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Service



# **High Pathogenicity Avian Influenza Eradication - Tennessee**

## **Final Environmental Assessment, March 2017**

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### **Agency Contact:**

Lori P. Miller, PE  
Senior Staff Officer/ Environmental Engineer  
Animal and Plant Health Inspection Service  
Veterinary Services  
Science, Technology and Analysis Services  
4700 River Road, Unit 41  
Riverdale, MD 20737

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# I. Introduction

## A. Background

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) is responsible for protecting and improving the health, quality, and marketability of U.S. animals, animal products, and veterinary biologics by (1) preventing, controlling, and/or eliminating animal diseases, and (2) monitoring and promoting animal health and productivity. The authority for the mission of VS is found in the Animal Health Protection Act (7 United States Code 8301 et seq.).

Avian Influenza (AI), also known as bird flu, is caused by infection with viruses of the family Orthomyxoviridae, genus *influenza virus A*, species *influenza A virus* (Center for Food Security and Public Health, 2014). Influenza A viruses are the only orthomyxoviruses known to affect birds (USDA-APHIS, 2012). Influenza A viruses are isolated from more than 100 different species of birds. Migratory waterfowl (such as gulls, ducks, and shorebirds) are a major reservoir for these viruses (CDC, 2015a; USDA, 2015). They serve as sources of infection for domestic flocks during yearly migrations.

Strains of AI viruses are classified as highly pathogenic<sup>1</sup> (HPAI) or low pathogenicity (LPAI) based on the genetic features of the virus and the severity of the avian disease they cause (CDC, 2015a). Influenza A viruses have antigenically-related nucleocapsid and matrix proteins, and are classified into subtypes on the basis of their haemagglutinin (H) and neuraminidase (N) antigens. Sixteen H subtypes (H1–H16) and 9 N subtypes (N1–N9) are known (USDA-APHIS, 2012). To date, the highly virulent influenza A viruses that produce acute clinical disease in chickens, turkeys, and other birds of economic importance are only associated with the H5 and H7 subtypes (OIE, 2010).

Worldwide, many strains of AI cause varying degrees of clinical illness in poultry. Low pathogenicity viruses generally cause mild disease (USDA-APHIS, 2012); birds infected with LPAI exhibit symptoms such as ruffled feathers and decreased egg production (CDC, 2015a). LPAI is one of the “other communicable diseases of livestock or poultry” regulated under 9 CFR part 53. Section 53.2 allows the APHIS Administrator to invite the proper State authorities to cooperate with the Department in the control and eradication of this disease including the use of indemnity payments. In Tennessee, the Commissioner and State Veterinarian have the authority to act during an animal health emergency (Tennessee Code Ann. §§ 44-2-101, 44-2-102, 44-16-

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<sup>1</sup> Pathogenicity is the ability of the virus to produce disease.

204 (2016); Tenn. Comp. R. & Regulations). Other sections provide for appraisal (9 CFR § 53.2) and destruction (9 CFR § 53.3) of animals, and disinfection or destruction of materials (9 CFR § 53.5), premises, and conveyances (9 CFR § 53.7). Provisions for the control of H5/H7 LPAI in 9 CFR part 56 focus on the reduction of LPAI in flocks on a long-term or ongoing basis. The National Poultry Improvement Plan (NPIP) for Commercial Poultry (9 CFR part 146) and its Auxiliary Provisions (9 CFR part 147) do not specifically identify procedures, processes, and control for highly pathogenic strains of AI. That is, current regulations are not explicit on the likelihood of additional provisions being needed for highly pathogenic viral strains. Yet the intent is to be prepared for detection and control of HPAI outbreaks. VS has recently proposed changes to its NPIP program standards, including updating NPIP testing procedures. These changes were available for public comment until March 15, 2017.

HPAI is an extremely infectious and fatal form of the disease that, once established, rapidly spreads within and between flocks (USDA-APHIS, 2012; USDA, 2015). Birds infected with the HPAI virus could exhibit symptoms ranging from coughing, sneezing, nasal discharges, lack of energy and/or appetite, and decreased egg production, to soft-shelled or misshapen eggs, swelling, purple discoloration, lack of coordination and diarrhea, or sudden death. To detect HPAI in wild migratory birds as quickly as possible, APHIS established a national early detection system that involves monitoring and surveillance of migratory birds in the United States (HHS et al., 2006).

## **B. Purpose and Need**

In 2015, more than 48 million chickens and turkeys were affected by HPAI, based on 223 reported detections in 15 states. APHIS responded to these detections by working with affected states to implement quarantine and movement controls, depopulate affected flocks to prevent the spread of this disease to additional flocks, dispose of the carcasses, and clean and disinfect facilities and equipment.

An environmental assessment (EA), *High Pathogenicity Avian Influenza Control in Commercial Poultry Operations – A National Approach*, was published by APHIS in December 2015 to address the potential impacts of continuing to provide assistance with establishing and enforcing HPAI quarantines and conducting bird flu control activities as outbreaks occur across the nation (USDA-APHIS, 2015a). The EA was prepared consistent with the National Environmental Policy Act of 1969 (NEPA) and APHIS' NEPA implementing procedures (7 CFR, part 372) for the purpose of evaluating how the proposed action may affect the quality of the human environment.

On March 4, 2017, APHIS confirmed the presence of North American wild bird lineage HPAI in a commercial chicken breeder flock in Lincoln County, TN. The flock, consisting of 74,000

birds, is located within the Mississippi Flyway. A second case of HPAI was confirmed in another commercial breeder flock in Lincoln County, TN on March 16, 2017. APHIS' National Veterinary Services Laboratories has confirmed the virus in both cases to be H7N9. This virus is not genetically similar to the China H7N9 virus that infected both poultry and humans. APHIS is working closely with the Tennessee Department of Agriculture on a joint incident response. State officials quarantined the premises and birds on the property were depopulated to prevent the spread of disease.

The Tennessee Emergency Management Agency, the State Veterinarian, representatives from the poultry industry, and University of Tennessee extension professors evaluated disposal options available under the applicable laws and regulations (table 1). Burial, composting, incineration, rendering, and landfiling were considered; however, incineration, rendering, and landfiling were determined to be less desirable in emergency situations due to their lack of timeliness, potential transportation of birds from the affected farm, and the inability of equipment to handle a large-scale HPAI event (Hawkins et al., 2017). Similarly, the Tennessee Department of Environment and Conservation prefers on-site disposal options to off-site options when site conditions allow (pers. comm., Apple to Gray).

Between burial and composting, burial is a better option when the size and infrastructure of production houses at the affected farm precludes in-house composting. Outdoor composting is also an option but requires adequate space for equipment and the construction of windrows. Outdoor composting can be excluded as an option if there are active vectors (flies, etc.) that could spread HPAI (Hawkins et al., 2017). After consideration of the site conditions and infrastructure, burial was selected as the preferred disposal method in Lincoln County. The burial sites were selected following the Tennessee USDA Natural Resources Conservation Service (NRCS) Guide Sheet 316 ([https://efotg.sc.egov.usda.gov/references/public/TN/Emergency\\_Disposal\\_Animal\\_Mortality\\_TN316\\_Guide\\_Sheet.pdf](https://efotg.sc.egov.usda.gov/references/public/TN/Emergency_Disposal_Animal_Mortality_TN316_Guide_Sheet.pdf)).

Federal and State partners are working jointly to increase surveillance and testing in nearby areas, including Franklin County, TN, Moore County, TN, Madison County, AL, and Jackson County, AL. APHIS has prepared this site-specific EA to evaluate the impacts of depopulation, disposal, cleaning and disinfection, environmental sampling, and surveillance methods on the human environment in Lincoln County and the surrounding area.

**Table 1.** Information on disposal methods available in Tennessee, based on State statutes, rules, regulations, and/or bulletins and focusing on law applicable to the poultry industry.<sup>1,2</sup>

| State and References  | Time Limit | Burial Depth/Setback                                    | Burning  |             | Rendering | Landfill | Compost |
|---|------------|---|----------|-------------|-----------|----------|---------|
|   |            |   | Open-Air | Incinerator |           |          |         |
| Tennessee (Tenn. Comp. R. & Regs. 0400-11-01-.04)   | 48 h       | 2 ft with 5 ft additional cover; 3 ft if no other cover | –        | –           | –         | Y        | –       |
| <p>HPAI Disposal Policy 2017: Incineration, rendering and landfilling are low-priority disposal options because they are not timely, may require the birds to be transported from the affected farm, or the equipment required cannot sustain a large-scale HPAI event.”</p> <p>Disposal Policy 2009: “The State Veterinarian with the Tennessee Department of Agriculture should be notified when catastrophic losses are greater than 10,000 pounds. Landfilling, composting, or rendering may be the only options viable in the event of catastrophic livestock losses.”</p> |            |   |          |             |           |          |         |

1 Commercial Poultry Producer's Guide to Disposal Options for HPAI Mortalities in Tennessee (<https://extension.tennessee.edu/publications/Documents/D45.pdf>); Policy Concerning the Disposal of Dead Farm Animals and the Disposal of Offal from Custom Slaughter Facilities (<https://www.fda.gov/downloads/AnimalVeterinary/GuidanceComplianceEnforcement/ComplianceEnforcement/BovineSpongiformEncephalopathy/UCM167661.pdf>).

2 All statements from statutes, rules, regulations, and bulletins are derived from free, Web-based materials available as of March 2017, and use of the information is at the sole risk of the user. The USDA makes no warranty or representation of any kind, express or implied. Each state may have more current or accurate information. The USDA provides this information on an “as is” basis for comparison purposes only, and it shall not be liable or held responsible for any omissions, additions, or errors.

Abbreviations and special uses: blank = no explicit information found; ft = feet; R. = rule; Regs. = Regulations; Y = Yes. Note: If the type of burning is not specified, then Open burning was assumed and Incinerator is blank.

## **II. Alternatives**

The CEQ's NEPA regulations (40 CFR §§ 1500-1508) require Federal agencies to consider in their environmental documents alternatives that include other reasonable courses of actions in addition to a "no action alternative" (40 CFR § 1508.25(b)). In this situation, the no action alternative considers a lack of Federal actions taken during HPAI outbreaks<sup>2</sup> for the purpose of making comparisons to the other alternative.

This EA considers two possible alternatives: (1) The No Action—only State and local authorities take action during this HPAI outbreak, and (2) the Proposed Action—APHIS provides assistance to State and local authorities to establish and enforce HPAI quarantines (APHIS did not apply Federal Control Areas or Federal Quarantine Zones through Federal Order) and conduct eradication activities under existing authorities in 9 CFR parts 53, 56, 145, 146, and 147. These alternatives are discussed in this chapter, and are the basis for further analyzing potential environmental effects addressed in chapter 3 of this EA.

### **A. No Action**

Under the No Action alternative, APHIS would not be involved in HPAI activities such as depopulation and disposal of carcasses, and disinfection of equipment and premises. State and local authorities would be responsible for managing and funding these types of HPAI activities. Under this alternative, APHIS could conduct surveillance of commercial and backyard flocks through the NPIP, implement a quarantine, conduct environmental sampling, and release the quarantine. This alternative represents the baseline against which to compare the proposed action.

### **B. Eradication Using an Adaptive Management Program (Preferred Alternative)**

APHIS classifies Tier 1 diseases of national concern as those diseases posing the most significant threat to animal agriculture in the United States, and this includes AI. The OIE maintains a list of highly infectious diseases of concern (OIE, 2015; see <http://www.oie.int/animal-health-in-the-world/oie-listed-diseases-2015/>), of which HPAI is one. HPAI poses serious danger for animal health and welfare, an economic threat to animal livestock industries, and also a risk to human public health if the virus reassorts into strains capable of impacting humans. The Preferred

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<sup>2</sup> An outbreak is the occurrence of one or more cases (an individual animal infected by a pathogenic agent, with or without clinical signs) in a group of animals that share the same likelihood of exposure to a pathogen due to a shared common environment or common management practices (OIE, 2010).



alternative, therefore, would use an adaptive management approach to control the Lincoln County, Tennessee outbreaks, and includes but is not limited to the following activities:

- Surveillance
- Quarantine
- Depopulation
- Carcass Management
- Cleaning and Disinfection
- Environmental Sampling
- Quarantine Release

Specifically, under the Preferred alternative, APHIS would implement quarantines without application of Federal Control Areas or Federal Quarantine Zones via Federal Order and would provide funding for depopulation via Class A foam. APHIS would also provide funding for burial of carcasses, as well as wet cleaning, and disinfection of poultry houses. APHIS would conduct wildlife assessments around the infected premises. This alternative includes backyard and commercial surveillance; the control area (movement control and surveillance) extends 10 miles from the initial outbreak.

The adaptive management approach provides flexibility when responding to the HPAI outbreak, including selecting the most appropriate disposal method for the situation. The Preferred alternative will allow APHIS to use its central repository of carcass disposal resources and national contacts, provide consistency during the response to the outbreak, and facilitate international trade. Successful eradication of HPAI occurred after the outbreak in 2015 by using the adaptive management methods described in the national HPAI EA, and these methods are incorporated in this document by reference. For more detailed information regarding this adaptive management program, refer to the national EA (USDA-APHIS, 2015a).

### **III. Potential Environmental Consequences**

In this chapter, APHIS summarizes the potential environmental consequences of the alternatives considered for the HPAI emergency eradication program in Lincoln County, Tennessee and the surrounding area. The site-specific characteristics of the program area were considered with respect to the potential for the alternative to affect human health, nontarget species, and environmental quality. APHIS will conduct additional environmental analyses if HPAI outbreaks occur outside of Lincoln County.

#### **A. No Action**

Under the No Action alternative, APHIS would not be involved in HPAI depopulation, disposal of carcasses, and disinfection of equipment and premises. State and local authorities would be responsible for managing and funding these types of HPAI activities. APHIS would still conduct surveillance of commercial and backyard flocks through the NPIP and implement quarantines without application of Federal Control Areas or Federal Quarantine Zones via Federal Order where HPAI outbreaks occur in Lincoln County. APHIS would not assist with restoring biosecurity. In addition, compensation would not be provided to affected producers to encourage the reporting of disease incidence.

APHIS employees would not be at risk for infection or psychological impacts during these outbreaks due to lack of participation in restoring biosecurity, but individual producers, their families, and contractors are at risk. The public's concerns regarding human health and safety, and long-term impacts of an outbreak on food security, are similar under both alternatives. Under the No Action alternative, the length of time people experience these sources of anxiety is expected to be longer.

Impacts to air, soil, and water quality, and local vegetation would be the same under both the No Action alternative and the Preferred alternative because State and local authorities would use the disposal methods authorized in Federal and Tennessee regulations. Under the No Action alternative, wildlife may experience longer exposure times to carcasses piled up outdoors if the response time is increased due to the lack of personnel.

#### **B. Preferred Alternative**

Impacts associated with the adaptive management approach under the Preferred alternative are discussed in detail below. Since the majority of potential environmental impacts would be in Lincoln County where the outbreak is occurring, the EA focuses on this county but gives additional consideration to the other counties (Franklin County, TN; Moore County, TN;

Madison County, AL; Jackson County, AL) in the water quality, environmental justice, children, National Historic Preservation Act, and tribal sections.

### **Land Characteristics and Demographics**

Lincoln County is in the southern middle part of Tennessee, with Franklin and Moore Counties (TN) on the east side, Madison County, AL on the south side, and Jackson County, AL to the southeast. Lincoln county occupies 571 square miles (USDA-NRCS, 2004) and has an estimated population of 33,550 (U.S. Census Bureau, 2017). Elevations range from 700 feet above sea level in the Nashville Basin to 950 feet on the Highland Rim.

The average annual temperature for Lincoln County is 60.4°F (average high – 71.8°F; average low – 48.9°F). The average precipitation is 55.6 inches (MTIDA, 2015). Agriculture is the largest industry in Lincoln County (Lincoln County Tennessee, 2017), and it ranks 3<sup>rd</sup> in the state for value of sales of poultry and eggs (USDA-NASS, 2012). Other agricultural commodities include grain, tobacco, soybeans, corn, hay, wheat, cotton, cattle, and horses (MTIDA, 2015).

### **Environmental Resources**

#### Air Resources

Air emissions can impact human health. The release of criteria pollutants are associated with transportation to and from premises for surveillance, depopulation, carcass management, cleaning and disinfection, environmental sampling, and restocking. Depopulation, carcass management, and cleaning and disinfection may release additional particulates, gases, and other chemicals into the air under the Preferred alternative. Air emissions are not associated with setting up quarantines and releasing them.

Mass depopulation in Lincoln County is occurring via Class A foam. Foam is only approved for floor-reared poultry such as broiler chickens, turkeys, and ducks. Foam has non-flammable and non-explosive properties, occurs over a short period of time, and is not expected to significantly impact air quality around this poultry production facility.

After consideration of land features, size of flock, and infrastructure of the production houses, burial is the selected disposal method for carcasses in Lincoln County, TN. Unlined burial of carcasses may release gases associated with anaerobic decomposition, such as carbon dioxide, carbon monoxide, nitrogen oxides, sulfur dioxide, hydrogen chloride and fluoride, and methane (Engel et al., 2004; Yuan et al., 2012). Disturbance of soil will cause soil particles to become airborne. With the burial of carcasses, there is a potential for pathogens to be discharged into the atmosphere if the burial site accumulates gases, resulting in the forceful rupture of cover soils. Proper burial techniques (e.g., collecting burial site gasses and venting them through filters) reduces this likelihood.

Disinfectants could impact air quality during use and cause health problems, such as dermal or respiratory impacts to workers using them. However, APHIS requires employees and contractors to follow label instructions to ensure proper use of the chemicals selected for cleaning and disinfection to minimize impacts to the environment.

### Water Resources

Sources of water contamination include soil erosion, leaching, surface water runoff, and groundwater contamination. Impacts to water are not expected to occur from surveillance, quarantining and releasing premises, environmental sampling, and restocking. Therefore, this section will focus on the impacts of depopulation, carcass management, and cleaning and disinfection.

Major water bodies in Lincoln County include Lincoln Lake (6.68 miles from outbreak), Steelman Lake (7.08 miles), and Elk River (9.00 miles). In addition, the 10km control zone around the outbreak includes Milner Pond (4.36 miles) and Watercress Pond (7.43 miles), both of which are located in Madison County, AL. Minor water bodies in Lincoln County include Little Huckleberry Creek (0.25 miles), Robinson Creek (0.79 miles), Persimmon Pond Branch (0.84 miles), Hester Creek (1.44 miles), Big Huckleberry Creek (1.72 miles), and Indian Creek (1.74 miles). In addition, Jenny Branch is located in Franklin County, TN (2.25 miles).

The Class A fire suppression water-based foam used to depopulate the poultry houses dissipates quickly and has no known documented impacts on water quality when used in this manner. Burial of carcasses, however, may impact the quality of surface and ground water resources. Several contaminants of concern are present in carcasses that may leach into the surrounding soil and migrate to surface and ground water. These contaminants include ammonia-nitrogen, phosphorus, and chloride (Engel et al., 2004 and Pratt and Fonstad, 2009). In addition, poultry by-products and waste may contain numerous microorganisms, including pathogens (Arvanitoyannis and Ladas, 2007).

Leachate from carcass burial has been shown to impact water quality parameters, such as pH, conductivity, and biological oxygen demand (Yuan et al., 2012; Glanville et al., 2009). Many of these pollutants and water quality parameters are listed as reasons for water impairment under section 303(d) of the CWA. Excessive nutrient loading from phosphorus and nitrogen compounds, as well as total dissolved solids and pathogens, are common causes of impairment in U.S. waters. Phosphorus and nitrogen may cause eutrophication of water bodies (Carpenter et al., 1998). In Lincoln County, 13.91 miles of Elk River are listed as impaired from *Escherichia coli* linked to cattle grazing; however, EPA has approved a Total Maximum Daily Load protocol that addresses this fecal pathogen (TDEC, 2016).

Unlined burial may contribute to the release of contaminants into impacted waters, or impairment of otherwise healthy water bodies. In general, the potential for impacts to water quality rises as the number of carcasses increases (USDA-NRCS, 2012). Because unlined burial raises environmental concerns, it is only used in areas where environmental impacts are expected to be minimal. Ensuring soils are not highly permeable and the water table is not within 2 feet of the bottom of the burial pit minimizes the likelihood of significant environmental impacts to surface and groundwater (USDA-NRCS, 2015). NRCS and Tennessee authorities selected sites on the premises where the outbreaks occurred that meet these specifications.

At the first site, burial pits are located 500-700 feet from the closest poultry house, and 1,000 feet from the onsite pond. The second burial site is 150-200 feet from the closest poultry house, 500 feet from a pond on an adjacent property, and 900-1,000 feet from a pond on the producer's property. Both burial sites are less than one acre (approximately 75-100 feet wide by 200 feet long) (pers. comm. Humphrey to Miller). In addition, the closest public drinking water well is 0.375 miles northwest of the first burial site and 0.716 miles southeast of the second burial site (pers. comm. Humphrey to Miller). Based on the size and location of the burial sites, significant impacts to surface and groundwater or to public drinking water are unlikely.

Leachate from unlined burial is not the only environmentally concerning issue; other actions such as moving and storing carcasses can impact the environment too. Heavy equipment used for burying carcasses can disturb soil and cause sediment runoff to surface water. Selecting flat locations or locations with a minimal slope will reduce the potential for sediment runoff. Federal and State officials selected burial sites in Lincoln County that meet these specifications. Subsequently, no run-off control measures were used.

As part of the outbreak response program, there are measures required to prevent mechanical transfer of the virus, including disinfection of equipment, transport vehicles, and/or premises where infected poultry were maintained. Disinfectants used in the HPAI adaptive management program are registered for specific use with EPA and used according to label requirements. Label instructions for a disinfectant are provided for its proper application to prevent potential environmental impacts associated with the use of the registered product (EPA, 2008; Pollard et al., 2008).

### Soil Resources

Soil resources are unlikely to be impacted during surveillance, depopulation, cleaning and disinfection, environmental sampling, and restocking. Therefore, this section will focus on the impacts to soil from burial of carcasses.

The northern two-thirds of the county is in the Nashville Basin, which is characterized by narrow valleys separated by steep hillsides and narrow ridges. The majority of this area is underlain by limestone and outcrops of this bedrock are common. Soils range from deep and loamy to

shallow and clayey with rock outcrops. Drainage is south into the Elk River (USDA-NRCS, 2004).

The southern one-third of Lincoln County consists of the Highland Rim. The terrain is nearly level or has moderate sloping. Soils range from well-drained on the slopes to poorly-drained on the low flats and in depressions. They formed in 2 to 3 feet of loess over clayey residuum from limestone. Drainage is not well-developed in this area but is generally southward into the Flint River and Limestone Creek to the Tennessee River. Some drainage also occurs northward into the Elk River (USDA-NRCS, 2004).

Onsite unlined burial will impact the physical properties of soil by using heavy machinery to dig trenches and remove topsoil. Compaction may result in increased soil-bulk density values (the dry weight of the soil divided by the total volume the soil occupies) that may decrease re-vegetation rates of burial sites. These physical impacts to soil may result in increased erosion during and after burial activities have occurred.

Disposal of poultry carcasses in unlined burial trenches allows any biological and chemical agents that may be present to leach into the surrounding soil. In the case of phosphorus- and nitrogen-containing compounds, impacts to surface soil quality may be beneficial; however, excess levels may limit plant growth. The contribution of these pollutants to soils may also alter naturally occurring soil microorganisms responsible for cycling phosphorus and nitrogen in soils (Pratt and Fonstad, 2009). USDA-NRCS evaluated the Lincoln County, TN outbreak sites to identify suitable soils for burial that mitigate impacts to the surrounding environment to the greatest extent possible. Burial pits have been located in soils that do not flood, and hard bedrock, bedrock crevices, and highly permeable strata were avoided (USDA-NRCS, 2015).

## **Human Health Aspects**

### **Public Health**

Under the Preferred alternative, APHIS surveillance, carcass management, and cleaning and disinfection actions would attempt to ameliorate the impacts created by the presence and reassortment of AI viruses as they occur across the nation. Although confirmed cases of human infection from several subtypes of AI infection have been periodically reported since 1997, the human-to-human transmission is reported very rarely, and has been limited, inefficient, and unsustainable (CDC, 2015b; USDA-APHIS, 2011). Most of these cases resulted from close contact with infected poultry (e.g., domesticated chicken, ducks, and turkeys) or surfaces contaminated with secretions or excretions from infected birds. At this time, no AI viruses identified in the United States have been observed to affect humans (USDA-APHIS, 2015b). In the countries where HPAI viruses have crossed the species barrier to humans, there was close, prolonged contact with infected poultry (Sonnberg et al., 2013). This type of exposure by the

general public is not likely to occur during the current outbreak response if poultry carcasses are properly disposed.

#### Producers and Worker Safety

Individual producers or growers are the so-called “first in line” to potentially contract HPAI because of their close association with their flocks. Direct or indirect exposure to infected live or dead poultry, or a viral contaminated environment, is the primary risk factor for human infection (WHO, 2015). During this HPAI outbreak, people who contact infected birds, or surfaces that are contaminated with secretions or excretions from infected birds, are at higher risk of infection than the general population (CDC, 2015c). These individuals and their contractors also are responsible for disinfecting vehicles, equipment, and materials, and cleaning and disinfecting premises. The risks to these personnel are reduced by following published protocols for worker protection.

The use of water-based foam to depopulate the chickens in Lincoln County has the potential to decrease human exposure to this AI virus; however, workers can be at risk for slipping and falling. The use of water-based foam also has the potential to reduce the number of workers involved in depopulation efforts and is relatively easy to deploy under field conditions (USDA-APHIS, 2015c).

APHIS employees are filling many roles in the response operations including but not limited to: surveillance; overseeing 3-D (depopulation, disposal, and disinfection) activities; and administration. APHIS also is setting up contracts with several entities to participate in the decontamination and disposal of poultry. Prior to any carcass management work, the contracted companies are responsible for briefing their workers on the nature of the disease and training them in specific hygiene requirements. APHIS provides personal protective equipment to its employees, and requires its contractors to follow all appropriate worker protection standards.

Pathogens can inadvertently be carried offsite by workers, visitors, or intruders. Site security systems prevent unauthorized personnel from accessing the area and spreading disease. Decontamination of personnel prevents cross-contamination, and minimizes the risk of transporting disease agents (Baird and Savell, 2004). These practices minimize potential health effects to offsite workers and the general public. Users should carefully follow the disinfection directions on the label to handle and safely use disinfectant products and avoid harm to human health and the environment.

#### Psychological impacts

The sights and odors from a large number of carcasses can be emotionally upsetting to humans because human sympathies and compassion are invoked. Producers associated with this outbreak and their families could suffer psychologically from the loss of animals, disruptions in

community life, and from stress over concern for their financial future. Mental health counseling can help to mitigate psychological health impacts associated with this outbreak.

Depopulation, decontamination, and disposal workers could suffer psychologically from seeing and smelling the carcasses while they work. The use of personal protective equipment such as respirators may minimize the effects. Acute distress is likely to be felt by workers when initially confronted with odors until their olfactory system becomes desensitized during continuous exposure. These impacts are short in duration as the birds are depopulated within 24 hours of identification of the HPAI virus, and burial on the Lincoln County premises occurs rapidly.

### **Wild Birds**

Wild birds are a reservoir<sup>3</sup> for AI, and movement of wild birds carrying HPAI spreads the virus to new areas. APHIS believes the HPAI outbreaks in Lincoln County occurred as a result of wild birds introducing HPAI onto poultry breeder's premises. An epidemiological investigation is underway to understand the origin of the outbreak.

Given the proximity of wild birds to poultry, it is also possible for commercial poultry to infect wild birds. Under the Preferred alternative, Federal and State personnel, farm managers, and contractors would monitor their property daily and conduct wildlife management activities to minimize the exposure of wild populations to infected carcasses.

Surveillance, quarantines, environmental sampling, quarantine release, and restocking poultry houses will have no effect on wildlife populations. APHIS employs several layers of redundant safety measures and carefully monitors all cleanup and disposal activities to ensure that they are done in compliance with USDA protocols (USDA-APHIS, 2015c). Additional discussion about the impacts of depopulation, carcass management, and cleaning and disinfection on migratory birds and associated mitigation measures is located in the Migratory Bird Treaty Act section.

## **C. Other Environmental Issues**

### **Environmental Justice**

Federal agencies identify and address disproportionately high and adverse human health or environmental effects of proposed activities, as described in Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*.

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<sup>3</sup> Any population of free-ranging or free-living species in which an infectious agent/vector has become established, lives and multiplies and is therefore a potential source of infection/infestation to other domestic and free-ranging species.



Potential impacts to low-income or minority communities will depend on the distance between the community and the disposal site. Impacts to a low-income or minority community are highly unlikely if the disposal site is not close to the community. If transportation of carcasses to offsite final disposal locations were to occur, then APHIS would carefully select the time of transport and transportation route to minimize the potential for the public to encounter sights and smells associated with carcass management. To date, there is no use of off-site disposal options.

**Table 2.** Statistics summarized from 2010 Census Bureau data comparing the five county area where the surveillance action is occurring.

| County, State   | 2010 Census Population | Percent non-white <sup>1</sup> | Percent under 18 years of age | Percent living in Poverty <sup>2</sup> |
|---|------------------------|--------------------------------|-------------------------------|--|
| United States   | 308,758,105            | 27.6                           | 24.0                          | 13.5                                   |
| Alabama (AL)  | 4,779,736              | 31.5                           | 23.7                          | 18.5                                   |
| Madison, AL   | 334,811                | 31.8                           | 23.7                          | 13.3                                   |
| Jackson, AL   | 53,227                 | 9.2                            | 22.5                          | 18.4                                   |
| Tennessee (TN)  | 6,346,105              | 22.4                           | 23.6                          | 16.7                                   |
| Franklin, TN  | 41,052                 | 9.2                            | 21.8                          | 15.0                                   |
| Lincoln, TN   | 33,361                 | 10.6                           | 23.3                          | 16.0                                   |
| Moore, TN   | 6,362                  | 4.6                            | 22.2                          | 11.8                                   |
| <sup>1</sup> Individuals self-reporting as any race other than white (Black, African-American, American American and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander). |                        |                                |                               |  |
| <sup>2</sup> Poverty estimates are not comparable to other geographic levels of estimates.  |                        |                                |                               |  |
| Data is from the U.S. Census Bureau, 2017.  |                        |                                |                               |  |

Except for Madison County, the populations in these counties have fewer members of minorities than average in the United States. In general, the populations in these counties also have fewer children. While the percentage of people living in poverty is roughly equivalent across all the counties, Moore and Jackson Counties represent the range (11.8 to 18.4 percent). The U.S. Census Bureau does not report statistics for cities and towns with a population fewer than 5,000 people, so the presence of low-income or minority populations within the surveillance area of the quarantine cannot be confirmed (U.S. Census Bureau, 2017). The available demographic data suggests additional outreach targeting environmental justice communities within each county is not likely to be needed because program actions are not likely to be in areas with substantial minority or low-income populations, or large numbers of children. If there are low-income or minority communities identified within the quarantine zone such that impacts from program actions are reasonably foreseeable, then APHIS would conduct appropriate outreach to the potentially impacted community, and incorporate appropriate mitigations.

## Protection of Children and the Preferred Alternative

Federal agencies comply with Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks*. Neither alternative poses a risk of disproportionately high and adverse effects to children because they are not likely to be exposed to program actions. Using a variety of webpages, APHIS finds there are fewer than ten schools within the surveillance area. APHIS actions would not occur on, in, or near school properties. If transportation of carcasses to offsite final disposal locations were to occur, then children transported to/from school could encounter sights and smells associated with carcass management; however, offsite disposal has not been used to date. In general, APHIS expects there would be a negligible level of exposure of school children to program actions because impacts would occur only when the children walk or travel by a quarantined farm, which is a very short duration of exposure.

APHIS identifies eight active schools within the initial surveillance area in all the counties (combined). In contrast, official County webpages report there are 20 public schools within the three Tennessee counties, and 135 schools in Madison and Jackson Counties in Alabama. The comparatively low number of schools within the initial surveillance area shows the rural nature of the area and the limited number of children who are likely to be exposed to carcass management activities during this outbreak.

Poultry production facilities tend to not be adjacent to farmhouses or in backyard play areas. This means exposure of children to the sights, smells, and emotional impacts associated with control actions is more likely for children residing on a quarantined farm, but it is unlikely that many children would meet this exposure criteria. For poultry production facilities near play areas, APHIS would restrict access to discourage non-biosecure activities. In general, children are more susceptible than adults to air and water pollution because of their smaller body sizes and higher respiratory rates, so they could receive a toxic dose faster than a larger adult. Children's normal behaviors include playing in soil, which may lead to consumption of some soil particles. Contaminants in the soil could be ingested and lead to adverse health effects. By preventing access to carcass management activities, risks to children are reduced.

If children are identified as likely to become impacted due to proximity of a carcass management facility or a selected transportation route, then APHIS will conduct appropriate outreach to the community, and incorporate appropriate mitigation measures under the circumstances.

### **Historic and Cultural Resources**

The National Historic Preservation Act of 1966, as amended (16 U.S. Code § 470 et seq.), requires Federal agencies to consider the impact on properties included in, or eligible for inclusion in, the National Register of Historic Places (36 Code of Federal Regulations §§ 63 and 800). The proposed action does not have the potential to cause long-term visual, atmospheric, or audible elements that would result in effects on the character or use of historic properties based

on the nature and types of activities occurring on private poultry-producing land. APHIS began the process of Section 106 consulting with both Tennessee and Alabama while preparing this EA.

There are no listed historic places within the surveillance area in Moore County, Tennessee or in Jackson County, Alabama. Of the 16 listed historic places in Lincoln County, Tennessee, there are 14 buildings (7 Houses, the "Milk Plant" (museum), 3 Historic Districts, 1 school, and 2 churches) and two other types of structures (remains of a hydroelectric plant and a bridge). The Lincoln County Poor House Farm buildings (Yukon Road in Coldwater, TN) is the only location that appears to be near agricultural areas. In Franklin County, Tennessee, there are five listed historic places within the surveillance area (Falls Mill, Falls Mill Historic District, Hunt-Moore House, the R.N. Mann House, and the Zaugg Bank Barn). There are four listed historic places that appear to be within the surveillance area in Madison County, Alabama (New Market Historic District, New Market Presbyterian Church, New Market United Methodist Church, and Whitman-Cobb House).

For all of these locations, APHIS will not bury animal carcasses or otherwise disturb the ground associated with any listed historic places. To date, burials occurred only on privately-owned land used to raise poultry. In a worst-case situation, APHIS activities could be associated with short-term visual (dust), olfactory (offensive odors), or audible (noise) elements that would impact people in the area of the historic properties depending on the distance between the historic site and the private poultry-producing land. The closer the location to the affected farm, the greater likelihood of negative impacts. These impacts are expected to be short-term in duration, and people can easily avoid them by either going indoors or leaving the area. Intermittent and ephemeral dust, bad smells, and noise from the burial activities will not alter or change the character or use of historic properties. These impacts will cease when the emergency action ends.

APHIS' HPAI eradication measures will not include aerial applications of chemicals, and depopulation activities will remain contained within production facilities. Aside from the quarantined facilities, APHIS program activities do not affect human-made structures, and APHIS restricts access to program treatments and activities to an as-needed basis. Burial is the only proposed disposal method that would disrupt soil; if land near any listed historic place is likely to be affected, the property owners would be contacted on the best way to appropriately dispose of depopulated animals. However, APHIS in collaboration with USDA-NRCS and State agencies is highly unlikely to select sites for burial pits within the viewshed of a historic site such that carcasses (emerging from the burial pits due to expansion from methane generation) become visible. If APHIS discovers any archaeological resources during composting or burial activities, APHIS will notify the appropriate individuals.

### Tribal Consultation

Executive Order 13175, *Consultation and Coordination with Indian Tribal Governments*, calls for agency communication and collaboration with tribal officials when proposed Federal actions have the potential for Tribal implications. There are not any federally recognized Tribes in the vicinity of this outbreak. Ceded tribal lands from Cherokee Nation, Eastern Band of Cherokee Indians, and United Keetoowah Band of Cherokee Indians are, however, located in the outbreak and surveillance area. The Archaeological Resources Protection Act of 1979 (16 U.S.C. §§ 470aa-mm) secures the protection of archaeological resources and sites on public and tribal lands. If APHIS disturbs any Native American sites or artifacts are unearthed during burial activities, the appropriate individuals will be notified.

### Threatened and Endangered Species and the Preferred Alternative

Section 7 of the Endangered Species Act (ESA) and ESA's implementing regulations require Federal agencies to consult with the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service to ensure that their actions are not likely to jeopardize the continued existence of threatened or endangered species, or result in the destruction or adverse modification of critical habitat.

In Lincoln County, Tennessee, there are 18 federally listed species, including bats, fish, and freshwater mussels (FWS, 2017a). See table 3 for the complete list.

**Table 3.** Federally listed species in Lincoln County, Tennessee (FWS, 2017a).

| Scientific name                  | Common name                         | Status  | Critical habitat in Lincoln County? Yes or No |
|----------------------------------|-------------------------------------|---|---|
| <b>MAMMALS</b>                   |                                     |   |   |
| Indiana bat                      | <i>Myotis sodalis</i>               | Endangered  | No  |
| Gray bat                         | <i>Myotis grisescens</i>            | Endangered  | No  |
| Northern long-eared bat          | <i>Myotis septentrionalis</i>       | Threatened  | No  |
| <b>FISH</b>                      |                                     |   |   |
| Boulder darter                   | <i>Etheostoma wapiti</i>            | Endangered, and Non-Essential Experimental Population | No  |
| Slackwater darter                | <i>Etheostoma boschungii</i>        | Threatened  | No  |
| <b>MUSSELS</b>                   |                                     |   |   |
| Tubercled blossom (pearlymussel) | <i>Epioblasma torulosa torulosa</i> | Endangered  | No  |
| Turgid blossom (pearlymussel)    | <i>Epioblasma turgidula</i>         | Endangered  | No  |
| Cumberland monkeyface            | <i>Quadrula intermedia</i>          | Endangered  | No  |

| Scientific name         | Common name                           | Status     | Critical habitat in Lincoln County? Yes or No |
|-------------------------|---------------------------------------|------------|---|
| (pearlymussel)          |                                       |            |   |
| Birdwing pearlymussel   | <i>Lemiox rimosus</i>                 | Endangered | No  |
| Dromedary pearlymussel  | <i>Dromus dromas</i>                  | Endangered | No  |
| Finerayed pigtoe        | <i>Fusconaia cuneolus</i>             | Endangered | No  |
| Shiny pigtoe            | <i>Fusconaia cor</i>                  | Endangered | No  |
| Cumberlandian combshell | <i>Epioblasma brevidens</i>           | Endangered | No  |
| Cracking pearlymussel   | <i>Hemistena lata</i>                 | Endangered | No  |
| Slabside pearlymussel   | <i>Pleuroaia dolabelloides</i>        | Endangered | Yes   |
| Snuffbox mussel         | <i>Epioblasma triquetra</i>           | Endangered | No  |
| Rabbitsfoot             | <i>Quadrula cylindrica cylindrica</i> | Threatened | No  |
| Fluted kidneyshell      | <i>Ptychobranchus subtentum</i>       | Endangered | Yes   |

### Potential Impacts on Federally Listed Species

Runoff of the foam used for depopulation or the fluids from carcass decomposition into waters inhabited by listed freshwater mussels and fish could have adverse effects on them. A frequent cause of extirpation of freshwater mussels is water quality degradation (Downing et al., 2010). Pollutants such as fertilizers, herbicides, pesticides, animal wastes, septic tank and gray water leakage, and petroleum products, alter the chemistry of affected streams such that the habitat and food sources for the boulder darter are negatively impacted (FWS, 2009).

Soil erosion from the burial of carcasses could also adversely affect mussels and fish, including both listed fish and glochidial host fish. Excessive amounts of sediments, especially fine particles, that wash into streams can potentially affect mussels by reducing interstitial flow rates, clogging the gills of mussels, interfering with filter feeding, or reducing the light available for photosynthesis and the production of food items (Brim Box and Mossa, 1999). Sedimentation is believed to have been the main cause for the decline of slackwater darter populations (FWS, 2008). Siltation is a threat to the boulder darter (FWS, 2009).

Activities associated with surveillance of backyard and commercial poultry facilities or permitting of movement of eggs or feed would have no effect on listed species or habitat in the 10 mile radius surveillance area. In addition, listed bats and their habitats would not be exposed to depopulation and burial activities; thus, there would be no effect on these species.

### Adverse Modification of Critical Habitat

Critical habitat is the specific areas within the geographic area, occupied by the species at the time it was listed, that contain the physical or biological features that are essential to the conservation of endangered and threatened species and that may need special management or protection (FWS, 2016). It may also include areas that were not occupied by the species at the time of listing but are essential to its conservation (FWS, 2016). Physical or biological features of critical habitat are defined as “the features that support the life history needs of the species, including but not limited to water characteristics, soil type, geological features, sites, prey, vegetation, symbiotic species, or other features. A feature may be a single habitat characteristic, or a more complex combination of habitat characteristics. Features may include habitat characteristics that support ephemeral or dynamic habitat conditions. Features may also be expressed in terms relating to principles of conservation biology, such as patch size, distribution distances, and connectivity” (FWS and NMFS, 2016).

Placement of a carcass disposal site could adversely modify designated critical habitat of a listed species if it adversely affects the physical or biological features of that habitat. Two listed species have critical habitat within Lincoln County (see table 3). The disturbance and habitat alteration from burial site digging, and runoff of soil or decomposition fluids into surface water could cause adverse effects to critical habitat.

### **Protection of Federally Listed Species and Critical Habitat**

The foam used for depopulation of the chickens, when properly administered, will not enter into aquatic areas where listed fish or mussels occur. The foam is applied inside the barn, where it forms a 3-foot high mat of tiny bubbles. Over several hours, the foam dissipates, leaving moisture but not free liquids. The moisture evaporates, and does not run into waterways.

NRCS and State agencies are responsible for selecting the burial sites in Lincoln County. In general, they adhere to the following (from USDA-NRCS, 2015):

- Locating the burial pits down-gradient from springs or wells where possible or take steps necessary to prevent groundwater contamination.
- Locating onsite mortality management operations above the 100-year floodplain elevation unless site restrictions require location within the floodplain and the management operations located within the floodplain are portable and can be quickly relocated if it becomes necessary.
- Locating sites with restricted percolation and a minimum of 2 feet between the bottom of the facility and the seasonal high water table unless special design features are incorporated that address seepage.
- Removing or rendering inoperable all field drainage tile (subsurface drains) within the operational area of the burial pit/trench.
- Rapidly revegetating all areas disturbed by mortality management activities.

The disposal site will not be placed in or near the critical habitat of listed freshwater mussels. The critical habitat for the fluted kidneyshell and the slabside pearlymussel is in the Elk River, 5 to 6 miles north of the disposal sites in Lincoln County.

Therefore, APHIS has determined that the proposed HPAI depopulation and carcass disposal will have no effect on federally listed species or designated critical habitats in Lincoln County, TN, included in table 3.

### **Migratory Bird Treaty Act**

The Migratory Bird Treaty Act of 1918 (MBTA), as amended (16 U.S.C. 703–712) established a Federal prohibition, unless permitted by regulations, to pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird or any part, nest, or egg of any such bird.” FWS released a final rule on November 1, 2013, identifying 1,026 birds on the List of Migratory Birds (FWS, 2013). Species not protected by the MBTA include nonnative species introduced to the United States or its territories by humans and native species that are not mentioned by the Canadian, Mexican, or Russian Conventions that were implemented to protect migratory birds (FWS, 2013).

Executive Order 13186, “*Responsibilities of Federal Agencies to Protect Migratory Birds*,” issued on January 10, 2001, directs Federal agencies taking actions with a measurable negative effect on migratory bird populations to develop and implement a memorandum of understanding (MOU) with FWS that promotes the conservation of migratory bird populations. On August 2, 2012, an MOU between FWS and APHIS was signed to facilitate the implementation of this EO. The MOU provides APHIS with guidance to avoid and minimize, to the extent practicable, detrimental migratory bird habitat alteration or unintentional take during animal management activities.

There are 18 species of migratory birds of conservation concern that occur in Lincoln County, Tennessee (FWS, 2017b). These are listed in table 4. Birds of conservation concern are bird species, subspecies, and populations of migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act.

**Table 4.** Migratory birds of conservation concern that occur in Lincoln County, Tennessee (FWS, 2017b).

| <b>Common name</b>  | <b>Scientific name</b>           | <b>Season in Lincoln County</b> |
|---------------------|----------------------------------|---------------------------------|
| Black-billed cuckoo | <i>Coccyzus erythrophthalmus</i> | Breeding                        |
| Blue-winged warbler | <i>Vermivora pinus</i>           | Breeding                        |
| Cerulean warbler    | <i>Dendroica cerulea</i>         | Breeding                        |

| Common name           | Scientific name                   | Season in Lincoln County |
|-----------------------|-----------------------------------|--------------------------|
| Chuck-will's-widow    | <i>Caprimulgus carolinensis</i>   | Breeding                 |
| Dickcissel            | <i>Spiza americana</i>            | Breeding                 |
| Fox sparrow           | <i>Passerella iliaca</i>          | Wintering                |
| Kentucky warbler      | <i>Oporornis formosus</i>         | Breeding                 |
| Least bittern         | <i>Ixobrychus exilis</i>          | Breeding                 |
| Loggerhead shrike     | <i>Lanius ludovicianus</i>        | Year-round               |
| Louisiana waterthrush | <i>Parkesia motacilla</i>         | Breeding                 |
| Prairie warbler       | <i>Dendroica discolor</i>         | Breeding                 |
| Prothonotary warbler  | <i>Protonotaria citrea</i>        | Breeding                 |
| Red-headed woodpecker | <i>Melanerpes erythrocephalus</i> | Year-round               |
| Rusty blackbird       | <i>Euphagus carolinus</i>         | Wintering                |
| Sedge wren            | <i>Cistothorus platensis</i>      | Migrating                |
| Short-eared owl       | <i>Asio flammeus</i>              | Wintering                |
| Wood thrush           | <i>Hylocichla mustelina</i>       | Breeding                 |
| Worm eating warbler   | <i>Helmitheros vermivorum</i>     | Breeding                 |

General migratory bird stressors include artificial light, noise, chemical contamination, human disturbance, structural addition to the landscape, and vegetation manipulation or removal. Some of these stressors can be avoided during carcass management activities by minimizing the time in an area, carefully considering placement of the burial site, and following Best Management Practices for carcass burial. APHIS will provide funding for euthanasia and disposal of carcasses and will emphasize the need for rapid response to this outbreak. This rapid response will minimize disturbance of migratory birds and eliminate their exposure to diseased carcasses. In addition, little to no vegetation that might be used by migratory birds would be removed in the creation of the burial pit because it is sited in a farm field.

### **Bald and Golden Eagle Protection Act**

The Bald and Golden Eagle Protection Act of 1940, as amended (16 U.S.C. §§ 668–668d) prohibits anyone, without a permit issued by the Secretary of the Interior, from taking bald eagles, including their parts, nests, or eggs. The Act provides criminal penalties for persons who “take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle...[or any golden eagle], alive or dead, or any part, nest, or egg thereof.” The Act defines “take” as “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb.”

Bald eagles are year round residents of Lincoln County (FWS, 2017b). Activities in nesting areas of eagles during the breeding season can affect the nesting success and could cause the eagles to abandon their nest. Disturbance of eagle roosting and foraging areas can also negatively affect bald eagles. However, disturbance of eagle nesting, roosting, and foraging sites is unlikely because the areas around commercial poultry facilities are busy areas and eagles that might be in the area would be accustomed to trucks and other equipment. According to the Bald



Eagle Management Guidelines (FWS, 2007), “[e]agles are unlikely to be disturbed by routine use of roads, homes, and other facilities where such use pre-dates the eagles’ successful nesting activity in a given area. Therefore, in most cases ongoing existing uses may proceed with the same intensity with little risk of disturbing bald eagles.”

Poisoning from lead shot or sodium pentobarbital or other barbiturates used for euthanasia can cause poisoning of bald eagles from feeding on carcasses. However, these methods of depopulation will not be used to control this outbreak. In addition, carcasses will be buried as quickly as possible to minimize exposure to foraging eagles.

### **Cumulative Effects**

The potential impacts to HPAI control in commercial poultry production in combination with similar actions are referred to as cumulative impacts. The level of these cumulative impacts to soil, water, and air depend upon the routine activities occurring at each facility, the magnitude of the outbreaks at the poultry production facilities, and the disposal methods selected.

Soil, air, and water quality may be impacted by the leachate or air particulates from managing routine disposal of carcasses onsite. Poultry carcasses may be buried or composted on a farm, and poultry producers may use small-capacity onsite incinerators for their routine mortalities (Blake et al, 2008). Other routine activities that may impact soil, air, and water quality include year-round application of excess manure containing nutrients and chemicals on farmland (Halden and Schwab, 2008; Hribar, 2007).

In addition to routine activities on a farm, USDA, other Federal agencies, or State and local government agencies may have conducted, or may conduct in the future, programs or actions at poultry production facilities that could, combined with HPAI adaptive management activities, significantly impact the environment. To minimize impacts to the environment, APHIS, NRCS, and State agencies took into consideration other actions that have taken place or will take place on the site prior to selecting the disposal method of burial.

To date, two HPAI-confirmed premises in Lincoln County have had their commercial breeder flocks depopulated. APHIS is encouraging the use of proper mitigations to ensure minimal cumulative impacts to human and wildlife health. Routine cleaning and disinfection already occurred on a daily basis inside the poultry houses in Lincoln County; however, the specific disinfectants used and the amount of each disinfectant used to control the outbreak is different. Disinfectants are carefully selected and applied following label instructions to minimize environmental impacts.

HPAI adaptive management measures employed on premises within Lincoln County are individually insignificant but could be associated with cumulatively significant impacts if the farm has multiple outbreaks of HPAI or if numerous farms in the surrounding area have outbreaks. To preserve environmental quality for the human population and ecological resources, potentially negative cumulative impacts will be minimized by following best management practices, including enhanced implementation of biosecurity measures to prevent pathogen spread. As a result, the proposed action is less likely to result in long-term or adverse cumulative impacts to the quality of the environment.

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## **VI. Listing of Agencies Consulted**

Tennessee Department of Environment and Conservation  
Emergency Services  
William R. Snodgrass Tennessee Tower  
312 Rosa L. Parks Avenue  
Nashville, TN 37243

Tennessee Department of Agriculture  
Land and Water Stewardship  
440 Hogan Road  
Nashville, TN 37220

U.S. Department of Agriculture  
Animal and Plant Health Inspection Service  
Policy and Program Development  
Environmental and Risk Analysis Services  
4700 River Road, Unit 149  
Riverdale, MD 20737-1237

U.S. Department of Agriculture  
Animal and Plant Health Inspection Service  
Veterinary Services  
Science, Technology and Analysis Services  
4700 River Road, Unit 41  
Riverdale, MD 20737-1237