to people or equipment that has been used in capture and marking of wild birds, increases the risk of virus transmission.

Banding and Risk to Human Health

While CDC considers the current risk to the general public from the HPAI A(H5) virus detections in U.S. wild birds and poultry to be low, risk depends on exposure, and people with more exposure, such as bird banders, may have a greater risk of infection. Currently, there has been one documented bird to human transmission of the current HPAI A(H5N1) strain circulating in North America. The transmission involved an individual who had direct exposure to infected poultry while participating in depopulation of an HPAI positive poultry farm. The infected individual reported symptoms of fatigue and has since recovered. The only other documented human case of the current strain of HPAI A(H5N1) infection was reported from the United Kingdom of Great Britain and Northern Ireland to the World Health Organization on 6 January 2022. The case was identified through routine follow up of exposed persons from a premises with birds infected with HPAI A(H5N1) viruses. The individual was asymptomatic and has since recovered. All strains of HPAI should be treated as potentially zoonotic. Additional human infections with HPAI A(H5) in the U.S. resulting from close contact with infected birds/poultry would not be surprising given past human infections that have occurred in other countries.

Avian influenza viruses enter the cells of the human upper respiratory tract or conjunctival mucosa, either by breathing in particles or self-inoculation with contaminated hands. Virus can be present in the following materials associated with birds: feces, saliva and mucous, blood, feathers, contaminated surfaces, and contaminated air droplets and dust/dander.

Mitigation Measures

Recognizing that considerable uncertainty exists, several mitigations may help reduce risk of banding operations to both wild and domestic birds and banding personnel. A hierarchy of controls and mitigations is summarized in Figure 1 by degree of anticipated effectiveness.

Discontinuation of banding activities, all of which involve capture and handling of birds, provides the greatest level of mitigation against HPAIV spread and possible bird to human transmission, however, obviously results in the greatest impact to monitoring and management processes.

Restricting banding operations to bird groups which are believed to have lower susceptibility to HPAI infection based on confirmed detections could ensure critical data are available for management decision-making for some priority species. Information on confirmed detections and mortalities in wild birds can be found at USDA APHIS: 2022 Detections of Highly Pathogenic Avian Influenza in Wild Birds. At present waterfowl, raptors, and scavengers (e.g., gulls, corvids) appear to be more susceptible to transmission than passerines for instance.

Another potential mitigation would be to avoid banding and/or capture and handling of wild birds in close proximity to domestic bird flocks (at least 20 km beyond the perimeter of an infected premise – this ensures that banding operations are occurring outside of the USDA-determined infected, buffer, and surveillance zones, especially where wild and domestic birds could access the same waterbodies or feeding areas. This presumes that sufficient data on the location and composition of domestic flocks is available to wildlife managers.

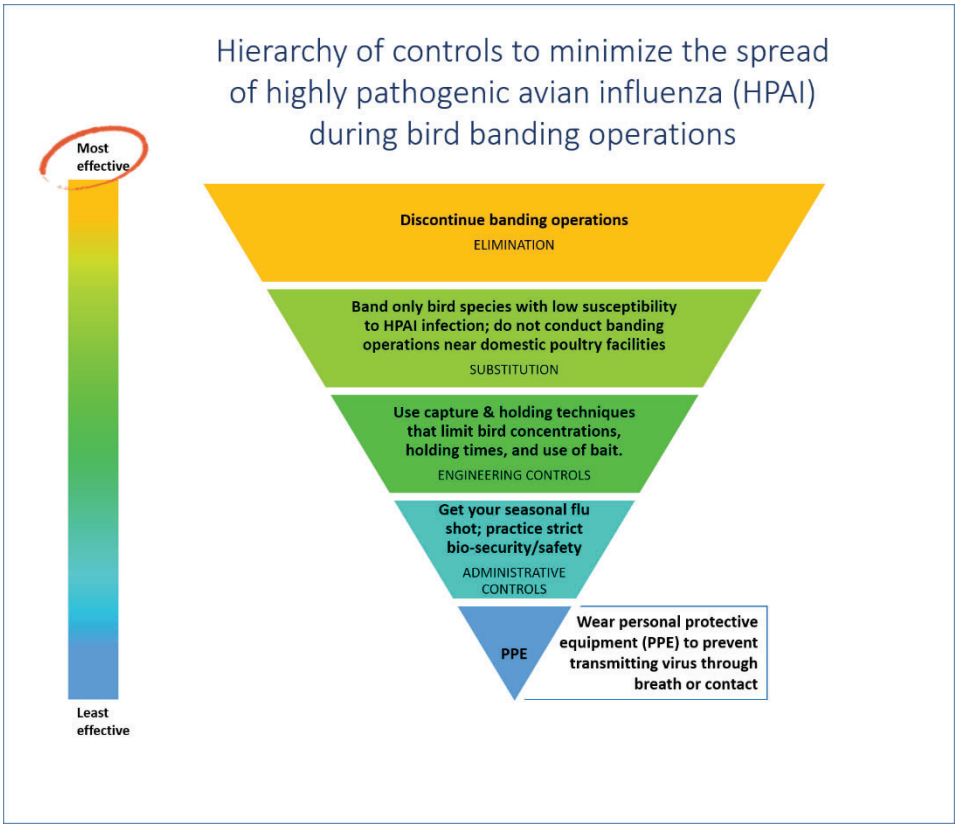

Fig. 1. Hierarchy of controls or mitigations.

Capture, holding, and handling methods associated with banding operations may be modified to reduce risk of HPAI transmission among birds. Baiting and associated capture methods such as baited traps and baited rocket net sites could be reduced or eliminated if HPAI is confirmed in wild birds in the region. If trapping is implemented, consider frequency and timing of trap visitation or periods of trap activity to minimize the time that birds are aggregated. The amount of bait applied could be reduced so that it does not persist as long in the environment. Trap size might be adjusted to allow for less aggregation of captured birds until they can be removed and processed. Traps placed in direct sunlight may reduce transmission due to the sanitization effects of ultra-violet light. For some species, drive trapping methods might be altered to reduce the number of birds concentrated in holding pens and holding pen sites may be moved between successive drive-capture events. Other capture and handling methods such as nocturnal dip-netting from boats and mist netting may be applicable for certain species and could aid in reducing concentration of birds.

Increased biosecurity measures applied in the field by banding crews to ensure equipment and clothing is changed and/or sanitized between trapping events will aid in reducing transmission among captured and handled birds. Thoroughly clean all equipment used for banding (e.g. catch boxes, pliers, band carousels) daily with soap and water to remove organic material, then disinfect with a 10% bleach solution or Virkon®).

Similarly, enhanced biosafety practices including use of Personal Protective Equipment (PPE) and practices to minimize contact with dust, dander, bird secretions, or potentially contaminated water should be considered depending on current HPAI outbreak status and whether the circulating strain(s) is known or suspected to be zoonotic. The Department of Interior has published guidelines for biosecurity and

biosafety practices when handling wild birds (see Attachment). These guidelines specify differing levels of mitigation depending on the field activity (handling apparently healthy birds or sick/dead birds) and disease conditions (zoonotic confirmed/suspected or not). These guidelines are presently under review and possible revision by the Department.

While it might be thought of as a primary option, the use of personal protective equipment (PPE) is actually the least effective mitigation strategy for minimizing the spread of HPAI to humans, domestic poultry, and wild birds. This is because it can be difficult to safely and effectively employ under field conditions, requires fit-testing and training of field crews, creates other hazards such as heat exhaustion, and relies on unmonitored compliance by crews. Significant PPE requirements (such as respirators) and other field mitigations may also reduce the availability of willing banding crew participants.

Utility of Banding Data During HPAI Outbreak

Possible increase in transmission and prevalence of HPAI in birds captured during banding operations could affect the representativeness of the banded sample, violate assumptions of subsequent analyses, and bias demographic estimates derived from these data. Recording of capture methods may permit evaluation of these effects with sufficient sample size, replication, and control working in cooperation with the USGS Bird Banding Lab and other partners. Implications of possible increase in HPAI infection rates in the banded sample, and ability to account for effects in monitoring program design and analysis, should be considered when assessing risks and benefits of banding operations during a HPAI outbreak.

When Should a Return to Normal Banding Operations Resume?

Presently, we suggest that any special, elevated mitigations adopted for banding operations per guidance summarized here continue until USDA has declared the entire country free from HPAI in domestic poultry. We note again that there is considerable uncertainty regarding the present strain of HPAI now circulating in domestic poultry and wild birds in North America and this criteria, as well as mitigation guidance, may change in the future.

Recommendation

While limited published information is available, that information is consistent with the hypothesis that any activity that concentrates wild birds and involves handling of multiple birds increases bird stress and likely increases risk of disease transmission. Present detections in wild birds in North America do suggest, however, that not all bird groups or species are equally susceptible which may be due to innate resistance, habitat use, behaviors, or a combination of factors. Banding is a critical activity supporting migratory bird management and conservation; risk of transmission likely varies substantially by taxonomic groups, regions, time-periods, and banding methods. The wild bird population-level impacts of possible increased transmission associated with banding operations are largely unknown. We, therefore, recommend that decisions to proceed with, modify, or discontinue individual banding programs be evaluated on a case-by-case basis based on the criteria summarized here. Risk-benefit evaluations should be conducted in the context of the current HPAI outbreak status and whether current strain(s) are known to cause human morbidity and mortalities. In all cases, banding at a specific location should be suspended if bird mortalities of unknown cause are detected until the cause is determined. Banders should continue to report mortality events to the USGS National Wildlife Health Center (https://www.usgs.gov/centers/nwhc/science/report-mortality-events-and-submit-specimens) and consult with them on appropriate testing. The U.S. Fish and Wildlife Service, along with other Federal, state, and international partners continues to assess risk associated with this rapidly changing outbreak and will provide further information as it becomes available.

Literature Cited

Canadian Wildlife Health Cooperative. 2016. National wild bird interagency avian influenza surveillance program. Operational Plan 2016-2017.

Soos, C., E.J. Parley, K. McAloney, B. Pollard, E. Jenkins, F. Kibenge, and F.A. Leighton. 2012. Bait trapping linked to higher avian influenza virus detection in wild ducks. Journal of Wildlife Management 48:444-4448.

U.S. Department of Agriculture, U.S. Department of the Interion, and National Flyway Council. 2021. Implementation Plan for Avian Influenza Surveillance in Waterfowl in the United States, Summer FY 2021 – Winter FY 2022.

Veterinary Services Surveillance, Preparedness, and Response Services Animal and Plant Health Inspection Service U.S. Department of Agriculture. 2016. Final Report for the 2014–2015 Outbreak of Highly Pathogenic Avian Influenza (HPAI) in the United States: Revised August 11, 2016.

Attachment: DOI Health Information Bulletin: Avian Influenza and Safety Guidelines for Handling Wild Birds (May 24, 2022).

United States Department of the Interior

OFFICE OF THE SECRETARY
Washington DC 20240

DOI Health Information Bulletin
Avian Influenza and Safety Guidelines for Handling Wild Birds

To: Bureau/Office Emergency Coordinators
Bureau/Office Safety Managers
Natural Resource/Conservation Manager

From: Thomas Balint
Director, Office of Emergency Management

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Captain Michael Quinn
Acting Director, Office of Occupational Safety and Health

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This Health Information Bulletin provides information and guidance for employees who have been or have the potential to be exposed to Highly Pathogenic Avian Influenza (HPAI) virus.

Eurasian and mixed Eurasian/North American strains of Highly Pathogenic Avian Influenza (HPAI) virus have been identified in both wild and domestic birds in the United States. Some strains of avian influenza viruses, including the current strain (H5N1), can cause illness and death in both domestic poultry and wild bird species. Avian influenza viruses can also be zoonotic, which means they can cause infection in people. Human infections with avian influenza viruses are typically rare, but can occur, usually after close contact with infected birds or virus contaminated environments. On April 28, 2022, the CDC confirmed the first case of avian influenza in a person involved in depopulating a H5N1-infected poultry facility. Illnesses in humans from other strains of avian influenza viruses have ranged from mild to severe illness, occasionally resulting in death. Based on available information about these viruses, the CDC advises the overall risk to the public's health from the 2021-2022 H5N1 avian influenza virus detections in US wild birds and domestic poultry to be low, however some people may have job-related or recreational exposures and immune-compromised conditions that put them at a higher risk for infection.

Surveillance for HPAI in wild birds is critical to monitor the geographic spread of the viruses and to detect changes in virus structure over time, especially with migration in the spring and fall. Routine field work that may involve handling (e.g. bird banding) of wild birds or response efforts to avian mortality events is essential for wildlife health monitoring and conservation purposes. In preparation for ongoing surveillance

efforts, the Department of the Interior (DOI) reviewed established work practices and personnel safety standards to ensure appropriate use of preventative measures and personal protective equipment (PPE) when DOI personnel are supporting routine disease monitoring and surveillance efforts associated with handling of live or dead wild birds.

The attached guidance document*, Updated Employee Health and Safety Guidance for Wild Bird Management Activities and Avian Influenza Surveillance, 2022*, contains information about PPE and safe work practices. This document specifies the minimum PPE to be used for each activity, including contacting servicing health and safety offices for guidance on respirator use.

After review and consultation with several partners, this Information Bulletin has been prepared as a reminder to review the attached 2022 updated Guidance, incorporate the hierarchy of controls into safe work practices, and update or conduct job hazard assessments to utilize appropriate PPE. Please note that opening carcasses in the field is not recommended and requires additional PPE, precautions, and consultation with your servicing health and safety office. Distribute this Guidance to appropriate personnel. Discuss any questions or concerns you may have regarding your work activities with your health and safety office, office of public health or wildlife health office.

Updated Employee Health and Safety Guidance for Wild Bird Management Activities and Avian Influenza Surveillance, 2022

This document provides guidance for protecting Department of Interior (DOI) employees involved in handling live or dead wild birds. The risk of exposure to avian influenza viruses, and consequent safety recommendations, are dependent on the presence of one or more HPAI avian influenza viruses (strains that are potentially infectious to humans) in wild birds in one of the North American Administrative Flyways (Appendix 1). Some people may have job-related or other exposures that put them at risk for infection with avian influenza viruses. Discuss any questions or concerns with your health and safety office, office of public health, or wildlife health office.

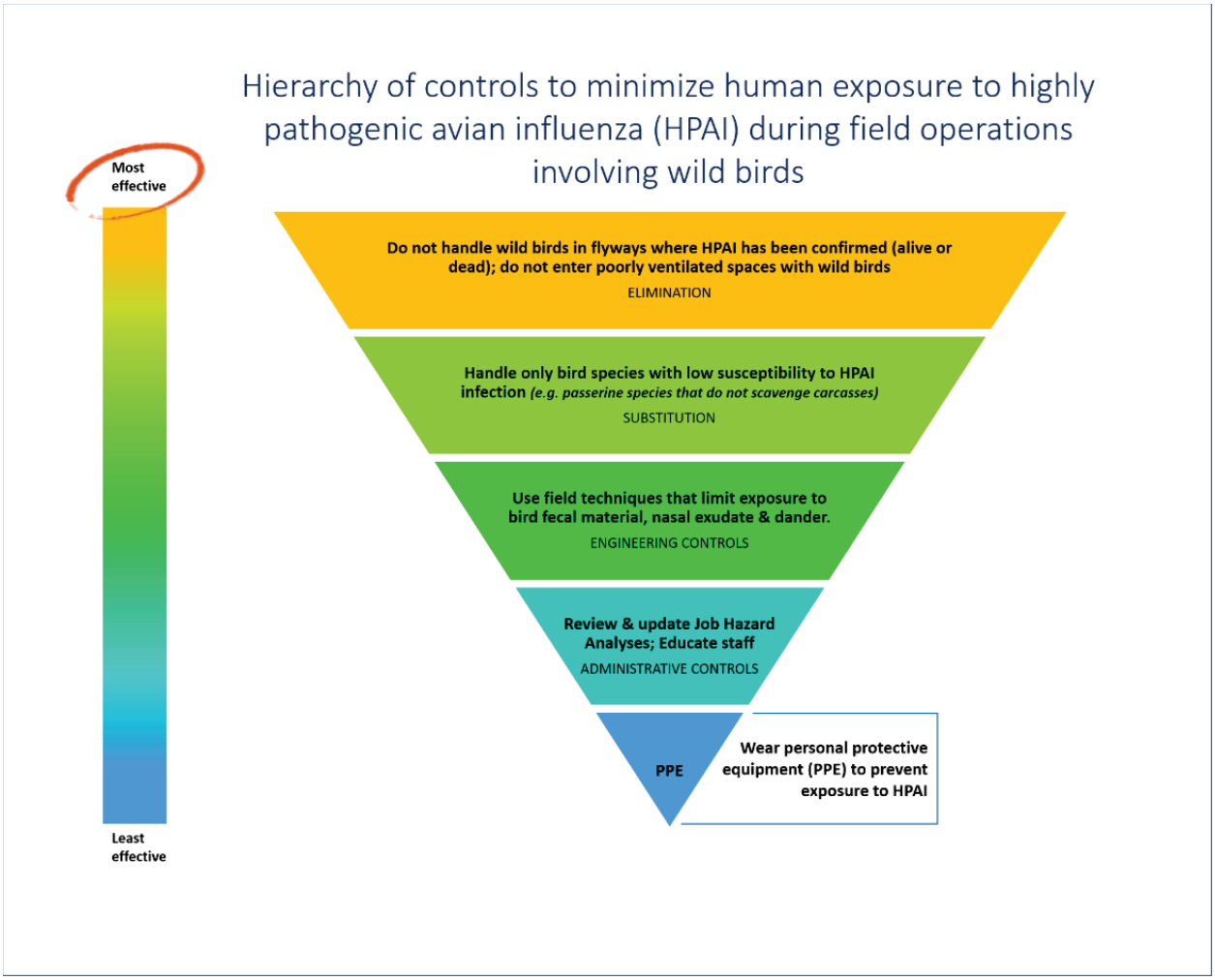
I. Job Hazard Assessments

a. Job hazard assessment or analysis (JHA) is a systematic process for identifying hazards and eliminating or minimizing their risks. First you break down a job or activity into basic steps and examine each step for potential hazards. For larger or more complex operations, you may need to divide the operation into several activities or sub-steps. For each hazard you identify, you must develop a means of eliminating or controlling the hazard.

b. Each DOI bureau has JHA templates available, please click here to find an example JHA template from the U.S. Fish and Wildlife Service.

II. Hierarchy of Controls

a. Controlling exposures to occupational hazards is the fundamental method of protecting workers. A hierarchy of controls is used to determine how to implement feasible and effective control solutions. The control methods at the top of graphic are potentially more effective and protective than those at the bottom. Following this hierarchy normally leads to the implementation of inherently safer systems, where the risk of illness or injury has been substantially reduced. Below is a hierarchy of controls specific to controlling exposure to HPAI.



III. Personal Protective Equipment (PPE)

Instruction and up-to-date information must be provided to personnel at risk of coming in contact with HPAI avian influenza viruses:

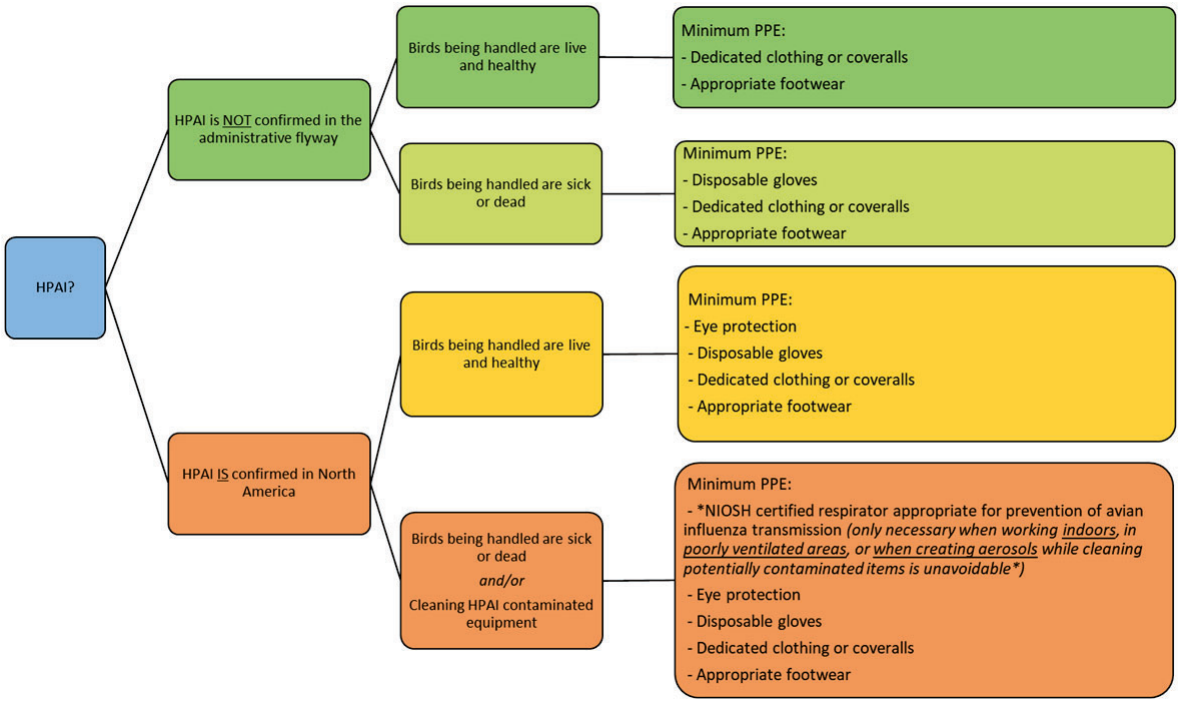
- while handling infected animals - trapping and handling of wild birds, euthanasia, collection of cloacal and/or oropharyngeal swabs and carcass collection and disposal
- while conducting routine field work activities for monitoring avian health (e.g., bird banding)
- while working with contaminated objects or surfaces (e.g. saliva, blood, mucous, feathers, dander, or droppings from birds) - cleaning and disinfection of equipment/vehicles/non-disposable PPE
- through contact with persons infected with avian influenza viruses

DOI agencies are required to provide the necessary PPE to at-risk personnel. PPE use and training is done in accordance with the Occupational Safety and Health Administration (OSHA) Personal Protective Equipment standards (29 CFR 1910.132 – 134), DOI's Job Hazard Analysis policy (485 DM 14), and applicable bureau/office requirements.

The flowchart below describes conditions, general activities, and the protective measures required to minimize exposure to HPAI. It specifies the **minimum PPE** to be used for each activity. Other PPE and safety precautions may be necessary depending on specific risk factors and conditions of the worksite or the tasks. For detailed PPE donning and doffing information, please review the Safe Work Practices for Working with Wildlife document.

It is important to note that the flowchart below does not attempt to cover all tasks that may be assigned to DOI personnel. High exposure tasks not anticipated in the chart should be evaluated in consultation with servicing health and safety offices. Guidance on PPE will continue to be re-evaluated as more information becomes available and as the characteristics of different avian influenza viruses are better defined.

Department of the Interior flowchart guidance for personal protective equipment (PPE) and safe work practices when working with wild birds depending on presense of highly pathogenic avian influenza (HPAI) in the administrative flyway.



** Use of respirators requires implementing a respiratory protection program as required by the Occupational Safety and Health Administration. Consider wearing a respirator depending on frequency and duration of work activities with wild birds, even if the birds do not appear sick. Contact your servicing Safety and Health or Wildlife Health team for guidance.*

Safe Work Practices

When preparing for field work

- Consult regional health and safety public health or wildlife health personnel regarding HPAI and other zoonotic disease risks in your area.
- Please see contacts section in this document for more information.

When in the field

- While working with wildlife, do not eat, drink, smoke, use your cell phone, touch your face, hair, or exposed skin.
- Thoroughly inspect all PPE prior to use for signs of damage and carefully remove worn PPE to prevent self-contamination. Ensure that contaminated PPE is segregated and treated as potentially infectious prior to disposal and/or decontamination.
- Clean surfaces of equipment and reusable PPE with detergent and water, then disinfect with a virucide that kills avian influenza viruses (such as Virkon). Follow the label instructions. The EPA lists products registered for use against avian influenza. Decontaminate tools and other equipment prior to reuse.
- After contact with wildlife, remove gloves and wash your hands thoroughly with soap and water for at least 20 seconds. If soap and water are not available, use an alcohol-based hand sanitizer with at least 60% alcohol.
- Minimize dust by thoroughly wetting or misting contaminated surfaces and avoid generating mists during equipment decontamination.
- Do not touch exposed skin or parts of your body (especially the face), with gloved hands. Replace torn or damaged gloves immediately.
- If there is known exposure to body fluids from a bird (e.g., fecal material splashed in eyes or mouth) follow proper occupational reporting protocols, contact your health care provider, and give a complete history of your activities and potential for occupational exposure.

*Use of respirators

- Use of respirators requires implementing a respiratory protection program as required by OSHA. At a minimum, this includes development of a written program, employee training, medical clearance, and fit-testing to ensure appropriate respirator selection and use. National Institute for Occupational Safety and Health (NIOSH) approved respirators and additional guidance are available on CDC's website.
- Under certain high-risk conditions such as handling large numbers of birds in a confined area confirmed to have HPAI virus, it may be necessary to upgrade respiratory protection to powered air purifying respirators (PAPR) or other protection options.

If workers need respirators to prevent potential exposure to avian influenza viruses, OSHA advises, at a minimum, a NIOSH-certified N95 filtering face piece respirator or higher (such as a Powered Air Purifying Respirator [PAPR]) as part of a comprehensive respiratory protection program that includes medical exams and fit testing, and that meets the requirements of OSHA's Respiratory Protection standard 29 CFR 1910.134.

Opening carcasses in the field is **not** recommended as this may increase the risk of disease transmission and decrease the diagnostic value of the carcass. Consult DOI health and safety officers and your respective wildlife health office for more guidance if this activity is necessary.

Designated protective measures should be applied for at least 30 days after the date of the last detection of HPAI avian influenza in wild birds within the North American flyways where field work and/or response activities are being conducted.

IV. Vaccination, anti-viral medications, and medical monitoring

It is recommended that DOI personnel should obtain the seasonal influenza vaccine. Follow the Advisory Committee on Immunization Practices (ACIP) annual recommendations for the prevention and control of influenza with vaccines, which include information on the available vaccine products, timing of vaccination, and vaccination of individuals who could have complications from receiving the vaccine. The annual ACIP recommendations can be found on the Centers for Disease Control and Prevention (CDC) website.

Vaccination for seasonal influenza viruses will reduce the possibility of an individual being infected with both avian and human influenza viruses at the same time. There is a small possibility that without vaccine protection dual infection could occur and result in viral re-assortment; re-assortment can result in new, previously unrecognized virus subtypes. During a threat or occurrence of an actual pandemic, CDC may develop guidance on anti-viral medication and emergency vaccine use based on population risk during an influenza pandemic.

V. Monitoring

CDC recommends that all persons with direct or close exposure to HPAI infected birds, HPAI infected flocks, or surfaces potentially contaminated with HPAI virus should be monitored for illness for 10 days after their last exposure. Monitoring should occur regardless of the health status of the bird (well-appearing, sick, or dead) and regardless of whether they were wearing appropriate personal protective equipment (PPE) or not. The following instructions apply to all people with direct or close exposure to infected birds.

1. In some situations, active monitoring, in which the state/local health department reaches out to check on you, may be recommended.

2. For all situations, you should monitor yourselves daily for any of these signs and symptoms for 10 days:
   - Fever (Temperature of 100°F [37.8°C] or greater) or feeling feverish/chills (fever may not always be present).
   - Cough

- Sore throat
- Difficulty breathing/Shortness of breath
- Headaches
- Runny or stuffy nose
- Muscle or body aches
- Diarrhea (less common)

3. If symptoms occur, contact your state/local health department as well as the respective bureau/office safety manager or Office of Public Health immediately. If you do not know how to contact your state/local health department, the Office of Safety and Health or Office of Public Health can assist.

4. Your health department will give you further assistance and may recommend testing. Testing consists of a sample from a nose or throat swab.

5. Stay home and limit contact with others as much as possible and do not handle live birds until the results of testing are known. While at home, ill persons should practice good cough and hand hygiene to lower the risk of transmission of virus to others.

6. If you are sick, a doctor might prescribe an antiviral medication, which you should start immediately.

7. In any emergency situation, seek medical attention immediately.

8. For further information on influenza, visit the CDC website.

DOI Health and Safety, Wildlife Health Office, and Public Health Office Contacts

DOI Office of Safety and Health:

- Phone: 303-570-7110
- Email: michael_quinn@ios.doi.gov
- SharePoint site: DOI Occupational Safety and Health Home

U.S. Fish and Wildlife Service

- *Health and Safety Office*:
  - Phone: 202-219-0189
  - Email: fws_safety&health@fws.gov
  - SharePoint site: Health & Safety Office

- *Wildlife Health Office*:
  - Phone: 970-278-7543
  - Email: darby_murphy@fws.gov or samantha_gibbs@fws.gov
  - SharePoint site: NWRS Wildlife Health office - Home

National Park Service

- *Office of Occupational Safety and Health:*
  - Email: risk_management@nps.gov
  - SharePoint site: NPS Occupational Safety and Health

- *Office of Public Health:*
  - Phone: 202-538-5681
  - Email: publichealthprogram@nps.gov
  - SharePoint site: Avian Influenza

- *Wildlife Health Office:*
  - Email: npsdiagnostics@nps.gov
  - SharePoint site: Health/Disease

U.S. Geological Service

- *Health and Safety Office*:
  - Email: gs-oa_safety_ih@usgs.gov
  - SharePoint site: Safety and Health Homepage

Appendix 1. North American Administrative Flyways Map