Animal and Plant Health Inspection Service
U.S. DEPARTMENT OF AGRICULTURE

Response Activities for African Swine Fever Outbreaks in Domestic Swine in the United States and U.S. Territories

Final Programmatic Environmental Assessment

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List of Abbreviations and Terms

AHPA	Animal Health Protection Act
APHIS	Animal and Plant Health Inspection Service (USDA)
ASF	African swine fever
AVMA	American Veterinary Medical Association
CDC	Centers for Disease Control and Prevention
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
DNA	deoxyribonucleic acid
EA	environmental assessment
e.g.	for example
EIS	environmental impact statement
EO	Executive Order
ERAS	USDA APHIS Policy and Program Development, Environmental and Risk Analysis Services
et seq.	"et sequentes" or "et sequential" Latin meaning "and the following"
FAD	foreign animal disease
FIFRA	Federal Insecticide, Fungicide and Rodenticide Act
hr	hour
ICG	Incident Coordination Group
i.e.	that is
IMT	Incident Management Team
km	kilometer
lbs	pounds
lbs/hr	pounds per hour
MOU	memorandum of understanding
n.d.	undated
NAAQS	National Ambient Air Quality Standards
NCAC	North Carolina Administrative Code
NEPA	National Environmental Policy Act of 1969, as amended
NHPA	National Historic Preservation Act
NVS	National Veterinary Stockpile
NVSL	National Veterinary Services Laboratories
ONTL	USDA APHIS Office of National Tribal Liaison
OTR	USDA Office of Tribal Relations
PEA	programmatic EA
PFAS	perfluoroalkyl and polyfluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfate
PPE	personal protective equipment
RCRA	Resource Conservation and Recovery Act
SO_2	sulfur dioxide
spp.	species (plural)
SHPA	Swine Health Protection Act
U.S.	United States
U.S.C.	United States Code

USCB	United States Census Bureau
USDA	United States Department of Agriculture
USDI	United States Department of Interior
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service (USDI)
U.S. SHIP	United States Swine Health Improvement Plan
VS	USDA APHIS Veterinary Services
VSD	ventilation shutdown
VSD+	ventilation shutdown plus
WOAH	World Organization of Animal Health
WS	USDA APHIS Wildlife Services
°C	degrees Celsius
°F	degrees Fahrenheit

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1 Introduction

1.1 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 eliminating animal diseases, and (2) monitoring and promoting animal health and productivity. The authority for the mission of USDA APHIS VS is found in the Animal Health Protection Act (AHPA) (7 United States Code (U.S.C.) 8301 et seq.).

African swine fever (ASF) is a complex viral disease that has infected domesticated and wild swine herds around the world since it was first described in 1921 in Kenya. Susceptible species include all members of the swine family (Suidae): domesticated swine, European wild boar, warthogs, bush pigs, and giant forest hogs. Peccaries (also known as javelinas or skunk pigs), which are found in southwestern North America, are not in the Suidae family and are believed to be resistant to infection with ASF virus (USDA APHIS, 2023a).

Acute ASF causes hemorrhagic symptoms, but chronic and asymptomatic forms of the disease may not show these symptoms. ASF progresses with different clinical signs depending on isolate virulence, host, dose, and route of exposure. The hyperacute form can cause 100 percent mortality four to seven days post-infection with typical hemorrhagic symptoms. An asymptomatic and chronic form that can turn animals into carriers is less common but plays an important role in the persistence and dissemination of the disease in endemic areas, especially if infected ticks are present (Sanchez-Vizcaino et al., 2012). Currently, there is no effective and safe vaccine or treatment available for the ASF virus.

The ASF virus has several properties that make it difficult to control and eradicate. The virus is a very complex and large enveloped deoxyribonucleic acid (DNA) virus (Galindo and Alonso, 2017). The ASF virus presents high genetic and antigenic variability, with 24 different genotypes, most of which currently circulate in the sub-Saharan African continent (Njau et al., 2021). There are significant variations in virulence across genotypes (USDA APHIS, 2023a). The virus that causes ASF is very stable in the environment. The virus can withstand low temperatures, fluctuations in pH, and remain for weeks to months in infected material and raw meat (USDA APHIS, 2023a). Blome et al. reported instances of the ASF virus surviving up to 15 weeks in refrigerated meat, up to six months in preserved ham, and 399 in Parma ham (Blome et al., 2020). The ASF virus can persist for more than five years in infected soft ticks of the genus *Ornithodoros* that can serve as vectors and natural reservoirs for the disease (Kleiboeker et al., 1999).

The first description of the disease occurred in Kenya in 1921, with many sub-Saharan African countries subsequently affected by ASF. Since 1957, when the first outbreak outside the African continent occurred in Portugal, ASF has infected swine in Asia, Europe, Oceania, and the Americas. In 2021, ASF outbreaks occurred in the Dominican Republic and Haiti. ASF is currently widespread and endemic in sub-Saharan Africa and parts of West Africa (eFeedLink, 2023; USDA APHIS, 2023a). According to the World Organisation for Animal Health (WOAH),

from January 1, 2022, through February 28, 2026, there have been 13,879 outbreaks of ASF in domestic pigs and 30,430 outbreaks in wild or feral swine in 74 countries and territories, with 1,152,369 cases in swine and 48,613 cases in wild or feral swine, resulting in 2,571,160 domestic swine losses in domestic[1] (WOAH, 2026).

The most common modes of transmission of the ASF virus in domestic swine are direct, indirect, and vector-borne. Direct transmission occurs when healthy swine come into direct contact with infected domestic or feral swine or come in contact with their bodily fluids, such as saliva, urine, feces, semen, or aerosolized respiratory secretions. Indirect transmission can occur through the ingestion of virus-contaminated pork or feed or from contaminated fomites[2]. The virus can be carried on clothing, shoes, equipment, vehicles, or food waste (USDA APHIS, 2023a). Soft ticks (*Ornithodoros* spp.) can potentially serve as a vector for transmission, passing the virus to swine hosts when taking their blood meal. Three *Ornithodoros* and one *Alectorobius* species that are endemic in the United States and U.S. territories (*O. coriaceus*, *O. parkeri*, *O. turicata*, and *A. puertoricensis* (previously *O. puertoricensis*)) have experimentally been shown to be capable of being infected with the ASF virus and transmitting the virus to swine (Hess et al., 1987; USDA APHIS, 2023a).

The ASF virus has been introduced and transmitted by the illegal movement of infected swine and contaminated products (and their contact with naïve swine). In addition, wild boar populations have been implicated in sustained transmission of ASF virus, particularly in parts of the European Union (Beltrán-Alcrudo, 2017). The increased rate and distances of global trade in animals has resulted in a greater risk of the disease spreading worldwide (Sanchez-Vizcaino et al., 2012). The viable longevity of ASF virus in the environment and meat products, the prevalence of asymptomatic carrier animals, and the lack of an effective and economical vaccine has caused the greater viral load in endemic areas, as well as facilitated the spread of ASF worldwide (Sanchez-Vizcaino et al., 2012).

ASF is a critical threat to the United States, particularly given confirmed detections in the Dominican Republic and Haiti in 2021 (USDA APHIS, 2021d; 2021e). After ASF was detected in the Dominican Republic, USDA APHIS increased surveillance and safeguards in the nearby U.S. territories, Puerto Rico and the U.S. Virgin Islands. USDA APHIS created a Foreign Animal Disease protection zone for ASF, as defined by WOAH, in Puerto Rico and the U.S. Virgin Islands on September 17, 2021. This allows USDA APHIS to intensify surveillance efforts and enforce stricter movement controls in those locations to keep the disease out of the United States. Additionally, trading partners who recognize the protection zone, would continue to trade with the U.S. mainland even in the event of an ASF introduction into Puerto Rico or the U.S. Virgin Islands, protecting international trade markets. USDA APHIS also issued a Federal Order suspending the interstate movement of all live swine, swine germplasm, swine products, and

[1] Per WOAH, losses are defined as the number of swine deaths from ASF plus animals killed and disposed of. The reported number represent the losses in the establishments affected by the outbreaks but does not include animals culled in areas around the outbreak in order to control the disease (WOAH 2026).

[2] Fomites are inanimate objects or materials that may be contaminated with or exposed to the ASF virus and can transfer the virus to a new host.

swine byproducts from Puerto Rico and the U.S. Virgin Islands to the mainland United States. USDA APHIS took these actions out of an abundance of caution to further safeguard the U.S. swine herd and protect the interests and livelihoods of U.S. pork producers (USDA APHIS, 2021d). On December 2, 2021, USDA APHIS revised the Federal Order to allow the interstate movement of processed pork products and byproducts from Puerto Rico and the U.S. Virgin Islands under certain conditions (USDA APHIS, 2021c). As of November 2024, ASF is considered to be endemic in the Dominican Republic with more than 390 outbreaks of the virus in 2025 (SHIC, 2025). ASF continues to be present in Haiti, and the political and economic instability has prevented the implementation of formalized control efforts in this country.

The eradication of ASF in wild boar from Portugal and Spain in the mid-1990s proved elimination of the disease without vaccination and when both domestic and wild population are affected is possible, but difficult. The lack of a commercially available, effective vaccine approved for emergency use in the United States makes prevention of disease entry of utmost importance, and thorough preparation for an emergency response vital (USDA APHIS, 2023a). USDA APHIS is working closely with other Federal and State agencies, the swine industry, producers, and international partners to prepare for and prevent an occurrence of ASF in North America (USDA APHIS, 2023a). USDA APHIS implements proactive mitigations and prevention efforts to reduce the risk of ASF outbreaks prior to entry of animals or animal products into the United States.

In the event of an ASF outbreak[3], USDA APHIS VS goals are to:

1) Detect, control and contain ASF in swine as quickly as possible;
2) Eradicate ASF using strategies that seek to stabilize animal agriculture, the food supply, the economy, and to protect public health and the environment; and
3) Provide science- and risk-based approaches and systems to facilitate continuity of business for non-infected animals and non-contaminated animal products.

Achieving these three goals will allow individual livestock facilities, States, Tribes, regions, and industries to resume normal production as quickly as possible. They will also allow the United States to regain ASF-free status without the response effort causing more disruption and damage than the outbreak itself (USDA APHIS, 2023a).

1.2 Purpose and Need

The establishment of ASF in the United States is of great concern to USDA APHIS. ASF does not affect human health and cannot be transmitted from swine to humans. However, the disease can cause economic devastation to the swine industry and great socioeconomic impacts to consumers in affected countries. ASF is a critical threat to United States swine due to the continued global spread, millions of susceptible swine in the United States, including feral swine, and the potential for severe economic impacts.

[3] USDA APHIS defines an outbreak as the occurrence of cases of a disease that are in excess of what is normally expected in a given population (USDA APHIS, 2023a).

According to WOAH, pork meat accounts for 31 percent of the global protein intake (WOAH, 2025). Since 2000, the United States has been annually among the world's top five annual pork exporters. From 2010 through 2022, U.S. exports of fresh and frozen pork cuts averaged more than 5.6 billion pounds. In the last 5 years, the United States ranked second in the top five pork exporting countries with exports averaging over 20 percent of commercial pork production (USDA ERS, 2024). An ASF outbreak of any size, including a single detection, could immediately disrupt international exports of pork, pork products, and byproducts of swine.[4] In a large outbreak, international trade and interstate commerce could be disrupted for an extended period. Food supply chains could be interrupted causing increased prices to consumers. The potential costs associated with controlling an outbreak, including indemnity payments, depopulation, disposal, and cleaning/disinfection, could be high. Indirect costs and impacts associated with an ASF outbreak may include unemployment and financial losses or disruptions in related industries (e.g., grain, other feed products, tourism, etc.) (USDA APHIS, 2023e).

With a potential 100 percent mortality rate and currently no commercially available, effective vaccine or treatment for swine, ASF poses a serious threat to commercial producers. The only way to stop further transmission of ASF is to depopulate all affected and exposed swine (USDA APHIS, 2022a). Although ASF has never been detected in the United States, international travel and trade pose a substantial risk for viral incursion into the country. Illegal entry of swine products and byproducts presents the largest potential pathway for entry of the ASF virus into the United States (USDA APHIS, 2023a).

Upon strong suspicion of ASF (i.e., displaying clinical signs or a presumptive positive test detection) on a premises, a temporary hold order, a quarantine and/or some type of stop movement will be immediately issued on a premises by a State or Tribal Authority. Confirmation of ASF by the National Veterinary Services Laboratories (NVSL) is not necessary for States, or Tribes, to implement quarantines and/or movement controls on individual premises during an investigation. Once ASF virus confirmation is made in domestic swine located on the mainland contiguous United States by the NVSL Foreign Animal Disease Diagnostic Laboratory, the Secretary of Agriculture will issue a National Movement Standstill of at least 72 hours. During a standstill, all interstate and intrastate movement of live swine, dead domestic swine, and feral swine is prohibited (USDA APHIS, 2023c). USDA's legal authorities related to ASF disease mitigation operations are further discussed in Section 1.3, Statutory and Regulatory Considerations.

When a foreign animal disease (FAD)[5], such as ASF, is detected, while USDA APHIS VS is the lead USDA APHIS program heading the federal response, incident response begins at the local

[4] ASF is considered a listed disease by the World Organization of Animal Health (WOAH). Member Countries must report to WOAH all outbreaks of notifiable terrestrial animal diseases, including ASF. This information then becomes immediately available to the world so that countries can take any necessary preventive action, such as trade restrictions. More information is available at the USDA APHIS website: USDA APHIS | WOAH and International Standards.

[5] A FAD is a transboundary animal disease not known to exist in the U.S. animal population (USDA APHIS, 2023a). An FAD may be a World Organization for Animal Health (WOAH) listed terrestrial and aquatic animal disease;

level. Once assistance is requested from States, Territories or Tribes, USDA APHIS VS, as the lead Agency program for an ASF response in domestic swine, would establish an Incident Coordination Group (ICG) led by an Incident Coordinator. USDA APHIS VS would deploy National Incident Management Team(s) (IMT), and coordinate the incident response, including managing public messages and taking measures to control and eradicate ASF. Other USDA APHIS programs, for example, Legislative and Public Affairs and Wildlife Services (WS), may directly provide assistance with outbreak response activities based on their expertise or have employees assisting on USDA APHIS VS response teams.

USDA APHIS VS and other supporting USDA APHIS programs would closely coordinate its ASF response activities with State and territory authorities, Tribes, local governments, and impacted swine producers or owners. The extent of USDA APHIS VS's role depends on coordination with and the need for assistance of those entities and individuals in responding to an outbreak in any given location. USDA APHIS VS ASF outbreak response actions may include any combination of activities to control the spread of ASF, including implementing depopulation of swine and disposal of carcasses, which can range from loaning equipment to assisting directly in those actions, assisting in sanitizing affected premises, and providing support with monitoring and guidance as to the appropriate time to release a premises from quarantine.

In the event of a confirmation of the ASF virus in domestic swine, a full epidemiological assessment must be completed in order to determine the extent of the outbreak, which includes the identification and prioritization of epidemiologically-linked Contact Premises[6], conduct of surveillance within established control areas and surveillance zones, and investigation of the possibility of contact with feral swine, especially those determined to be sick or dead. Measures must be taken to keep feral swine separate from domestic swine, as they are potential reservoirs of the ASF virus. As a result, feral swine found near ASF-infected domestic swine may be depopulated in order to increase the separation between feral and domestic swine (USDA APHIS, 2023a). Should feral swine be affected by the control and eradication measures proposed by the Secretary of Agriculture for an ASF outbreak in commercial or backyard swine, the Secretary will consult with the State agency(ies) having authority for management of feral swine (USDA APHIS, 2023a). USDA APHIS VS may utilize personnel from the APHIS Wildlife Services (WS)[7] program to assist with ASF control and eradication in domestic swine, as well as to perform targeted surveillance, control, and depopulation or population reduction of feral swine found within a Control Area or Surveillance Zone[8] and thereby posing a potential risk to commercial and backyard swine.

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additionally, at any time, the Secretary of Agriculture, or designee, may designate a disease or pest as an FAD. A FAD or emerging animal disease may involve livestock, poultry, other animals, and/or wildlife.

[6] Contact Premises are premises with swine that have been epidemiologically-linked to an infected premises through exposure to animals, animal products, fomites, or people (USDA APHIS, 2023a).

[7] USDA APHIS WS is a cooperatively funded, service-oriented program that receives requests for assistance with wildlife damage management from private and public entities, including Tribes and other governmental agencies.

[8] For purposes of this EA, a Control Area is an area with a 5-kilometer (km) (3.1-mile) radius that immediately surrounds a commercial or backyard premises with a confirmed positive ASF detection. The Control Zone includes a

If a detection or outbreak of ASF occurs in feral swine, Federal, State, and Tribal agencies that have primary jurisdiction over wildlife may choose to directly request assistance with direct control and surveillance of feral swine from USDA APHIS WS. With USDA APHIS involvement, a unified State-Federal Incident Command organizational structure and IMT(s) would include personnel from both USDA APHIS VS and WS at national and local levels and the State Animal Health Official of the affected State/Territory (USDA APHIS, 2023b). USDA APHIS WS will lead field response activities and use its personnel for those activities requiring technical expertise with feral swine (USDA APHIS, 2023b). USDA APHIS WS will coordinate with local feral swine authorities and experts to obtain information about the area and determine what and how to implement response measures.

The potential actions associated with a USDA APHIS response to the detection(s) of ASF in feral swine not in the vicinity of domestic swine are outside the scope of this programmatic EA (PEA), although the approaches, resources, and tools used would be similar to those discussed in this PEA. In all scenarios involving feral swine during an ASF outbreak, feral swine population control and reduction activities would be based on the specific outbreak situation, including location, environment, resource availability, and disease transmission risks. USDA APHIS WS evaluated the potential environmental effects associated with lethal and nonlethal methods of feral swine damage management, as well as carcass disposal, in their environmental impact statement *Feral Swine Damage Management: A National Approach* (USDA APHIS, 2015b); that information is being incorporated herein by reference.

In the event of an ASF outbreak in either domestic or feral swine USDA APHIS would follow the strategic guidance detailed in the ASF Response Plan (USDA APHIS, 2023a), additional USDA APHIS Foreign Animal Disease Framework documents/materials, and other policy guidance posted on the ASF FAD Preparedness and Response website (found at: https://www.aphis.usda.gov/animal-emergencies/asf).

The National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. Section 4321 et seq. (42 U.S.C. 4321 et seq.)), requires that Federal agencies assess and consider impacts on the human and natural environment of their actions. When an action does not have a reasonably foreseeable significant effect on the quality of the human environment, or if the significance of such effect is unknown, Federal agencies are required to prepare an environmental assessment (EA). If, based on the finding of the environmental review, the agency determines not to prepare an environmental impact statement (EIS) because the proposed action will not have significant effects on the human or natural environment, the agency can conclude the NEPA process with a finding of no significant impact (FONSI) (42 U.S.C. 4336(b)(2)).

Consistent with NEPA and the USDA NEPA regulations (7 Code of Federal Regulations (CFR) 1b), USDA APHIS VS has prepared this PEA to analyze the potential environmental impacts associated with actions that may be taken during an ASF outbreak in U.S. domestic swine. Because ASF outbreaks can potentially result in the large-scale depopulation of swine and the

3-km (1.9-mile) Infected Zone that immediately surround an Infected Premises or infected swine and a 2-km (1.2-mile) Buffer Zone that surrounds an Infected Zone or a Contact Premises.

disposal of carcasses and ASF virus-contaminated materials, it is imperative to determine if USDA APHIS VS actions to address an ASF outbreak in domestic swine could have a significant impact on the quality of the human environment. Per 7 CFR 1b.1(f)(3), when considering whether the reasonably foreseeable impacts of an action are significant, USDA subcomponents, in this case, USDA APHIS, will consider and analyze the potentially affected environment and degree of the effects of the action. In providing rationale for whether the degree of effect is significant, responsible officials shall consider:

- How the unavoidable short- and long-term adverse impacts of implementing the action compares to the short- and long-term adverse or beneficial consequences of not implementing the action; and
- How the irreversible or irretrievable commitment of a resource, as part of the action, contributes to a loss of long-term productivity for the human environment.

The findings of this PEA will be used to support ASF planning and decision-making and enhance the decisionmakers' ability to protect the environment and human health. This PEA also informs the public about the potential environmental effects of ASF outbreak response activities.

The geographic scope for this PEA includes all U.S. states and territories as an ASF outbreak could occur in any of these places. While this may seem like a broad geographic scope, individual ASF outbreak locations would likely be localized, involving a limited number of premises, a county, or perhaps a few counties in states or territories at a time. USDA APHIS VS would need to quickly act to assist in ASF emergency response activities anywhere an outbreak may occur.

1.3 Statutory and Regulatory Considerations

Based on the described authorities, below, USDA APHIS VS, in coordination with State, Territorial, and local authorities, Tribes, and the swine owners or producers, will carry out disease mitigation operations to eradicate any outbreaks of ASF that may occur and to prevent the establishment of ASF in U.S. swine populations. In general, the United States, as well as other countries, strive to prevent the introduction and establishment of ASF to protect the health of their swine populations and enhance their ability to export swine and pork products. USDA APHIS personnel abide by all applicable federal laws and associated state and local laws.

USDA APHIS VS safeguards American agriculture and ecosystems against the introduction of diseases into U.S. animal populations. The AHPA, 7 U.S.C. Section (§) 8301-8322, authorizes the Secretary of Agriculture (Secretary) to "carry out operations and measures to detect, control, or eradicate any pest or disease of livestock." 7 U.S.C. § 8308(a). ASF is one such disease of livestock, specifically swine. To carry out these disease mitigation operations, the AHPA further authorizes the Secretary to cooperate with other federal agencies, states, or political subdivisions of States and Tribal nations, among others (7 U.S.C. § 8310(a)). The Secretary has delegated the authority under the AHPA to USDA APHIS (7 CFR 2.80(a)(37)). Within USDA APHIS, VS is responsible for providing direction and coordination for programs and activities under the AHPA (7 CFR 371.4(b)(xii)).

The AHPA recognizes the role of state and local authorities in addressing local outbreaks of animal-related diseases. 7 U.S.C. Section 8305 authorizes the Secretary of Agriculture to prohibit or restrict the movement in interstate commerce of any animal, article, or means of conveyance if the Secretary determines that the prohibition or restriction is necessary to prevent the introduction of any pest or disease of livestock into the United States or the dissemination of any pest or disease of livestock within the United States. While the Secretary may hold, seize, quarantine, treat, destroy, dispose of, or take other remedial action to animals, including swine, that are moving or have been moved in interstate commerce, if the Secretary has reason to believe they may be affected by a disease of livestock (7 U.S.C. § 8306(a)(1)) and wishes to restrict intrastate movement of such animals, the Secretary must declare an extraordinary emergency (7 U.S.C. § 8306(b)(1)). The Secretary may only declare an extraordinary emergency upon a "*finding that measures being taken by the State are inadequate to control or eradicate the pest or disease*," and after review and consultation with the State (7 U.S.C. § 8306(b)(2)(A)).

Additionally, 9 CFR 53 gives the USDA APHIS Administrator authority to determine the existence of disease and the authority to prevent the spread of disease through the destruction and/or disinfection of animals, eggs, and materials as appropriate. As such, it also authorizes USDA APHIS VS to appraise and indemnify animals and materials destroyed, provided certain conditions are met; these conditions include complying with quarantines, adhering to proper biosecurity protocols, and accurately designating payments between contract growers and owners of swine (USDA APHIS, 2023a).

The Swine Health Protection Act (SHPA), 7 U.S. Code 3801 et seq., authorizes the Secretary of Agriculture in cooperation with States and other jurisdictions to regulate the treatment and feeding of garbage to swine. Untreated garbage serves as a potential source for numerous infectious diseases, such as ASF, that could be transmitted via improperly treated garbage. The SHPA and regulations found in 9 CFR 166 contain provisions that prohibit persons from feeding waste to swine unless properly treated to kill disease organisms. Those feeding waste to swine are required to hold a valid license with the exception of circumstances outlined in 9 CFR 166. In addition, 9 CFR 166.2(c) states that these regulations shall not be construed to repeal or supersede State law that prohibits the feeding of garbage to swine.

Policy guidance has been developed regarding the role of USDA APHIS VS in an FAD outbreak in domestic livestock that has a wildlife component, given the authority granted to USDA APHIS under the AHPA. Per VS Memorandum 573.1, *USDA, APHIS, VS Animal Health Policy in Relation to Wildlife*, in any FAD outbreak in domestic livestock that involves wildlife, such as feral swine, USDA APHIS VS will work collaboratively with Federal, State, and Tribal wildlife entities to respond to the outbreak, recognizing that these agencies have primary authority and responsibility for managing free-ranging wildlife. However, if necessary, in an extraordinary emergency, VS has statutory authority in the AHPA to implement disease control and/or eradication actions for any animal, including wildlife, under certain conditions (USDA APHIS, 2023a).

USDA APHIS WS authority related to feral swine includes the following:

Feral swine are a non-native invasive species known to cause damage to natural, agricultural, cultural and economic resources and pose risks to human and animal health. Congress has acknowledged that feral swine are a harmful and destructive species, and that a federal response to feral swine damage is warranted (Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act of 2014, Public Law No. 113-76 2014). Within the USDA, this authority has been delegated to the USDA APHIS WS program. USDA APHIS WS' statutory authorities for implementing Feral Swine Damage Management, in cooperation with other entities, are the Act of March 2, 1931, as amended (46 Stat. 1468; 7 U.S.C. 426-426b), and the Act of December 22, 1987 (101 Stat. 1329-331; 7 U.S.C. 426c). Executive Order 13112 directs federal agencies to use their programs and authorities to prevent the spread or to control populations of invasive species that cause economic or environmental harm, or harm to human health. USDA APHIS WS works collaboratively with federal land management agencies, Tribes, states, and U.S. territories that have established populations of feral swine to eradicate populations and reduce the number of feral swine and associated damages they inflict to agriculture, property, natural and cultural resources, and human health.

USDA APHIS WS is authorized to implement disease surveillance and assist with reducing disease spread in wildlife under the Acts of March 2, 1931, as amended (7 U.S.C. § 8351-8352; 46 Stat. 1468-1469), and December 22, 1987 (7 U.S.C. § 8353; 101 Stat. 1329-1331). USDA APHIS WS routinely monitors feral swine for ASF as part of its normal operational activities. Feral swine found dead or sick due to non-traumatic events (disease, starvation, old age, etc.) are euthanized (if necessary) and USDA APHIS WS will alert USDA APHIS VS to determine the need for a foreign animal disease investigation. Targeted surveillance may be conducted by USDA APHIS WS in response to an initial ASF detection or ongoing outbreak in either domestic or feral swine. As noted in Section 1.2, Purpose and Need, in the event of an ASF outbreak, USDA APHIS WS will lead field response activities and use its personnel for those activities requiring technical expertise with feral swine (USDA APHIS, 2023b).

USDA APHIS VS prepared this PEA to comply with the provisions of NEPA and USDA NEPA implementing regulations (7 CFR 1b) by evaluating how the proposed action, if implemented, may result in any reasonably foreseeable significant adverse impacts to the environmental or quality of life. USDA APHIS VS is analyzing two alternatives in this PEA that could adequately meet the need for action for emergency response actions in the event ASF is detected in the United States: (1) the Federal Operational Assistance Alternative (the No Action Alternative and the Preferred Alternative) and the (2) No Federal Operational Assistance Alternative. The proposed action examined in this PEA consists of USDA APHIS VS response activities, in coordination with State, territory, and local authorities, Tribes, swine owners and producers, and the pork industry, in the event of an ASF outbreak.

1.4 Relationship of This PEA to Other Environmental Documents

This PEA relies on the programmatic EIS, *Carcass Management During a Mass Animal Health Emergency* (herein referred to as the Carcass Management EIS). (USDA APHIS, 2015a) which evaluated carcass disposal activities. Carcass management includes the location, collection, transportation, processing/treatment, and/or disposal of carcasses and body parts, as well as the cleanup and decontamination after the carcasses are removed from the site. The EIS analyzed the

impacts to the environment of various carcass management options, as well as decontamination procedures that could be used during a mass animal health emergency. Additionally, the EIS evaluated mitigation measures that would reduce environmental impacts from carcass disposal and decontamination activities.

USDA APHIS WS has analyzed their feral swine disease surveillance actions in their EIS, *Feral Swine Damage Management: A National Approach*,[9] which documents all necessary federal, State, local, and Tribal laws and regulations that guide feral swine management activities, including USDA APHIS WS involvement in disease surveillance. As a result, USDA APHIS WS routine disease surveillance activities in feral swine are not considered in this document as these are a related activity and not part of the proposed action of this PEA. USDA APHIS WS prepares state, territorial, or local level analyses, as needed, to address local feral swine issues and needs in accordance with NEPA and USDA's NEPA implementing regulations.

1.5 Issues Considered in this EA

USDA APHIS VS developed a list of topics for consideration in this PEA based on anticipated FAD response activities, issues identified in public comments submitted for other similar EAs, the scientific literature on ASF outbreak eradication efforts, and the use of depopulation and carcass management methods. Each major issue is evaluated under each alternative. The following topics were identified as relevant to the scope of the impacts analysis in this PEA:

- Depopulation methods,
- Carcass management – disposal, cleaning and disinfection, transportation, and odor,
- Impacts to soil, water, and air,
- Risks to human health,
- Risks to wildlife, especially birds of conservation concern, eagles, and threatened and endangered species, and
- Other potential environmental issues:
  - Children's health risks,
  - Tribes, and
  - Historic and cultural resources.

[9] USDA APHIS WS information on its feral swine damage management program is available on its website following this link: https://www.aphis.usda.gov/aphis/ourfocus/wildlifedamage/operational-activities/feral-swine/feral-swine-program.

2 Alternatives

NEPA requires all reasonable alternatives to be explored and objectively evaluated. Alternatives that are eliminated from detailed study must be identified along with a brief summary of the reasons for their dismissal. For the purpose of this analysis, an alternative is considered "reasonable" if it is technically and economically feasible and would meet the Proposed Action's purpose and need. "Unreasonable" alternatives that would not meet the purpose and need were dismissed from further consideration and evaluation in this PEA.

Section 2.1 describes in detail the two alternatives considered in this PEA. Section 2.2 describes the alternatives that were considered but not analyzed in detail in the environmental consequences section of the PEA. The alternatives not analyzed were not chosen for detailed analysis because they are not technically or economically feasible or do not meet the management goal of eradication of ASF at premises with swine.

2.1 Alternatives Considered

USDA APHIS VS evaluates two alternatives in this PEA to determine the potential environmental impacts of its proposed activities taken in response to a detection or outbreak of ASF in domestic swine herds, with the major goal to quickly eradicate ASF. The alternatives must safeguard U.S. swine herds and protect the interests and livelihood of U.S. pork producers and owners from ASF. The chosen alternative must meet the following management goals:

1) Control and contain ASF in swine as quickly as possible;
2) Eradicate the ASF virus using strategies that protect public health and the environment, and stabilize animal agriculture, the food supply, and the economy; and
3) Provide science- and risk-based approaches and systems to facilitate continuity of business for non-infected animals and non-contaminated animal products.

This PEA considers the impacts of no federal operational assistance in comparison to the current approach of federal operational assistance (the No Action Alternative). In this PEA, the No Action Alternative is also the Preferred Alternative. Under this alternative, no changes are made to the current protocols that USDA APHIS has developed and would follow in responding to an ASF outbreak. Details of the alternative are described in Section 2.1.1. Under the No Federal Operational Assistance Alternative, if an ASF outbreak were to occur, State authorities, Tribes, and private owners and producers would be responsible for operational activities such as depopulating infected swine herds, disposing of the carcasses, and completing cleanup and disinfection. USDA APHIS VS would provide technical guidance and equipment upon request. The No Federal Operational Assistance Alternative is described in Section 2.1.2.

2.1.1 Federal Operational Assistance Alternative (Preferred Alternative/No Action Alternative)

Under the Federal Operational Assistance Alternative, in the event of an ASF outbreak, trained USDA APHIS personnel from several programs in the agency, including VS (lead program for ASF outbreaks in domestic swine), act as first responders in addition to providing

federal oversight for ASF outbreak response activities. A joint Incident Command System with both State/Territorial or Tribal and federal resources, as described under the No Federal Operational Assistance Alternative, would be expanded in response to the need to provide additional human resources, equipment, and supplies. USDA APHIS VS ASF outbreak response activities can include any combination of continuing to monitor for the spread of ASF in swine; assisting in the control, depopulation, disposal of swine carcasses and infected material, and transportation, which can range from loaning equipment to assisting directly in those actions; providing support with monitoring; and providing guidance as to the appropriate time to release a premises from quarantine. USDA APHIS VS can provide guidance and recommendations on methods of depopulation, disposal, and cleaning and disinfection, but even under the Federal Operational Assistance Alternative, states, Tribes, and swine owners and producers make their own choices based on site-specific considerations.

Providing a rigorous federal response incentivizes the rapid reporting of disease incidence because it achieves disease eradication while providing relief to the owner/operator who may lack the resources to deal with the outbreak in a timely manner. Under this alternative, animal suffering is minimized, and an owner/operator can resume business as rapidly as possible.

Under this alternative, as part of an ASF outbreak response, USDA APHIS VS could use other depopulation, disposal, and cleaning and disinfection methods not identified in this document that may become available in the future as long as they have the same or fewer potential environmental impacts. For example, a new chemical disinfection treatment would be considered for use if it is registered by the United States Environmental Protection Agency (USEPA) on the ASF virus and poses no greater risks to human health and non-target organisms than the currently approved treatments.

Below are additional details on the key activities of depopulation, disposal, transportation, and cleaning and disinfection under the Federal Operational Assistance Alternative (No Action Alternative).

2.1.1.1 Depopulation

Federal law gives USDA APHIS VS authority to destroy, dispose of, or take any other remedial action with respect to any animal that is moving or has been moved in interstate commerce and may have been affected with or exposed to a disease of livestock at the time of movement (7 U.S.C. 8306(a)(1)). Pursuant to statutory and regulatory authority, (7 U.S.C. 8310(a); 9 CFR 53.4), USDA APHIS VS is authorized to cooperate with other Federal, State, local, and Tribal authorities in the control and eradication of ASF if ASF is detected in the United States. This includes the authority to depopulate herds affected by ASF in order to contain or stop the spread of disease.

Depopulation is the destruction of many animals in response to an animal health emergency (USDA APHIS, 2023a). Depopulation is not used under ordinary circumstances and is applied only during an emergency. ASF is highly contagious and can be spread when infected animals come into contact with healthy animals through contact with infected saliva, respiratory secretions, urine and feces (USDA APHIS, 2023a). Although not expected to be a significant

exposure route, the virus can also potentially be spread by ticks that feed on infected animals (USDA APHIS, 2023a). Therefore, speed is of utmost importance to limit the spread of the disease and the pain and suffering of new swine that may become infected. The selection of the depopulation method to be used must be timely and limit 1) the spread of the disease and 2) the pain and suffering of both infected animals and of new animals becoming infected.

Under the Federal Operational Assistance Alternative, USDA APHIS VS would coordinate with State/territorial or Tribal authorities at their request and producers/owners to conduct and assist with depopulation of swine at ASF-infected premises, as needed. USDA APHIS VS may provide support with services and materials, including contracting equipment as needed. If USDA APHIS VS is involved, personnel follow all state and federal regulations for depopulating.

State Animal Health Officials and USDA APHIS VS would discuss recommended depopulation methods (AVMA, 2026; NPB, 2016) with swine owners and producers. Decisions regarding the method used are based on available resources and personnel at the site, the timeliness of executing the best method for the facility, herd size and density, the type of operation (indoor/outdoor, housing type), human safety, environmental conditions, animal welfare, and cost effectiveness. The use of a particular depopulation method will not impact indemnity payments if the method has been identified by the American Veterinary Medical Association (AVMA) (AVMA, 2026) as the most effective depopulation method(s) during an emergency, based on their demonstrated welfare outcomes, feasibility, and suitability during emergency response operations and USDA APHIS concurs with the method(s) selected (USDA APHIS 2022h). The method(s) selected must consider animal welfare to the extent practicable (USDA APHIS, 2023a). State partners and the swine producers or owners and not USDA APHIS VS make the ultimate decision as to which depopulation method is used.

Depopulation methods are identified within a three-tiered system under the AVMA's Guidelines for the Depopulation of Animals (AVMA, 2026). (The AVMA represents veterinarians and advocates for public policy that supports veterinarians and protects animal health, animal welfare, and public health.) Tier 1 depopulation methods are given highest priority and should be utilized preferentially during an emergency response. According to the AVMA, under certain circumstances during an emergency, it may not be reasonably possible to implement a Tier 1 depopulation method, necessitating the use of a method categorized as Tier 2 when circumstances of the emergency constrain the ability to reasonably implement a Tier 1 method or when Tier 1 methods are unavailable. These circumstances include, but are not limited to, constraints on zoonotic disease risk, response time, human safety, depopulation efficiency, deployable resources, equipment, animal access, disruption of infrastructure, disease transmission risk, environmental concerns, and animal remains disposal (AVMA, 2026). Tier 3 methods have limited to no evidence to support their use, or evidence may be contrary to good animal welfare. According to AVMA, "Tier 3 should be considered only when circumstances preclude the reasonable implementation of any of the Tier 1 or 2 methods and when the risk of doing nothing is likely to have a reasonable chance of resulting in significantly more animal suffering than that associated with the proposed depopulation method (AVMA, 2026)."

The following potentially available depopulation methods are also available under the No Federal Operational Assistance Alternative:

- Inhalant (carbon dioxide gas),
- Compressed Foam,
- Ventilation shutdown plus (VSD+),
- Electrocution,
- Captive bolt,
- Gunshot, and
- Injectable euthanasia agents.

The size and number of the swine that must be depopulated heavily influences the method(s) selected. All depopulation methods listed above may not be allowed and/or available in every state, territory, or county. State and local laws on depopulation must be reviewed and followed, and proper authorities must be contacted. Each of the methods is described as follows.

Carbon Dioxide (CO_2)

CO_2 is a colorless, odorless gas that is an accepted, Tier 1 depopulation method per AVMA (AVMA, 2026). Gas has been used in the mass euthanasia of poultry more frequently than it has with mammals. CO_2 has been used commercially in slaughter houses to stun swine which were then exsanguinated (USDA APHIS, 2015c). CO_2 is a practical means for depopulation provided certain criteria are met to address the numbers and size of swine and overall throughput (AVMA, 2026). Some farms use CO_2 as their primary method of euthanasia for suckling or nursery swine (up to 70 pounds (lbs)) (AVMA, 2026).

Chambers that can be quickly filled with CO_2 from a compressed gas cylinder or bottle will be needed to accomplish depopulation by CO_2 inhalation for large numbers of swine. Proper construction of the chambers is important to ensure the safety of the workers, adequate footing for the swine, and achievement of a lethal CO_2 concentration. Dump trucks, dump trailers, semi-trailer, roll off dumpsters, and shipping containers are some commonly available items that may be used as chambers (AASV, 2020). In one study, a CO_2 displacement rate of 20 to 30% of the container volume/min for five minutes and additional holding time of 15 minutes resulted in 100 percent mortality to groups of swine (AVMA, 2026). Safeguards are taken to protect personnel using the equipment including training on use, ensuring more than one person present, going outdoors where possible to use CO_2, knowing the location of the gas sources and emission vents, alarm signals, and any special precautions for working in swine barns.

The advantages of using CO_2 are: 1) its well established rapid depressant, analgesic, and anesthetic effects, 2) its ready availability, 3) inexpensive, non-flammable, and nonexplosive and poses a minimal hazard to personnel when used with properly designed equipment, and 4) its negligible bioaccumulation potential. Inhalation of CO_2 causes little distress to the swine, suppresses nervous activity, and induces death within 10 minutes (AVMA, 2026). CO_2 can be transported in liquid form, allowing the large volumes to be delivered to a depopulation site. The National Veterinary Stockpile (NVS), which is overseen by USDA APHIS VS, has access to a variety of animal handling equipment and depopulation equipment, including CO_2 carts. NVS deployable equipment and resources would equally be available to states and Tribes under both alternatives.

To rely solely on gas treatments is often not practical because it would exhaust limited resources during an outbreak by creating sudden demands for those supplies (AVMA, 2026). The use of CO_2 is most practical for small swine and may not be a practical method of mass depopulation of larger swine (NPB, 2016).

Compressed Foam

Compressed foam used for depopulation is a mixture of water, commercial foam concentrate, and gas (ambient air or nitrogen) made using specialized equipment (AVMA, 2026; Benson et al., 2012). This depopulation method is effective on swine of all ages (i.e., sows, finishers, nursery pigs) and can be used on groups of swine. Swine are placed in contained spaces, including trailers, shipping containers, barns, corrals, or earthen pits with sides, and covered with foam within 60 seconds. The medium- or high-expansion foam creates a blanket of foam over the top of swine causing rapid unconsciousness and death. Both water-based and nitrogen-filled foam depopulation of swine are classified by AVMA as Tier 1 depopulation methods.

Compressed air or water-based foam is created by passing foam concentrate and water through a hose and foam nucleation screen, adding only air (no added gases) (AVMA, 2026). This medium-expansion foam (expansion rate ~1:40–1:50) creates small bubbles. Immersion in the foam quickly blocks the animal's airway, causing asphyxiation and resulting in death

Compressed nitrogen or nitrogen-filled foam is also created with foam concentrate and water but differs from water-based foam in that it requires less water and is injected with nitrogen gas, instead of ambient air, to create large bubbles. The high-expansion bubbles (expansion ratio 1:250–1:500) in the foam break, releasing nitrogen that is inhaled by swine that displaces oxygen, causing death by anoxia (i.e., oxygen deprivation) (AVMA, 2026).

Disadvantages of using compressed foam depopulation include the large amount of water required and the need for specialized equipment and trained/experienced personnel. Generating nitrogen-filled foam also requires a source of nitrogen. While nitrogen, an inert gas, is nonflammable, nonexplosive, and widely available, it can be costly.

Foam is created by modular units such as a handheld foam generating nozzle or a larger, high-expansion foam generator. Although this is specialized equipment, local firefighting and forestry departments may be able to provide foam generators (AVMA, 2026). Also, USDA APHIS NVS has access to a variety of depopulation equipment, including foamers, and trained contractors available through USDA contracts (USDA APHIS, nd-b).

USDA APHIS VS uses and recommends the use of Class A fire-suppression foam concentrate (PHOS-CHEK® WD881 or SILV-EX Plus® Class A Foam Concentrate) for depopulation. The Class A fire-suppression foam concentrates utilized by USDA APHIS VS do not contain perfluoroalkyl and polyfluoroalkyl substances (PFAS), including perfluorooctane sulfate (PFOS) and perfluorooctanoic acid (PFOA) (Johnson Controls, 2024; Perimeter Solutions, 2019; 2022). PFAS, which include PFOS and PFOA, are man-made chemicals that have been used in a wide array of consumer, commercial, and industrial products, including some fire-

fighting foams. These chemicals are found throughout the environment where they break down very slowly. Scientific studies have shown that exposure to some PFAS in the environment may be linked to harmful health effects in humans and animals (for more information see PFAS Explained | US EPA (USEPA 2023e)).

Ventilation Shutdown Plus (VSD+)

The 2026 AVMA Guidelines for Depopulation of Animals provides that VSD using heat and humidity (VSD+) is a Tier 3depopulation method for swine (AVMA, 2026). VSD+ involves shutting off any air circulation into the house, closing inlets, and turning off fans with the additional use increase in the heat and humidity within the houses with the goal of achieving 100 percent mortality in as short of a time as possible (AVMA, 2026). The AVMA (2026) does not recommend VSD alone as a depopulation method. Many variables including age, size, insulation, and ventilation system of a barn, the ability to seal off air leaks, and the number and size of the animals in the barn make it difficult to raise temperatures enough within a structure using VSD alone to achieve 100 percent mortality within the desired timeframe.

The need to depopulate an infected herd quickly may sometimes require the use of VSD+. VSD+ may be used if ASF is detected in the United States because it provides relatively quick depopulation and requires fewer resources and personnel. Decisions will be handled on a premises-by-premises basis, with close coordination and collaboration by state and USDA APHIS VS officials. The State and swine owner ultimately choose the method used, but USDA APHIS VS can concur with the use of VSD+ in limited circumstances. T Whenever VSD+ may be used, USDA APHIS VS also has the AVMA goal of achieving 100% mortality rate in as short of time as possible.

Electrocution

The AVMA guidelines consider electrocution a Tier 1 method of depopulation for swine over 10 pounds (AVMA, 2026). Electrocution causes death by the passage of electrical current through the body, resulting in cardiac fibrillation and cerebral hypoxia (USDA APHIS, 2015c). Currently, there are portable swine-electrocution units available that are designed to deliver a 1000-volt death charge to swine as they pass under the electrode at the rate of approximately 600 swine/hour (USDA APHIS, 2015c). There are two methods that can be used for euthanasia by electrocution: head-only and head-to-heart. Regardless of the method chosen, the current must first move through the brain to cause insensibility (NPB, 2016). An animal must always be stunned either prior or simultaneously as an alternating current is passed through the body. Passing an insufficient electrical current through the body without prior or simultaneous stunning will cause pain and, therefore, is not considered humane (USDA APHIS, 2015c).

Captive Bolt

Captive bolt is considered a Tier 1 physical depopulation method (AVMA, 2026). Captive bolt guns eject a solid bolt plunger from a device to cause blunt force trauma to the brain with or without penetrating the swine's skull (NPB, 2016). For suckling and nursery swine, a nonpenetrating captive bolt can be used and for nursery, growing, and mature swine, a penetrating

captive bolt can be used for depopulation provided the swine are appropriately restrained and the captive bolt can be properly and safely applied (AVMA, 2026). As a swine ages, the thickness of its skull increases and insufficient force of the nonpenetrating captive bolt will only stun and not euthanize the animal due to insufficient impact on the brain (NPB, 2016). The captive bolt gun should be placed firmly against the front of the head, directed at the mid-line of the forehead, a half inch above eye level (NPB, 2016). It is important to select the bolt length and cartridge combination appropriate to the age and size of swine that is being euthanized to ensure that the bolt is long enough to penetrate the swine's skull (NPB, 2016). Several penetrative and non-penetrative captive bolt devices are commercially available. The practicality of using a captive bolt decreases when time is a factor and as the number of swine to be depopulated increases (AVMA, 2026).

Gunshot

The AVMA guidelines consider gunshot a Tier 1 depopulation method for nursery, growing, finishing, and mature swine (AVMA, 2026). The impact caused by the penetrating bullet aimed at the head causes concussion and damage to vital areas of the brain of the swine (NPB, 2016). When properly performed, swine euthanized via gunshot are immediately rendered insensible with death occurring shortly thereafter (Whiting et al., 2011; National Pork Board 2016; Leary et al., 2020; as reported in (Lavelle et al., 2024)). The time for swine to achieve death by gunshot is somewhat dependent on weight. Based on their trials, Lavelle et al. (2024) reported the mean time to death for any weight class of feral swine never exceeded 109.91 seconds and the overall actual maximum time to death was 195 seconds (Lavelle et al., 2024). The size of the firearm and ammunition should be matched to the size of the swine to ensure the effectiveness of the technique, using one close range shot to minimize the occurrence of pass-through shots. This method is appropriate for use on nursery swine or older, but not appropriate for use on suckling swine (AVMA, 2026).

As part of routine operational control, USDA APHIS WS uses firearms to euthanize trapped feral swine to reduce damage to crops, disease risks to livestock, and threats to natural resources and property. During an ASF outbreak response, upon request, USDA APHIS personnel, primarily from USDA APHIS WS, that are certified to use firearms, or a swine owner may use the method to depopulate domestic swine. Additionally, USDA APHIS WS may depopulate feral swine using gunshot in order to prevent transmission of ASF between domestic and feral swine. USDA APHIS staff adhere to the USDA APHIS policy of humaneness when eradicating animals.

When euthanizing swine by gunshot, extra care must be taken to ensure human safety. The user of the weapon should be trained in firearm safety and understand the potential for ricochet (NPB, 2016). Ideally, swine should be outdoors and on soil to reduce the chance of the bullet passing through the target and ricocheting. The safety risks associated with the use of firearms were found to be minimal when used by certified USDA APHIS WS personnel (USDA APHIS, 2019b). Some types of firearm ammunition may also contain lead, which potentially can be a concern to the environment, wildlife, and human health. Non-lead ammunition is sometimes an available option but, in terms of safety and performance, lead ammunition likely remains the best alternative under certain circumstances (USDA APHIS, 2022b). USDA APHIS WS use of lead has declined as non-lead substitutes have become available, researched, and determined to be

effective; however, the use of non-lead shot is dependent on availability and whether non-lead ammunition can be safely used.

Using gunshot for depopulation becomes less practical as the number of swine to be depopulated increases. In one trial, two rifle operators walking through a swine pen positioned back-to-back, were able to euthanize 782 piglets in 3 hours and 20 minutes (3.91 minutes per piglet) (Whiting et al., 2011). This depopulation method would most likely be used for small commercial herds; as a secondary depopulation method when the primary method is not suitable for all swine on the premises; and for feral swine within a Control Area or Surveillance Zone.

Injectable Euthanasia Agents

Injectable euthanasia agents would most likely be used in depopulating small numbers of animals, such as backyard herds and potentially feral swine within a Control Area or Surveillance Zone, as this method is not practical for depopulating large numbers of swine (AVMA, 2026). In general, due to the cost of the drugs, the need to handle each animal, and concerns regarding disposal, euthanasia chemicals for depopulation would rarely be used except possibly for backyard swine. This method of depopulation involves the intravenous administration of an anesthetic or barbiturate into swine and is a situationally used, AVMA Tier 1 method (AVMA, 2026). Injectable euthanasia solutions (i.e., barbiturates) are used to depress the central nervous system, causing deep anesthesia progressing to respiratory and cardiac arrest (NPB, 2016). Injections are typically administered by hand using a syringe or syringe pole (USDA APHIS, 2024b). These injections can be used on swine of any age.

As controlled substance drugs, Federal drug regulations require euthanasia agents to be bought, stored, and used under supervision of an individual, such as a licensed veterinarian, who is registered with the U.S. Drug Enforcement Administration. USDA APHIS personnel and private individuals, such as veterinarians, are certified to use approved injectable euthanasia agents. If this method of euthanasia is used, special considerations must be taken when disposing of the carcass in order to prevent incidental exposure of scavenging animals to chemical residues in the carcass (AVMA, 2026; NPB, 2016). Policies for use of injectable euthanasia agents by USDA APHIS personnel comply with the U.S. Drug Enforcement Administration and the U.S. Food and Drug Administration (FDA) regulations, in addition to compliance with requirements of the states where personnel use these drugs.

After live capture, a chemical immobilization drug would be administered to feral swine, followed with injection of a euthanasia drug. USDA APHIS WS would administer a lethal potassium chloride or sodium pentobarbital injection into the target animal through a needle and syringe, not a dart. Personnel would monitor the animal post-injection, remove euthanized feral swine from the environment, and follow the appropriate regulations regarding disposal.

2.1.1.2 Disposal

Under this alternative, USDA APHIS VS, State, Territorial, and/or Tribal officials, and swine owners/producers work together to evaluate disposal options based on the size of the herd, local conditions, and applicable laws and regulations to ensure the safe disposal of carcasses (USDA APHIS, 2015a). Disposal may involve other State and Federal agencies: USDA may coordinate

with the Department of Health and Human Services, the Department of Homeland Security, and/or the USEPA to provide technical assistance and guidance, in alignment with Federal, State, and local regulations. USDA APHIS VS takes an integrated approach to disposal and recommends a single or combination of methods to ensure proper disposal with minimal potential to affect the environment and have ASF stamped out quickly (USDA APHIS, 2015a; 2017b). State/Territorial partners and swine producers/owners have the ultimate responsibility for selecting the method(s) of disposal that will be used at a particular location. For example, upon request, USDA APHIS VS may assist with finding carbon sources for composting, identifying landfills or incinerators that will accept carcasses and other ASF-infected materials, and providing or finding contractors or equipment for constructing approved compost piles or burial pits.

Swine mortalities and depopulation create a need for carcass disposal. As carcasses begin to degrade, bodily fluids, chemical and biological leachate components (liquid that results from decomposition of biomass), agricultural dust, and potentially harmful gases are released. Also, it is very important that any ASF virus in the environment is killed or removed so it cannot infect additional swine. Carcass management (the location, collection, transportation, processing/treatment, and/or disposal of carcasses and body parts, as well as the cleanup and decontamination after the carcasses are removed from the site) (USDA APHIS, 2015a) serves to reduce or avoid environmental effects from the virus, leachate, and other harmful products. Potential issues that may be encountered with carcass management could vary widely based on State and local regulations and requirements, site conditions, and environmental factors. Landfills may not be approved to accept ASF-contaminated carcasses or waste. Rendering plant may not be located close enough to impacted premises. For example, there are no approved landfills for large capacity carcass disposal in Puerto Rico or the U.S. Virgin Islands, so other disposal methods would have to be utilized in these locations. Concerns during swine carcass management include not only carcass cleanup, but disposal of potentially infected bedding and other material (i.e., fomites).

Carcass management guidelines and best management practices (USDA APHIS, 2014a; 2014b; 2022b) must be followed to mitigate risks to the human environment. Early depopulation efforts (before the virus has an opportunity to spread) minimize the volume of carcasses for disposal which reduces the potential for significant environmental effects (USDA APHIS, 2017b). USDA APHIS VS assessed the potential impacts from "mass carcass management," which is the management of 50 tons (100,000 pounds) or more of biomass (approximately, 417 swine at 240 pounds each) per premises in the 2015 Carcass Management EIS (USDA APHIS, 2015a). As described in the Carcass Management EIS, standard operating procedures and mitigation measures are available to ensure that carcass management has no effect on the environment, even when a threshold of 50 tons of carcasses is exceeded.

When appropriate (i.e., based on site-specific conditions and state and local regulations), the following methods for disposal of swine carcasses and other ASF-infected material may be used:

- Composting,
- Burial,
- Landfill disposal,
- Rendering,

- Incineration, and
- Open-air burning.

The following paragraphs briefly describe the potentially available disposal methods that may be utilized during an ASF outbreak. It is important to note that not all methods may be approved for use in every state or at a specific site. State and local laws must be reviewed, and proper authorities must be contacted.

Additional information on these disposal methods can be found on the USDA APHIS Carcass Management Dashboard at: https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/emergency-management/carcass-management/carcass (USDA APHIS, 2021a). Standard operating procedures, process details, and tools for these disposal methods are included in the USDA APHIS "Emergency Carcass Management Desk Reference Guide" at: https://www.aphis.usda.gov/media/document/1027/file (USDA APHIS, 2024a). When disposal guidelines are followed correctly (USDA APHIS, 2015a; 2017b), the likelihood of any potentially adverse environmental impacts is minimized.

Composting

Composting is a carcass disposal method that promotes decomposition through placement of carcasses between layers of carbon rich organic materials (USDA APHIS, 2012). During the process, bacteria, fungi, and other microorganisms break down organic materials into a stable mixture called compost while consuming oxygen and releasing heat, water, and carbon dioxide and other gases. Under optimal conditions, composting results in a dark brown to black soil called "humus" containing primarily non-pathogenic bacteria and plant nutrients. With the proper conditions, composting destroys most infectious disease agents (USDA APHIS, 2012; 2015a).

A carcass composting system requires a carbon source (e.g., sawdust, straw, silage, manure, or leaves), bulking agents (e.g., sludge cake, spent horse bedding, or rotting hay bales), and biofilters (a biofilter is a layer of carbon source and/or bulking agent that enhances microbial activity, deodorizes the gases released at ground level, and prevents access by insects and birds) (NABCC, 2004). Properly constructed piles include at least a 2-foot-thick base layer of carbonaceous material, like wood chips, that absorbs liquids and prevents leachate migration and at least a 2-foot-thick cover of carbon material, which minimizes the release of gasses and odors and prevents access by insects and scavengers (USDA APHIS, 2012; 2014b; 2017a).

During the composting process decomposition requires nitrogen, carbon, oxygen, and moisture for optimal tissue breakdown. The carcasses serve as the source of nitrogen and the addition of high carbon plant material meets the carbon requirement, absorbs excess moisture, and retains heat/sustains high internal temperatures necessary for rapid decomposition and pathogen suppression (USDA APHIS, 2012). Carcasses may be pre-processed by grinding and mixed with a carbon source to speed up decomposition; grinding also decreases the amount of carbon material and land space required (Lemieux et al., 2019).

When compost piles are properly constructed inside facilities, leachate contamination of areas outside the barns and houses is not a concern. Outdoors, a properly selected composting site can

minimize potential environmental impacts by reducing surface water runoff, movement of leachate, and migration of composted nutrients into ground water (Berge et al., 2009; USDA APHIS, 2012; 2014a; 2017b). The benefit of using composting is that it minimizes the potential for further exposures as carcasses do not need to be transported offsite for disposal.

See USDA's Carcass Management Course Composting Module at https://www.aphis.usda.gov/sites/default/files/9-composting.pdf for additional information on composting. Also, the USDA APHIS "Livestock Mortality Composting Protocol" is available at: https://www.aphis.usda.gov/sites/default/files/livestock-mortality-compost-sop.pdf (USDA APHIS, 2017a).

Burial

In this disposal method, carcasses are buried above or below ground in "lined" or "unlined" pits or trenches, typically dug with a backhoe on-site. Depending on the number of carcasses to be buried, the pit or trench may be required to be lined (engineered) to prevent seepage of leachate from decomposing carcasses into the soil and ground water and the release of methane (CH_4). When a lining is used, carcass burial trenches and pits are lined with materials underneath, such as synthetic liners or compacted clay liner systems, which can reduce groundwater contamination significantly by impeding leachate from moving through the soil (Chowdhury et al., 2019).

Shallow burial with carbon, also known as trench composting or above-ground burial, combines elements of burial and composting, and has been shown to be a successful method for disposing of swine carcasses(Duc et al., 2023; McMaine et al., 2025; USDA APHIS, 2022c). With this method, a shallow pit of 12 to 24 inches is excavated in soil and a 12- to 24-inch layer of carbon material is placed in the trench prior to placing carcasses (NIANR, 2025). (USDA APHIS would recommend soil be excavated 24 inches or more within the vegetative root zone. This allows for at least 12 inches of carbon material cover and an adequate thickness of soil cover.) The carcasses are then covered using the excavated soil, creating a low mound. The mound is seeded with a regionally and seasonally appropriate grass seed mix and covered with a layer of straw mulch or a biodegradable erosion control netting. Shallow burial with carbon is less labor intensive than composting, where piles must be monitored for temperature, moisture, and periodically water must be added and piles turned (NIANR, 2025).

Unlined burial, especially for a small number of carcasses (state regulations determine the number of carcasses and size of the pit for that volume) may occur on premises only with the permission of the owner/operator and by meeting state and local requirements. Many localities do not allow unlined burials because public health impacts could potentially arise, such as exposure to pathogens or chemicals released into the environment during decomposition. As such, this is not a common carcass disposal choice, except possibly for small backyard herds.

States typically set requirements for burial of animal carcasses consistent with state environmental regulations, including a maximum weight for carcasses, soil types, minimum depth and distance to waterbodies and residences, maximum slope, and minimum distance above water table. To meet the local disposal requirements, responders determine the soil types, slope, and drainage patterns in the affected environment and, with the owner or producer, determine a

location for such a burial site. Federal, state, local, and tribal regulations will be reviewed and followed, and proper authorities will be contacted prior to disposal.

See USDA's Carcass Management Course On-site Burial Module at https://www.aphis.usda.gov/sites/default/files/11-on-site-burial.pdf for additional information on composting. USDA APHIS's "Guidelines for the Emergency Use of Above Ground Burial to Manage Catastrophic Livestock Mortality" is available at: https://www.aphis.usda.gov/sites/default/files/agb-emergency-policy.pdf (USDA APHIS, 2021b).

Landfill Disposal

The USEPA regulates non-hazardous waste landfills under Subtitle D of the Resource Conservation and Recovery Act (RCRA) in coordination with state and local agencies. Disposal of carcasses in a certified solid waste landfill (USEPA, 2021) allows for the safe and efficient disposal of large quantities of carcasses.[10] Disposal at landfills is advantageous due to their large capacities and widespread distribution throughout the country. However, individual landfill managers may put restrictions on the type or quantity of materials they accept. The landfill will also control the frequency of deliveries. Technical requirements and procedures for landfill disposal of ASF wastes are established by the state-level regulatory agency responsible for permitting landfills (state environmental agency). The state environmental agency informs federal/state agencies charged with protecting animal health, biosecurity, and disease control of the landfill facilities deemed technically able and willing to accept ASF wastes for disposal.

Landfill burial does not inactivate pathogens or destroy biomass. Proper design and long-term management of the landfill minimizes risks from landfill disposal of animal carcasses. Design features include liners at the bottom of the landfill, cover materials (such as soil and vegetation) at the top of the landfill, and gas control systems (which collects and removes gases). These measures reduce the likelihood of uncontrolled leachate and/or gases moving into the environment and potentially affecting the water supply.

See USDA's Carcass Management Course Permitted Landfill Module at https://www.aphis.usda.gov/sites/default/files/6-off-site-permitted-landfill.pdf for additional information on landfill disposal.

Rendering

Carcass rendering is an off-site process that uses heat to convert raw animal tissues into various fat, protein, and mineral products (USDA APHIS, 2012). Rendering uses pressurized steam at varying degrees and times such as 239 degrees Fahrenheit (°F) to 309 °F for 40 to 90 minutes in continuous- or batch-flow units to inactivate bacteria, viruses, protozoa, and parasites while

[10] Solid waste landfills must meet stringent design, operation, and closure requirements under Subtitle D of RCRA. These landfills are excavated or engineered sites where non-liquid waste is deposited for final disposal and covered. The units are designed to minimize the chance of release of any leachate or gases into the environment.

making a variety of products (National Renderers Association, 2006). Rendering is sufficient to inactivate ASF viruses and can be used for swine carcasses if a rendering plant is nearby. However, the number of rendering plants located near an ASF outbreak, limitations on their ability to pick up carcasses in a timely manner, and plant capacity may be limited.

Rendering facilities typically are equipped with scrubbers to control emissions of odors and air toxins, as well as wastewater treatment systems to meet discharge permit requirements for the wastewater that is generated (USDA APHIS, 2015a).

See USDA's Carcass Management Course Rendering Module at https://www.aphis.usda.gov/sites/default/files/7-rendering.pdf for additional information on rendering.

Incineration

Incineration is a waste treatment process that involves the combustion of substances contained in waste materials. Incineration and other high-temperature waste treatment systems are described as "thermal treatment." Incineration burns carcasses to ash, flue gas, and heat with an auxiliary fuel source, such as propane. The type of species of animal has a large influence on the speed at which carcasses are incinerated; the greater the percentage of animal fat, the more efficient the carcass will burn. Swine have a comparatively high fat content and burn hotter and more quickly than other species (USDA APHIS, 2012).

The ash is mostly formed by the inorganic constituents of the waste and may take the form of solid lumps or particulates carried by the flue gas. Ash, collected in receptacles at the bottom of most incinerators, is disposed of at landfills or other controlled facilities designed to minimize human health risks. The flue gases must be cleaned of gaseous and particulate pollutants before they are dispersed into the atmosphere. Emission control devices are attached to incinerators as part of an environmental protection plan (USDA APHIS, 2012). Incineration can be a highly efficient disposal method which produces little residue as carcasses and associated materials are reduced to inert ash (USDA APHIS, 2012).

Incinerators use an auxiliary fuel source, such as propane, to burn carcasses to ash. Due to the cost of the auxiliary fuel, it may not be an economically viable disposal alternative for large numbers of carcasses. Incinerators can be fixed or portable (smaller incinerators on or towed by trucks). Incineration of carcasses at a fixed-facility incinerator is a highly controlled process designed to minimize human health risks from air emissions. Waste-to-energy incinerators have been used on a pilot-scale and could likely be used in the future. New incinerator models are generally biosecure and minimize the loss of ash and leachate. Incineration can be associated with human health risks from inhalation of air emissions and ash disposal, but these are typically minimal unless older models are employed. Incineration is sufficient to inactivate viruses.

Portable or transportable incinerators are typically much smaller and can be used on-site to dispose of carcasses. Portable incinerators range in size from small incinerators that can process 300 pounds per hour (lbs/hr) to large incinerators that can process 2,000 lbs/hr. Due to the high price of operation, portable incinerators would potentially be used in areas where burial or

composting is not allowed due to environmental constraints and where disposal at a landfill is not available. Portable incinerators may require permitting from regulatory entities. Some states have exempt portable incinerators used for animal carcass disposal from the requirements for waste combustors/incinerators and provide conditions for their operation. For example, North Carolina Department of Environmental Quality has indicated in their Foreign Animal Disease Response Recommendations (NCDEQ, 2022) that, under certain circumstances, the use of an incinerator may be necessary to control a foreign animal disease. In these cases, per regulations found under 15 North Carolina Administrative Code (NCAC) 02D .1201(b)(4), incinerators are exempt from air permitting requirements provided the following requirements are met:

- The incinerator is located on a farm and is operated by the farm or farm operator.
- The incinerator is used solely for the disposal of animals originating on the farm where the incinerator is located.
- The incinerator is not charged at a rate that exceeds its design capacity.
- The incinerator complies with 15A NCAC 02D .0521 (visible emissions).

The Tennessee Department of Agriculture exempts from air quality permitting incinerators for livestock carcass disposal if the equipment has a manufacturer's rated capacity less than 500 lbs/hr or a total burner rated capacity less than 4000,000 British Thermal Units per hr (TNDA, 2023).

See USDA's Carcass Management Course Off-site Incineration Module at https://www.aphis.usda.gov/sites/default/files/8-off-site-incineration.pdf for additional information on incineration.

Open Air Burning

Open air burning is a disposal method where carcasses are scattered over wood or other flammable material, doused with a flammable liquid, and set on fire. Burning occurs on open land above-ground, in a dug-out pit, or combustible piles (pyres). Many states or local governments specifically prohibit open burning of carcasses. Permits (generally from a county or state fire marshal) are typically required where open burning is allowed. The disposal method has rarely been used, but it is mentioned to ensure it is distinguished from incineration.

Additional information regarding open burning is available from USDA's Carcass Management Course Open Burning Module found at https://www.aphis.usda.gov/sites/default/files/10-open-burning.pdf.

Feral Swine Carcass Disposal

Feral swine found within the Control Area and Surveillance Zone of an ASF-infected domestic swine premises could serve as a transmission source to susceptible domestic and feral swine. In this instance, in support of USDA APHIS VS, USDA APHIS WS would perform targeted surveillance, control, and depopulation of these feral swine. Removal of swine carcasses in the Control and Surveillance Areas will be prioritized through all outbreak phases (USDA APHIS,

2023b). Feral swine carcasses would be disposed of according to federal, state, territorial, tribal, county, and local regulations and USDA APHIS disposal guidance.

USDA APHIS WS evaluated the human health and ecological risks associated with carcass disposal in wildlife damage management in the document: "Human Health and Ecological Risk Assessment for the Use of Wildlife Damage Management Methods by USDA-APHIS-Wildlife Services, Chapter XXIII, Carcass Disposal in Wildlife Damage Management." This information is incorporated herein by reference. USDA APHIS WS disposes of carcasses more commonly as a result of wildlife damage management activities compared to disease outbreaks. Generally, if wildlife is diseased, it is turned over to the Health Department or disposed of appropriately to eliminate disease transmission to other wildlife. The disposal method chosen for feral swine carcasses will depend on the location, site environmental characteristics, and resource availability; options would include (USDA APHIS, 2023b):

- Removal from the affected area – carcasses would be taken to a central area for disposal or performed onsite (e.g., mobile incineration). Biosecurity measures will be used when transporting carcasses to prevent environmental contamination (e.g., heavy duty bags, containers, tarps);
- Above or below ground burial, including shallow burial – requires site-specific environmental and logistical considerations; or
- Leave in place – may be used if carcass(es) cannot be accessed due to terrain or if other options are not possible.

Hydrated lime delays scavenging for up to a week and could be used on feral swine carcasses if there is a time lag before disposal.

Other Methods

USDA APHIS VS could use other disposal methods not identified in this document that may become available in the future as long as those methods have the same or fewer potential environmental impacts.

2.1.1.3 Transportation

During an ASF outbreak, most swine carcasses are likely to be disposed of on-site, requiring minimal transportation, which reduces the need for biosecurity measures, such as a cleaning station for vehicles (USDA APHIS, 2011). However, carcass disposal may not be feasible on all sites and, therefore, a certain amount of offsite carcass transport may be necessary. Animal health officials work to ensure moving carcasses: 1) does not spread the virus; and 2) is safe for humans (e.g., the surrounding public, decontamination personnel, transport operators, and landfill, incinerator, and rendering workers). To reduce the potential for impacts, all necessary biosecurity steps are followed as outlined in the National Animal Health Emergency Management System Guidelines (USDA APHIS, 2012). Following depopulation, swine carcasses may be transported off-premises in sealed containers lined with sealed heavy-duty plastic zip bags, covered with a tarp, and disinfected prior to transport. USDA APHIS VS may assist in finding contractors to take containers to a landfill, renderer, or other off-site disposal location (Slingluff et al., 2014).

The U.S. Department of Transportation and USEPA regulate interstate truck transport, with only a limited role for the USDA to regulate animal transportation for animal health. USDA protects animal health during transportation through regulations that generally prohibit interstate movement of diseased animals (9 CFR 71.3) or those comingled with dead animals (9 CFR 71.17) or garbage (9 CFR 166.8), and by requiring the final carrier to clean and disinfect conveyances before reuse (9 CFR 71.5, 71.6). Vehicle owners are responsible for cleaning and disinfecting, which is done without expense to the USDA (9 CFR 166.14). Many methods can be used to disinfect vehicles and equipment used to transport swine, swine products, and carcasses, including heat and registered disinfectants and soaps discussed further in Section 2.1.2.4 of this EA. USDA APHIS representatives can inspect and stop the interstate movement of infected or disease exposed animals (9 CFR 71.13). Other than these types of justifiable requirements to protect animal health and ensure biosecurity of transported materials, USDA cannot restrict the time, place, or manner of interstate movement, which includes the emission efficiency of conveyances.

2.1.1.4 Cleaning and Disinfection

ASF virus is highly contagious and can survive on various surfaces (Mazur-Panasiuk et al., 2019). Aggressive cleaning and disinfection practices are required for both ongoing biosecurity measures to contain the virus to infected premises and to eliminate the virus from contaminated equipment, materials, and other fomites (objects or materials that carry infectious agents, such as vehicle tires, equipment, and shoes). Cleaning is the removal of gross contamination, organic material, and debris from the premises. Cleaning can be mechanical, like sweeping (dry cleaning) or the use of water and a soap or detergent (wet cleaning). Disinfection refers to the methods that are used on surfaces to destroy or eliminate microorganisms, such as viruses and bacteria. ASF virus disinfection can be physical (e.g., heat) or chemical (e.g., disinfectants); a combination of methods may be required. Chemical disinfectants assist in protecting animal health by inactivating microbes on hard nonporous surfaces that cause disease in animals. Cleaning and disinfection activities focus on eliminating the virus in the most cost-effective manner possible.

Pesticide applicators must carefully follow disinfectant label directions including the contact time (the amount of time the surface should remain visibly wet with the disinfectant), use of protective equipment, use limitations, dosage, entry restrictions and all other directions, to safely handle and use the products and avoid harm to human health and the environment. If the ASF virus or the appropriate use sites do not appear on the label, applicators must either find another registered product or states must get the use approved under an alternate registration, such as a Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) section 18 emergency exemption or a FIFRA section 24(c) approval (see the following USEPA website for additional information on section 18 and section 24(c) registrations: https://www.epa.gov/pesticide-registration/guidance-fifra-24c-registrations and https://www.epa.gov/pesticide-registration/pesticide-emergency-exemptions, respectively).

There are eight disinfectant products registered by USEPA for use against the ASF virus in/on farm premises, structures and equipment; veterinary equipment and premises; and food processing equipment and premises (USDA APHIS, 2023d). The products contain the following active ingredients:

- alkyl dimethyl benzyl ammonium chloride,
- didecyl dimethyl ammonium chloride,
- glutaral,
- hydrogen peroxide,
- sodium chloride,
- sodium dichloro-s-triazinetrione, and/or
- potassium peroxymonsulfate.

USDA APHIS also maintains four FIFRA section 18 emergency exemptions (i.e., sodium hypochlorite, acetic acid, citric acid, and thymol) for use against the ASF virus (USDA APHIS, 2025). The selection of a specific product for use on premises, vehicles, and/or equipment would likely follow a conversation involving state and federal personnel. USDA APHIS VS could assist swine producers with sources for cleaning and disinfection products and, during outbreak procedures, assist with cleaning and disinfection activities.

Since outdoor areas cannot be properly cleaned and disinfected, fallowing (leaving land idle or inactive) can be considered. Use of a fallow period in place of cleaning and disinfection is often used as a cost-effective virus elimination practice. Fallowing for a minimum of 180 days after the completion of depopulation/ euthanasia may be an option for premises upon the approval of USDA APHIS VS and State personnel (USDA APHIS, 2020). During the fallow period, the premises owner will maintain these conditions:

1. No swine shall be introduced; premises must remain vacant of all swine.
2. No materials or equipment are to be removed prior to the completion of the fallow period; exceptions may be made if proper cleaning and disinfection have been conducted in accordance with VS and State personnel.
3. The affected premises must be adequately fenced or other measures taken to prevent unauthorized access and the incursion of feral swine.
4. Measures are taken to prevent the attraction of wildlife (e.g., access to feed).

Restocking premises prior to the conclusion of the fallow period may result in a restock violation and the resetting of the fallow period. A premises may not restock until approved to do so.

2.1.1.5 Odors

Odors are a complex mixture of various free and particle-bound compounds (Bunton et al., 2007), that may include gases, such as ammonia and hydrogen sulfide, and trace amounts of more than 330 odorous volatile organic compounds, such as ammonia and amines, volatile fatty acids, alcohols, and carbonyls, hydrogen sulfide, indoles, skatoles, mercaptans (Liu et al., 2014). Generally, odor levels associated with animal agriculture depend on site-specific conditions including the species, local climate, geography, size and type of the facility, animal diet, manure management system, ventilation system, regulations, and human factors (Bokowa et al., 2021). Odors may come from the animals themselves and the livestock housing facility, including feed, but mostly are the result of the handling, storage, treatment, and land application of animal manure (Bokowa et al., 2021).

State, regional, county, and municipal air pollution control entities can regulate odor emissions in their jurisdictions, but no federal standards and standardized measurement methodologies have yet to be enacted (CDC, 2016; USEPA, 2018). Many state governments have laws regulating concentrated animal feed operations, animal feeding operations, and the management of routine and catastrophic livestock mortalities that include odor control (ADA, 2021; CDC, 2016; Mukhtar, 2012; Payne, 2017).

Both routine and emergency carcass management operations are permeated with odors and the smell of decaying animal flesh causes revulsion in most humans. To a certain extent, the human nose can become desensitized during extended exposure to any smell, therefore distress is likely to be felt by workers only from time to time. Passersby are likely to avoid the smells by leaving the area and closing vehicle windows. People residing downwind from a carcass management operation are not likely to be able to avoid periodic wafting odors.

The effective and prompt disposal of animal carcasses and associated materials is a critical component of a successful response during an animal disease outbreak. Following standards and best management practices when disposing of swine carcasses minimizes biosecurity risks and potential environmental and public health effects. For example, properly constructed compost piles are covered with two feet of carbon material and are managed and monitored during the process so that odors are absorbed and minimized (ADA, 2021; Mukhtar, 2012; Payne, 2017). In Kentucky, livestock carcasses being buried must be covered with at least two inches of quicklime, in part, to prevent odors (Higgins et al., 2024).

USDA APHIS VS and others (MBAH, 2002; USDA APHIS, 2023a) may provide troubleshooting guidance for odor problems arising from disposal of carcasses and potentially infected material but USDA APHIS VS does not manage odor. The responsibility to manage odor lies with the swine owner and producer.

2.1.2 No Federal Operational Assistance Alternative

Under this alternative, if an ASF outbreak were to occur, State authorities, Tribes, and swine producers and owners would be responsible for operational activities such as depopulating infected swine herds, disposing of the carcasses, and completing cleanup and disinfection. USDA APHIS VS would provide technical guidance and equipment upon request, by the state, territory, or Tribe. Under the No Federal Operational Assistance Alternative, USDA APHIS would continue to conduct surveillance to monitor for ASF and determine if outbreaks have occurred. USDA APHIS VS would not be involved in depopulation, disposal, clean-up, and disinfection at sites where ASF is detected within the mainland United States. USDA APHIS VS would monitor sites after depopulation and carcass management activities have been implemented to determine if ASF has been eradicated. The U.S. territories of Puerto Rico and U.S. Virgin Islands do not have adequate infrastructure and state or local resources to respond to an outbreak without USDA APHIS assistance. Therefore, USDA APHIS VS would provide operational assistance with an ASF response in U.S. territories under both alternatives. Otherwise, under this alternative, USDA APHIS VS would not provide any operational assistance with ASF response actions.

USDA APHIS VS would provide indemnity payments for depopulated swine subject to regulatory requirements (9 CFR part 53). Under the AHPA (7 U.S.C. 8301 et seq.), USDA APHIS VS can make indemnity payments of up to 100 percent of the fair market value for animals that must be destroyed because they are exposed to disease. Further, the AHPA also authorizes USDA APHIS VS to compensate certain costs associated with cleanup, disinfection, and disposal of animals and materials, as necessary to eliminate the virus (USDA APHIS, 2023a).

In the event ASF is detected in the United States, a State, territory, or Tribal official would immediately issue a quarantine, hold order, or standstill notice and restrict movement of swine and pork products from infected premises based on the authority and regulations of the affected State or territory. USDA APHIS VS may issue a federal quarantine when requested by a State Animal Health Official or as directed by the Secretary of Agriculture. This action is based on statutes and regulations of the affected state or territory, but varies by State (USDA APHIS, 2023a). An Incident Command would be set up by USDA APHIS VS, the response lead program, to ensure all personnel responding to an outbreak are working in unison so that resources are used efficiently (USDA APHIS, 2022f).

Within the unified Incident Command, the Incident Commander works with the Operations Section (unit responsible for executing tactical activities) and Situation Unit (unit responsible for collecting, processing, and organizing the incident information) to determine zone, area, and premises designations during an ASF outbreak. These designations are captured in the Emergency Management Response System 2.0 (USDA APHIS, 2023a). Under the No Federal Operational Assistance Alternative, USDA APHIS VS would monitor the outbreak location and provide recommendations to the impacted States or territories as to whether it is appropriate to lift the quarantine when the premises meets the State's criteria for release of quarantine and movement control (USDA APHIS, 2023a). The State agencies, swine producers or owners, and contractors would be responsible for depopulation, disposal, including any associated transportation of carcasses and infected material to an off-site disposal facility, and disinfection and clean-up of the affected premises.

2.2 Alternatives Considered but Not Analyzed in Detail in the PEA

A few alternatives were considered but not further analyzed because they are not technically or economically feasible or would not meet the management goal of surveillance and eradication of ASF if detected. These alternatives are described here.

2.2.1 No Federal Support Alternative

Under the No Federal Support Alternative, USDA APHIS VS would not conduct ASF eradication operations; all operational ASF outbreak response activities would solely be left up to State agencies, Tribes, and swine owners and producers to direct and implement as outbreaks occurred. State agencies, Tribes, swine owners and producers, or private entities would conduct depopulation, disposal, cleaning and disinfection, and transportation activities as needed and as funding allowed but would do so without federal assistance or guidance. Unlike the No Federal Operational Assistance Alternative, USDA APHIS VS would not provide any support of any kind

under the No Federal Support Alternative: no operational, financial, or surveillance support, no technical consultation, and no loaning of equipment.

If ASF gets detected in a state that is unable to eradicate it quickly or completely on its own, ASF may spread to other swine herds in the United States. Such an outcome would negatively impact the U.S. pork industry and likely international trade because the United States may be unable to sell swine products to trade partner countries because of concerns that ASF could spread to their countries. Thus, this alternative would neither meet the purpose and need for action nor USDA APHIS VS' goal to quickly eradicate ASF so it does not gain a foothold in the United States. This alternative would be counter to the AHPA (7 U.S.C. 8301-8317) whereby Congress articulated that disease outbreaks would be controlled through interdiction, research, and eradication and provided authority to the Secretary of Agriculture, which was delegated to USDA APHIS VS, to "carry out operations and measures to detect, control, or eradicate any pest or disease of livestock" (AHPA, 7 U.S.C. § 8308(a)). Thus, this is not a viable alternative to meet the need for action and USDA APHIS VS would be unable to fulfill its mission. Additionally, this alternative would be counter to USDA APHIS VS' mission to protect the health of livestock, including swine, in the United States by preventing the introduction and interstate spread of serious diseases and pests of livestock, and for eradicating such diseases within the United States, when feasible (see 7 CFR 371.4(a); USDA-APHIS: Veterinary Services). For these reasons, a No Federal Support Alternative is not a viable alternative and does not warrant further analysis as a separate alternative in this PEA.

2.2.2 Nonlethal Only Alternative

ASF is an emerging disease threat to swine, which could have impacts to the human environment without coordinated intervention. A common alternative often requested in public comments is a Nonlethal Only Alternative. Currently, there is no ASF vaccine approved for use in the United States and no effective treatment for ASF aside from early detection and depopulation. Live attenuated vaccines used on the Iberian Peninsula during 1960s might have been the origin of some low virulence strains that induced the onset of chronic forms of the disease (Sanchez-Vizcaino et al., 2012). Attempts to develop ASF antibody or vaccine protection only delayed the onset of symptoms and death. Although significant and promising advances continue to be made in developing an ASF vaccine, there is still no commercially available, effective vaccine approved for emergency use in the United States. Some of the recently developed gene-deleted live attenuated virus vaccines are showing promising results (Borca et al., 2023; Zhang et al., 2023).

In May 2025, WOAH adopted an ASF vaccine standard that aims to set out minimum standards for safe and effective vaccines (WOAH, 2025), such that:

1. They are effective in reducing the severity of the disease, limiting transmission of the virus and providing immunity to the animal, therefore reducing production losses due to ASF.
2. They must be proven safe before use, meaning they do not cause lasting or severe clinical signs, harm the environment or contain wild ASF viruses or other harmful agents.
3. Finally, they must match the circulating ASF genotype in the region of vaccination to ensure effectiveness and limit the risk of reversion to virulence and recombination.

According to WOAH, as of January 31, 2025, although there are countries that have approved or are conducting vaccine field trials, no countries or territories have reported the use of vaccines either in response to an ASF outbreak or as a preventative measure (WOAH, 2026).

If a safe and effective vaccine for ASF were to be developed, USDA APHIS would need to carefully consider the potential trade and disease control consequences of vaccination before approving an ASF vaccine for domestic use. Vaccine use could interfere with our ability to detect the disease quickly before the virus spreads, and this limited detection ability could lead to trade partners restricting their imports of U.S. pork and pork products, even when we are not experiencing an outbreak.

Currently, swine populations need to be depopulated and carcasses and ASF-infected materials must be disposed of to effectively eliminate further transmission of this disease. The Nonlethal Only Alternative would not meet the purpose and need of the proposed action at this time. WOAH notes that "…improvements in vaccine development and strengthened international standards for vaccine approval do not position vaccination on its own as a viable method for ASF control. Successful disease management involves a combination of biosecurity practices, import measures and animal movement control to which vaccines are a complementary action (WOAH, 2025)." If available, use of a safe and effective vaccine on U.S. swine would have to be part of a multi-layered ASF control strategy, such as described by WOAH, and not as a single solution.

2.2.3 Prohibition of Certain Depopulation and Disposal Methods Alternative

Under this Alternative, USDA APHIS VS would disallow certain depopulation and disposal methods without exception. USDA APHIS VS' ASF outbreak response aims to stop the production of the ASF virus by infected domestic swine. This is accomplished by rapid mass depopulation and the appropriate disposal of infected, and potentially infected, swine and materials. Given that decisions about depopulation and disposal are often time sensitive, it is both more efficient and better meets the purpose and need to quickly eradicate ASF outbreaks to rely on state and local partner expertise to determine the best depopulation and disposal method(s) based on the site-specific situation. USDA APHIS VS may be consulted and may provide concurrence that the selected methods are appropriate, but the Agency is not the ultimate decisionmaker. State and local partners have a more intimate knowledge about an infected premises and their own environmental laws and thus the reliance on state and local partners in determining the most appropriate methods to use on a premises-by-premises basis is necessary.

Because USDA APHIS VS cannot predict whether it will declare an extraordinary emergency in the future, USDA APHIS VS cannot implement an alternative that outright prohibits certain depopulation or disposal methods. Moreover, certain methods, while unpopular, such as depopulation using VSD+, may be necessary in some situations to meet the purpose and need to quickly depopulate ASF-infected swine to reduce viral contamination and eradicate the virus. In any instance that USDA APHIS VS determines that the depopulation or disposal method(s) chosen are not the most appropriate to use at an infected premises, USDA APHIS VS may limit indemnity payments and/or compensation. This is already something that can be done under the Federal Operational Assistance Alternative and the No Federal Operational Assistance

Alternative. For these reasons, a Prohibition of Certain Depopulation and Disposal Methods Alternative does not warrant further analysis as a separate alternative in this PEA.

3 Potential Environmental Impacts

This chapter of the PEA identifies the potentially affected environment and considers the potential effects of USDA APHIS ASF outbreak response actions on human health and the environment under each alternative. The sections in this chapter discuss the existing conditions, the potential impacts of the alternatives under each of the issues identified in Section 1.5, and other reasonably foreseeable actions.

3.1 Evaluating Potential Impacts of the Proposed Action

In its NEPA implementing regulations, USDA defines "potentially affected environment" as the condition of the physical, biological, social, and economic factors that may be impacted by a proposed action (or action alternative) environment of the area(s) to be affected or created by the alternatives under consideration (7 CFR 1b.2(f)(3)(i)). This PEA describes the physical and social effects that may occur from USDA APHIS VS proposed ASF response activities. To make an informed decision about which actions to take, it is necessary for a federal agency to understand who and what may be affected. While U.S. swine production operations are heavily concentrated in the Midwest and eastern North Carolina, small local producers or owners with backyard herds or swine as pets throughout the United States or U.S. territories may potentially be impacted by ASF. As a result, this PEA considers the potentially affected environment to be the entire United States and its territories.

Typical emergency response activities that occur regardless of the location of an ASF outbreak include establishing control zones centered on commercial and backyard premises with confirmed ASF detections. This EA assumes that the area most likely to be affected by ASF response operations occurs within each control zone (i.e., the zone immediately surrounding an infected premises and the buffer zone that immediately surrounds an infected zone (USDA APHIS, 2023a)). USDA APHIS VS support of the response by any U.S. state or territory in the potential program area would extend, as necessary, to new ASF-affected locations within those states or territories.

After swine depopulation occurs on ASF-infected and potentially infected properties, USDA APHIS VS and State officials would help premise managers or owners evaluate disposal options based on the size of the herd, local conditions, and applicable laws/regulations (USDA APHIS, 2015a). Animal health authorities may determine that off-site disposal is the best available option for managing carcasses; in these instances, carcasses would be transported over local roads.

Per 7 CFR 1b.2(f)(3), in considering whether the reasonably foreseeable impacts of the proposed action are significant, USDA APHIS will consider and analyze the potentially affected environment and degree of the effects of the action. In considering the degree of the effects, USDA APHIS should consider the following, as appropriate to the specific action in the context of the potentially affected environment:

- Both short- and long-term effects.
- Both beneficial and adverse effects.
- Effects on public health and safety.

- Economic effects.
- Effects on the quality of life of the American people.

3.1.1 Resources (Issues) Not Evaluated or Not Analyzed in Detail

The following resources or issues described in this section are not expected to be affected by the alternatives analyzed or there is no difference in potential impacts between the alternatives. These resources will not be analyzed further.

3.1.1.1 Swine Production and Practices

A concern raised by the public in their submitted comments on other USDA APHIS animal health emergency response programs is that the livestock industry contributes waste and other pollutants into the environment. Swine production processes are described in the Swine Industry Manual (USDA APHIS, 2011) and indicate areas of concern for swine producers. For most of the animal's life, bedding, waste, and gaseous emissions from swine are removed from the immediate environment or dispersed, so that they have, at most, minimal environmental impacts. However, potential environmental impacts can be associated with improperly managed waste that does not meet industry standards for swine operations. For example, a swine production or slaughtering facility that allows waste to build up can have environmental impacts from release of gases and leachate associated with waste. Although environmental impacts may occur as part of ongoing swine production facilities, these impacts are beyond USDA APHIS VS authority to regulate, especially under the AHPA. USDA APHIS VS does not have the regulatory authority to alter the federal or state permitting processes associated with sources of pollutants from animal production. Environmental pollutants associated with swine production are regulated by USEPA, States, and, in some instances, local government.[11]

Another public concern often voiced is that livestock should not be raised in confined spaces and should be raised in low-density environments. The raising of swine is not regulated under the AHPA (7 U.S.C. 8301 et seq.) or the Animal Welfare Act (7 U.S.C. § 2131, et seq.). This means that the choices of production practices are business decisions not subject to USDA APHIS control under these Acts. Many swine producers voluntarily participate in the U.S. Swine Health Improvement Plan (U.S. SHIP), a collaboration between state and federal officials, in order to demonstrate that the producers adhere to principles that limit disease spread, including ASF (USDA APHIS, 2022e). The U.S. SHIP addresses biosecurity standards, disease surveillance, compliance agreements, and more. Because USDA APHIS VS has limited authority to regulate the conditions for raising swine, changes to swine production practices are unlikely to change Agency activities associated with responding to an ASF outbreak.

3.1.1.2 Land Use and Infrastructure

According to the USDA Economic Research Service (USDA ERS, 2017), the overall major land uses in the continental United States are grassland pasture and rangeland (29 percent of U.S. total

[11] See Laws and Regulations that Apply to Your Agricultural Operation by Farm Activity | US EPA for more information.

acreage); forest land (28 percent); cropland (17 percent); special uses (such as parks and wildlife areas) (14 percent); miscellaneous uses (such as wetlands, tundra, and unproductive woodlands) (nine percent); and urban land (three percent). Figure 1 shows larger waterbodies (Great Lakes) and major land uses of the continental United States. Besides the natural land cover, there is manmade infrastructure that is not likely to be impacted by ASF outbreaks. Commercial and backyard swine production are likely found on farmlands (cultivated lands) and/or developed open spaces (Figure 1).

Land use, such as whether a farm is used to produce swine, and infrastructure, such as the barns used to raise swine, are expected to remain the same under both alternatives and be unaffected by ASF outbreak response activities. USDA APHIS VS does not have the authority to mandate swine housing, including density, number, location, or type of housing. USDA APHIS ASF emergency response activities are not expected to impact natural resources or habitats and, thus, these are not further evaluated in this PEA.

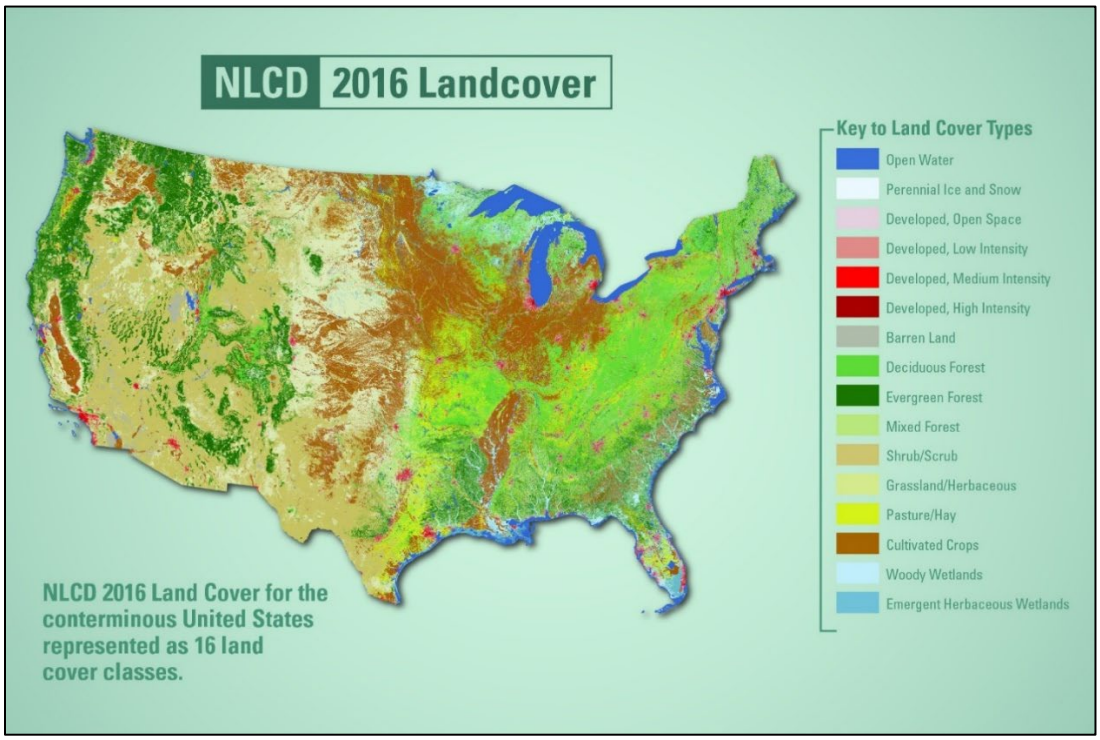

Figure 1. Land cover map of conterminous United States.

Source: (USGS, 2016).

3.2 Evaluation of Affected Environment

Measures to stop disease spread currently include disease monitoring and surveillance, and quarantine and movement controls. If an outbreak were to occur, measures would include depopulating affected herds; disposing of the carcasses and potentially infected onsite materials; and cleaning and disinfecting facilities and equipment. Under the Federal Operational Assistance Alternative (No Action), in addition to conducting disease monitoring and surveillance, USDA APHIS VS would work alongside and in close coordination with State and local government

partners and swine producers or owners to assist, when requested, with depopulation, disposal, transportation, and clean-up and disinfection at ASF-affected premises. Under the No Federal Operational Assistance Alternative, USDA APHIS VS would focus on disease monitoring and surveillance and provide recommendations and technical assistance with respect to all other aspects of an ASF outbreak response.

The potential impacts on soil, air, and water quality; human health (including effects on health and safety, the economy, socioeconomics, cultural and historic resources, children's health, and Tribes); and wildlife health, including migratory birds, eagles, and threatened and endangered species, are considered from depopulation, carcass management, transportation, odor considerations, and clean-up and disinfection of premises (including equipment used) and discussed, below, under each of the action alternatives.

3.2.1 Depopulation Methods

Thus far, ASF has not been detected in the United States or its territories. Currently, the only available approach to control and eradicate ASF is depopulation of infected animals. In the event of an outbreak, combinations of depopulation methods may need to be used due to on-site conditions (e.g., different types of housing) or insufficient resources (e.g., water) needed for a particular method. Depopulation methods were described in detail in Section 2.1.1.1. and are summarized in Appendix B. USDA APHIS VS may use other depopulation methods not identified in this document that may become available in the future if they have the same or fewer potential environmental impacts as those identified in the PEA.

3.2.1.1 Potential Impacts: Federal Operational Assistance Alternative (Preferred Alternative/No Action Alternative)

Under this alternative, in the event of an ASF outbreak, USDA APHIS VS would provide technical guidance with depopulation methods as under the No Federal Operational Assistance Alternative but could additionally provide the personnel and resources needed to help complete depopulation in a timely manner, if requested. State and Tribal partners and swine producers have the ultimate responsibility for selecting the method(s) of depopulation that will be used at a particular location. USDA APHIS VS would consider and may approve requests for indemnity from swine producers/owners. Upon request, USDA APHIS VS could mobilize equipment, supplies, and USDA APHIS personnel and contractors to assist with depopulation activities. Additionally, as under the No Federal Operational Assistance Alternative, USDA APHIS VS or State animal health officials would observe the depopulation to ensure it is carried out according to AVMA (2026) guidelines. It is expected that under the Federal Operational Assistance Alternative (Preferred Alternative/No Action Alternative), USDA APHIS personnel, upon request from the State or Tribes, will be involved in depopulation activities should an ASF outbreak occur in the United States.

Through NVS, USDA APHIS VS has access to various types of depopulation equipment that are often on standby in many areas of the country or can contract out the work to companies with the needed equipment. The type of herd (i.e., commercial or backyard), the swine production method, and the availability of equipment and resources at a specific location all influence the

decisions about the depopulation methods used to achieve the goal for depopulation in as short a time frame as possible.

USDA APHIS VS personnel, in coordination with State officials and swine operation personnel and owners, would use the most humane method available given the on-site conditions, the type of herd (backyard or commercial), location, and the availability of resources (people with expertise and methods), following USDA APHIS VS guidance (USDA APHIS, 2023a). Per AVMA (2026), VSD+ should only be considered when "circumstances preclude the reasonable implementation of any Tier 1 or 2 methods and when the risk of doing nothing is likely to have a reasonable chance of resulting in significantly more animal suffering than that associated with the proposed depopulation method (AVMA, 2026)." The same depopulation methods are available for use under either of the alternatives and the primary issue is the humaneness of the methods and who is implementing them. AVMA (2026)concluded that these methods can be used humanely for mass depopulation of swine, but some methods, such as VSD+, are only recommended for use in limited circumstances (AVMA, 2026). A difference that could occur under the Federal Operational Assistance Alternative (Preferred Alternative/No Action Alternative) is that USDA APHIS personnel that use these methods undergo national training to use them efficiently and effectively, which may allow for ASF to be stamped out faster. While most states and producers can use these same methods, they may not have the same level of training that USDA APHIS gives employees.

3.2.1.2 Potential Impacts: No Federal Operational Assistance Alternative

Under the No Federal Operational Assistance Alternative, State and Tribal partners and swine producers or owners have the ultimate responsibility for selecting the method(s) of depopulation that will be used at a particular location in the event of an outbreak. Upon request from a state official or swine owner, USDA APHIS VS could provide technical guidance on depopulation methods that would be effective given the current on-site conditions and characteristics, but USDA APHIS VS personnel would not assist with implementation. If the swine owner submits an indemnity request, depopulation must be conducted according to AVMA guidelines (AVMA, 2026). Additionally, either state or USDA APHIS VS personnel must be on-site to ensure that depopulation is completed and done correctly.

States and industry will likely perform depopulation without operational federal assistance in situations where they have sufficient resources. If the States, Tribes, or swine producers or owners do not have the resources to properly manage an outbreak, it is possible that ASF could spread further without quick and efficient depopulation of infected swine. With respect to environmental impacts, a concern is whether the goal to depopulate as quickly as possible can be met without federal operational assistance.

3.2.2 Carcass Management – Disposal, Transportation, Cleaning and Disinfection, and Odor

Carcass management, transportation, and cleaning and disinfection are concerns USDA APHIS VS closely coordinates with its regulatory partners including State and federal (e.g., USEPA can be involved in waste management) officials. In the event of an ASF outbreak, USDA APHIS VS

and State officials will work together to evaluate disposal options based on the size of the herd, local conditions, and applicable laws and regulations to ensure the safe disposal of carcasses (USDA APHIS, 2015a). USDA APHIS VS may recommend other disposal or cleaning and disinfection methods not identified in this document that may become available in the future if they have the same or fewer potential environmental impacts as those identified in the PEA.

3.2.2.1 Potential Impacts: Federal Operational Assistance Alternative (Preferred Alternative/No Action Alternative)

Under this alternative, USDA APHIS VS would provide not just technical assistance and recommendations as under the No Federal Operational Assistance Alternative, but also operational assistance in carcass management activities. Such assistance would help minimize any potential impacts from carcass management.

USDA APHIS VS takes an integrated approach to disposal and recommends a single or combination of methods to ensure proper disposal with minimal potential to affect the environment and have ASF stamped out quickly (USDA APHIS, 2015a; 2017b). Disposal methods that may be used, either alone or in combination, during a potential ASF emergency response may include:

- Composting,
- Burial,
- Landfill,
- Rendering,
- Incineration, and
- Open-air burning.

When done correctly following USDA APHIS guidelines for disposal, these disposal methods reduce the likelihood of any potentially adverse environmental impacts (USDA APHIS, 2015a; 2017b). As described in the Carcass Management EIS (USDA APHIS, 2015a), standard operating procedures and mitigation measures are available to ensure that carcass management has no effect on the environment, even when 50 tons of carcasses are exceeded. USDA APHIS evaluation of the potential environmental impacts of carcass management activities from the Carcass Management EIS (USDA APHIS, 2015a) is being incorporated herein by reference. Potential impacts to soil, water, and air resources associated with the disposal methods used are discussed below in Sections 3.2.3, 3.2.4, and 3.2.5, respectively.

USDA APHIS VS personnel would likely assist with the implementation of carcass management and cleaning and disinfection. USDA APHIS VS, State partners, and swine owners/producers would determine the appropriate methods for a given site. USDA APHIS VS could help with providing expertise, finding contractors, and providing resources, such as carbon for composting. USDA APHIS VS also could assist in identifying and coordinating with local landfills, incinerators, renderers, or off-site composting facilities, as well as obtaining contractors for transportation to and from these disposal facilities. USDA APHIS VS can provide a list of approved disinfectants and on a case-by-case basis can assist with contracting to carry out disinfection (depending on resources locally available, including personnel).

USDA APHIS provides training to its personnel on the various modes of disposal and biosecurity for transportation. Therefore, the potential spread of ASF would likely be reduced with the additional assistance from USDA APHIS VS in operational activities with managing ASF outbreaks.

Transport to offsite locations may be necessary for specific premises that may not be environmentally suitable for onsite disposal, have the space, or the means to quickly dispose of carcasses. Offsite disposal methods may include rendering, incineration, landfill, and offsite burial or composting.

Deliveries to and from a landfill are coordinated in advance between the landfill and the State or federal site manager on an infected premises (USDA APHIS, 2012). As a result, it may take one day or several days to complete offsite disposal. Completion of landfill disposal may be delayed as a result of weather which would interfere with loading of carcasses at the premises or the landfill's schedule (e.g., only open on weekdays). Disposal at a digester or incinerator may also need to be arranged in advance with that facility prior to transporting carcasses.

Air pollutant emissions resulting from the transport of swine carcasses and ASF-infected materials from commercial and backyard premises are expected to be short-term, transient, and minimal. Potential air emissions are discussed further in Section 3.2.5, Air Quality.

As part of an ASF response, stringent biosecurity measures while handling ASF-infected swine are required to ensure that ASF does not infect additional swine elsewhere (USDA APHIS, 2019a; 2023a). People and vehicles transporting live swine, pork products, and carcasses into and from the infected area can potentially transport the ASF virus. For example, during outbreaks, equipment may be moved between premises to depopulate herds and dispose of carcasses. Equipment can potentially carry the ASF virus and will need to be properly cleaned and disinfected to ensure that the virus does not spread.

Biosecurity plans give site-specific guidance on creating a perimeter buffer area, a cleaning and disinfection station for vehicles and people coming and going on the premises, and a designated area for personnel and vehicles that have not gone through cleaning and disinfection to ensure the ASF virus is not transported into or out of a swine holding facility, compost sites, feed bins, manure sheds, and other areas related to the swine operation. These biosecurity measures are used routinely and would be used during an ASF outbreak (USDA APHIS, 2015a; 2017b).

There are several disinfectant products available that may be used to disinfect vehicles, personnel clothing and equipment, farm equipment, supplies, and buildings. Production facilities may also consist of open floor areas, which would require the removal of litter and manure prior to disinfection efforts. It is a pesticide applicator's responsibility to ensure that a USEPA and State-registered product is approved for ASF disinfection and for the intended use site (USDA APHIS, 2023d).

USDA APHIS VS and others (MBAH, 2002; USDA APHIS, 2023a) provide troubleshooting guidance for odor problems arising from disposal. For example, for burial pits, carcasses and

debris should be covered soon after they are inserted. For incinerators and other disposal methods, consider wind direction. For composting, consider the proper addition and layering of additives (e.g., carbon sources) to assist with odor control. However, USDA APHIS VS does not manage odor. The responsibility to manage odor lies with the swine owner.

State, regional, county, and municipal air pollution control entities can regulate odor emissions in their jurisdictions, but no federal standards currently exist to directly regulate odors (CDC, 2016; USEPA, 2018). For this reason, odors associated with emissions from animal feeding operation are often regulated in response to nuisance complaints rather than demonstrated health effects (CDC, 2016).

Because new knowledge is obtained while an outbreak is ongoing, it is expected that methods and strategies will evolve and shift to account for this new knowledge in order to ensure the best and most effective methods are used to meet the goal to stamp out ASF as quickly and efficiently as possible. USDA APHIS VS may recommend other methods not identified in this document that may become available in the future if they have the same or fewer potential environmental impacts as those identified in the PEA.

3.2.2.2 Potential Impacts: No Federal Operational Assistance Alternative

Under the No Federal Operational Assistance Alternative, upon request by a State, USDA APHIS VS would provide technical guidance and recommendations, such as for carcass disposal, disinfection of premises, and transportation equipment, but would not assist with implementation of any of these activities. Contractors (e.g., truck drivers delivering carbon sources for composting or picking up carcasses for off-site disposal, pesticide applicators) would be available to assist with activities, supplementing resources and operational assistance provided by the state and guidance provided by USDA APHIS VS.

USDA APHIS VS would only provide information on transportation biosecurity measures, such as bagging carcasses in secure bags for disposal, and sanitizing trucks prior to leaving the premises, to ensure ASF virus is not taken off the premises. Per 9 CFR Part 53, USDA APHIS VS makes compensation available for clean-up and disinfection when requirements are met.

3.2.3 Soil Quality

3.2.3.1 Federal Operational Assistance Alternative (Preferred Alternative/No Action Alternative)

ASF outbreak responses activities will occur under each of the alternatives with the main difference being the level of involvement of USDA APHIS VS. Depopulation methods are not expected to impact soils. The by-products of CO_2 and VSD+ are carbon dioxide and water, which do not impact soil quality. Similarly, water-based and nitrogen-filled foam and their by-products do not impact soil quality. The Class A fire-suppression foam concentrates utilized by USDA APHIS VS are considered readily biodegradable and do not contain PFAS that break down very slowly and could contaminate soils (Johnson Controls, 2024; Perimeter Solutions,

2019; 2022). Electrocution and captive bolt are physical methods that do not have by-products and so cannot impact soils.

Gunshot/bullets or lead ammunition fragments inadvertently left on the ground could potentially increase levels of lead in soil. However, lead ammunition is relatively stable in the environment and degrades slowly in terrestrial and aquatic environment, probably taking tens to hundreds of years (Pain et al., 2019). Once degraded, its environmental fate suggests that the small amounts of lead that may be present in the environment would not have an adverse impact to soil quality (USDA APHIS, 2022b). Most projectiles will remain in the animals and carcasses are retrieved and disposed of properly, so the amount of lead in the environment from depopulation of swine is expected to be minimal. Non-lead ammunition may be used under certain circumstances, removing the risk of lead exposure. Also, the use of gunshot is likely to be limited to depopulating small commercial herds, as a secondary depopulation method, or for feral swine within a Control Area or Surveillance Zone.

Generally, use of injectable euthanasia agents for depopulation is only practical for small numbers of swine, so it is expected that its use would be limited in an ASF outbreak. Small amounts of the euthanasia agents may be released into the soil during administration/application of the drug or through excretion in urine/feces. Soil concentrations would be extremely low due to the low quantities of the injectable euthanasia agents used, the small amount of waste excreted and the metabolism and degradation of drugs. As a result, this depopulation method is unlikely to impact soil (USDA APHIS, 2024b).

Decaying carcasses release chemical contaminants or leachate. Disposal of depopulated animals could potentially impact soils if mitigation measures are not followed. Unlined burial or open-air burning of carcasses would be the methods with the most potential to impact soils because the byproducts of these methods are not contained and have a greater chance of migrating to nearby soils, primarily in the immediate area where unlined burial or open-air burning occurs. However, these disposal methods are likely to not be allowed in many locations. State and local regulations may not allow burial of carcasses based on soil type or how close groundwater or surface water is located to the proposed burial site.

Indoor composting provides a controlled environment and is not expected to directly impact soil quality because the by-products of composting will not be in direct contact with soils. The proper siting and construction of outdoor compost piles minimizes any impacts to soil from leachate created during the carcass decomposition process because it contains the leachate and prevents contact with the soils. As discussed under Section 3.2.4, Water Quality, a compost pile with a sufficiently thick base layer of porous carbonaceous material would absorb excess moisture and minimize the migration of leachate from the compost to the soil (USDA APHIS, 2015a). Additionally, an impermeable layer of a low-porosity soil base, pavement, or a suitable liner material may be placed beneath the compost pile to prevent movement of leachate into the soil (USDA APHIS, nd-a). As with composting, the layer of carbonaceous material used beneath carcasses for shallow burial with carbon would absorb decomposition fluids.

Finished compost may be used to enrich soil on-site or at other locations by providing nutrients and minerals, such as nitrogen, phosphorus, and potassium, that would increase crop yield and

plant growth. However, excess nutrients in the soil could also be harmful to plants. Additionally, nutrients found in compost and applied to the soil surface may be susceptible to moving off-site as runoff, so compost should be applied appropriately. Due to the fact that primarily nutrients will be released into the soil, the impacts to soils from composting are expected to be minor, but similar under each alternative (USDA APHIS, 2015a).

Disposal using outdoor composting or on-site burial may potentially disturb soil by digging trenches and removing topsoil and may compact soils from the use of heavy equipment, impacting soil quality. Disposal on-site at commercial and large backyard premises is not likely to be on previously undisturbed soil as these areas are already disturbed by the routine agricultural activities that take place there. With smaller backyard operations or pets, only a small area of soil would be disturbed, reducing any potential impacts.

Offsite rendering, incineration, and landfill disposal are conducted at permitted facilities with controls meant to protect the environment and would be expected to reduce any potential impacts to soils. Additionally, the release of chemicals from rendering, incineration, and landfill facilities are typically regulated through a Federal or State permitting process.

Impacts to soils from response activities are expected to be minor and similar under each alternative. Carcass management, including disposal, will be conducted regardless of the alternative and the particular disposal methods used would be more dependent on-site conditions than USDA APHIS VS involvement. Although, under the Federal Operational Assistance Alternative (Preferred Alternative/No Action Alternative) with additional USDA APHIS VS involvement and resources, the process is likely to be completed faster. The benefit of faster eradication of ASF is that it may prevent the spread of ASF to nearby premises or wild swine that may then infect other herds. USDA APHIS VS guidance and increased involvement in carcass management under the Federal Operational Assistance may minimize impacts to soil quality because of the Agency's expertise in handling outbreaks.

3.2.3.2 Potential Impacts: No Federal Operational Assistance Alternative

Under the No Federal Operational Assistance Alternative, USDA APHIS VS would focus on disease monitoring and surveillance and providing recommendations and technical assistance with respect to all aspects of an ASF outbreak. USDA APHIS VS may make recommendations on appropriate depopulation or carcass management methods, but ultimately, the State and swine owner/producer make the determination as to the method(s) to be implemented. However, soil impacts are expected to be similar whether USDA APHIS VS is involved or not in on-site response activities. The same carcass management and disposal methods (USDA APHIS, 2015a) are likely to be used under each of the alternatives, as the method chosen is based on site-specific factors including the number of carcasses, the type of premises, and whether on-site conditions are suitable for composting or burial. As a result, ASF response activities are expected to have minimal impacts on soils (USDA APHIS, 2015a).

3.2.4 Water Quality

The Clean Water Act (33 U.S.C. §§ 1251 et seq.) establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulates quality standards for surface waters. It is the primary federal law that protects the nation's water quality for the purposes of public health and welfare. Sources of water contamination may include soil erosion, leaching, surface water runoff, and groundwater contamination.

3.2.4.1 Potential Impacts: Federal Operational Assistance Alternative (Preferred Alternative/No Action Alternative)

Carcass management and disposal (USDA APHIS, 2015a) will be conducted regardless of the alternative and the particular disposal methods used are more dependent on-site conditions than USDA APHIS involvement. States have specific laws regulating the proper disposal of livestock (USDA APHIS, 2011), and property owners would be liable for all resulting environmental remediation costs associated with a disposal method (USDA APHIS, 2012). Thus, impacts to water quality from response activities are expected to be minor and similar under each alternative, although under the Federal Operational Assistance Alternative (Preferred Alternative/No Action Alternative) with additional USDA APHIS VS involvement and resources, the process is likely to be completed faster. The benefit of a faster completion of ASF eradication activities is that it may prevent the spread of ASF to nearby premises or wild swine that may infect other herds. USDA APHIS VS guidance and increased involvement in carcass management under the Federal Operational Assistance Alternative (Preferred Alternative/No Action Alternative) during outbreaks may minimize issues such as impacts to water quality because of the Agency's expertise in handling outbreaks.

Depopulation using CO_2 involves venting the CO_2 to the atmosphere. The gas does not mix with water and so it has no impact on water quality. The VSD+ process also has no impact on water quality as there is also no byproduct discharged to water. Electrocution and captive bolt are all physical methods that do not release chemicals or by-products into water and so cannot impact water quality.

Water-based or nitrogen-filled foam that may be used to depopulate swine have non-flammable and non-explosive properties, are used over a short duration, and are not expected to significantly impact water quality. The Class A fire-suppression foam concentrates utilized by USDA APHIS VS for compressed foam depopulation are considered biodegradable (Johnson Controls, 2024; Perimeter Solutions, 2019; 2022). These foam concentrates do not contain PFAS that break down very slowly and could contaminate groundwater or other water resources. Undiluted Class A foam concentrates can be toxic to aquatic life if in the water in significant concentrations. However, the foam concentrate is mixed with large volumes of water to create foam that has very low concentrations of the concentrate; for example water solutions with PHOS-CHEK WD881 used to generate foam only contain 0.1 to 1.0 percent of concentrate product by volume. Any spills of concentrate would be contained/absorbed to prevent runoff into sewer systems or bodies of waters. All applicable federal, state, and local regulations would be followed when using these products.

Injectable euthanasia agents are unlikely to impact water quality. Per FDA requirements in 21 CFR 522.900, animals euthanized with injectable euthanasia agents "must be properly disposed by deep burial, incineration, or other method in compliance with the state and local laws to prevent consumption of carcass material by scavenging wildlife". Use of these methods would prevent any release of these euthanasia agents to water bodies. Although these solutions could possibly be spilled on the ground during administration and, subsequently, residues end up in water from runoff; there is a low probability of this occurring (USDA APHIS, 2024b)

Gunshot/bullets or lead ammunition fragments inadvertently left on the ground could potentially increase levels of lead in soil. Lead ammunition degrades slowly in terrestrial and aquatic environments, likely over the course of tens to hundreds of years (Pain et al., 2019). Once degraded, its environmental fate suggests that the small amounts of lead that may be present in the environment would not have an adverse impact to water quality (USDA APHIS, 2022b). Furthermore, this is expected to be minimal as most projectiles will remain in the animals and carcasses are retrieved and disposed of properly. Non-lead ammunition may be used under certain circumstances, removing the risk of lead exposure. The use of gunshot is likely to be limited to depopulating small herds; as a secondary depopulation method; or for feral swine within a Control Area or Surveillance Zone.

Under each alternative, the leachate from decaying carcasses and disinfectants from disinfection activities may potentially impact water quality if not handled properly. The decomposition of large volumes of carcasses can create excessive amounts of leachate and other pollutants, such as ammonia, nitrates and chlorides. When the carcasses are buried and decompose, nutrients (i.e., nitrogen and phosphorus), pathogens (i.e., parasites such as *Cryptosporidium* and *Giardia* spp. or bacteria such as coliforms and *E. coli*), and other materials (i.e., heavy metals or drug residues) may be released into the environment if not contained (Engel et al., 2004). Without any mitigation measures, these may migrate into surface or groundwater and have been shown to impact water quality parameters, such as pH, conductivity, and biological oxygen demand (USDA APHIS, 2015a; Yuan et al., 2013). In general, the potential for impacts to surface water and groundwater quality rises as the number of carcasses increases and the proper disposal of carcasses becomes even more important.

Unlined burial may contribute to the release of leachate into impacted waters, or impairment of otherwise healthy water bodies (Pratt and Fonstad, 2011). Because unlined burial raises environmental concerns, it is only used in areas or circumstances where environmental impacts are expected to be minimal, such as the burial of a few carcasses, and where it is allowed under federal, state, and local regulations. The potential for the contamination of surface or ground water from unlined burial activities is reduced when disposal activities meet guidelines regarding the proper burial of carcasses (USDA APHIS, 2015a). Ensuring soils are not highly permeable and the water table is not within two feet of the bottom of the burial pit minimizes the likelihood of significant environmental impacts to surface water and groundwater (USDA APHIS, 2017b). The design and engineering of burial sites has changed significantly over time, now increasingly sophisticated liners and leachate collection systems are used to minimize risks to groundwater (Engel et al., 2004).

Research has shown that shallow burial with carbon generates less leachate than composting. In addition, using shallow trenches increases the separation from the groundwater table, which helps reduce the potential impacts on the soil (Flory et al., 2017).

Composting indoors within a structure can provide protection of the compost pile against bad weather, such as heavy rainstorms, and minimize the potential runoff of leachate into surface water or groundwater. Properly identifying an outdoor site for composting will minimize any potential impacts to water resources. During site selection, applicable State or local regulations, such as grading permits, sediment and erosion controls, and/or environmental approvals, should be considered to minimize runoff and protect water quality. USDA APHIS VS guidance (USDA APHIS, 2017a) for evaluating sites for outdoor composting recommends the following site factors that are protective of surface water and groundwater:

- Contain on-site soil depths or modify them, such as by creating a thicker base layer, to achieve at least 24-inches to seasonal high-water tables;
- Contain on-site soil depths in excess of 36 inches to bedrock;
- Not be located on a flood plain;
- Have (or construct) diversion ditches, terraces, or berms to direct surface water flows and storm water away from active compost piles.
- Meet state-specific setback requirements, which should be no less than:
  - 200-feet from a water supply well used for drinking;
  - 200-feet from water bodies, including: ponds, lakes, streams, rivers;
  - 200-feet from a nearby residence (not owned by the premises);
  - 50-feet from a drainage swale that leads to a water body; and
  - 25-feet from a drainage swale that does not lead to a water body.

A properly constructed compost pile would include a sufficiently thick base layer of porous carbonaceous material, such as wood chips, to absorb excess moisture and minimize the potential migration of leachate from the compost to the soil and groundwater (USDA APHIS, 2015a). If excess leachate is a concern, an impermeable pad of a low-porosity soil base, pavement, or a suitable liner material may be placed beneath the compost pile (USDA APHIS, nd-a). USDA APHIS VS maintains a roster of emergency mortality composting subject matter experts who have met specific training/experience standards and are available upon request to provide guidance during an animal health emergency.

Proper identification of an outdoor site for composting or burial and design will minimize any potential impacts to water resources. States have specific laws regulating the proper disposal of livestock (USDA APHIS, 2011). Most regulate separation distances of burial site from wells, surface water and the property line, and limit the number of animals that can be buried in an area, and some states have maps that show where animals can be buried safely and lawfully (USDA APHIS, 2011). It is expected that during site selection for burial of ASF-infected carcasses and material, all applicable federal, State, and local regulations would be followed under each alternative. The property owner is typically liable for all environmental remediation costs associated with the disposal method (USDA APHIS, 2012).

Offsite rendering, incineration, and landfill disposal are conducted at permitted facilities with controls meant to protect the environment and would be expected to reduce any potential impacts to water quality. Additionally, the release of chemicals from rendering, incineration, and landfill facilities are typically regulated through a Federal or State permitting process.

Open air burning is rarely used due to required permits (generally from a county or state fire marshal), which are not available in many locations. Combustion byproducts, such as ash, can be directly deposited onto surface water and, in some cases, may be transported down to groundwater via infiltration and percolation, potentially threatening water quality.

The disinfectants that would be used for ASF disinfection are registered for specific use with the USEPA. USDA APHIS VS assumes that disinfectants will be used according to label requirements, but it is the applicator's responsibility to do so. Label instructions for a disinfectant are provided for its proper application to protect human health and prevent potential environmental impacts associated with the use of the registered product. Users of chemical disinfectants must carefully follow label directions including the contact time (the amount of time the surface should remain visibly wet with the disinfectant), use of protective equipment, use limitations, dosage, entry restrictions and all other use directions, to safely handle and use the products and avoid harm to human health and the environment. For these reasons, potential impacts to water resources from ASF outbreak response activities are expected to be minor.

3.2.4.2 Potential Impacts: No Federal Operational Assistance Alternative

ASF outbreak response activities would occur under either of the alternatives, the main difference being the level of involvement of USDA APHIS VS. USDA APHIS VS guidance and increased involvement in carcass management during outbreaks may minimize issues such as impacts to water quality because of the Agency's expertise in handling outbreaks. However, because the States, localities, and Tribes can successfully employ outbreak response activities with varying levels of assistance from USDA APHIS VS, we do not anticipate the impacts to water quality to be appreciably different based on who is engaging in the outbreak response activities.

Under the No Federal Operational Assistance Alternative, potential impacts to water quality from transportation and cleaning and disinfection are expected to be the same whether USDA APHIS VS is involved or not in on-site response activities. The same disposal methods are likely to be used under either alternative, as the method chosen is based on factors including the number of carcasses, the type of premises, availability of materials and trained personnel, and whether on-site space is available for composting.

3.2.5 Air Quality

The Clean Air Act (42 U.S.C. §§ 7401 et seq.) is the primary Federal law that protects the nation's air quality for the purposes of public health and welfare. The Clean Air Act requires USEPA to establish National Ambient Air Quality Standards (NAAQS) for specific pollutants. These pollutants are known as criteria pollutants, and include ozone, particulate matter, carbon monoxide (CO), nitrogen dioxide, sulfur dioxide (SO_2), and lead. The standards are intended to

represent the maximum concentration of a specific pollutant in the ambient air that will not adversely impact public health or welfare. The USEPA will classify areas as in compliance (attainment) or not in compliance (nonattainment) with NAAQS. Per the Clean Air Act, States must develop plans to attain and maintain NAAQS in all areas of the country and a specific plan to attain the standards for each designated nonattainment area. The stringency of air pollution regulations in a specific area is based upon whether that area is in attainment (e.g., compliance) or nonattainment (e.g., not in compliance) with the standards.

The normal production and transport of livestock contribute to impacts to air quality. The agricultural and food sectors are among the largest users of freight transportation because products are transported from farm gates to storage or processing facilities before shipment to urban centers (DeCara et al., 2017). Commercially raised swine are often raised on farms specializing in individual production stages and ultimately transported offsite for processing (USDA ERS, 2013). Swine that die during the normal course of commercial production may also be transported offsite for disposal. In 2015, transport of meat, poultry, fish and seafood products traveled 43.8×10^9 ton-miles[12], with the average distance being 184 miles, primarily by rail and water (DeCara et al., 2017).

3.2.5.1 Potential Impacts: Federal Operational Assistance Alternative (Preferred Alternative/No Action Alternative)

Potential air emissions associated with ASF outbreak response activities may result from the use of vehicles, including heavy equipment (e.g., tractors, trailers, backhoes, dump trucks), depopulation and disposal methods (e.g., CO_2 carts/chambers, incinerators, compost piles), and disinfection products. However, the potential effects from these emissions are expected to be low in volume, temporary in duration, localized, and highly likely to dissipate below detectable levels. Offsite transportation and the use of heavy equipment are a regular part of swine production and emissions that would occur as a result of an ASF outbreak would not be expected to be more than those that would occur as a normal part of swine production.

Depopulation methods are not expected to have significant impacts on air quality. Electrocution, captive bolt, gunshot, and injectable euthanasia agents do not cause emissions and, as a result, do not impact air quality. The by-products of gassing with CO_2 and VSD+ are CO_2 and water. Water has no impact on air quality. CO_2 emissions from gassing dissipate below detectable levels quickly, making any potential impacts to air quality localized and temporary.

Water-based or nitrogen-filled foam that may be used to depopulate swine has non-flammable and non-explosive properties, are used over a short period of time, and are not expected to result in air emissions or impact ambient air quality. The Class A fire-suppression concentrates (e.g., PHOS-CHEK® WD881 or SILV-EX Plus® Class A Foam Concentrate) recommended and utilized by USDA APHIS VS do not contain PFAS, which break down very slowly in the environment and may be linked to harmful health effects in humans and animals (Johnson

[12] Freight or shipping activity is measured in ton-miles. One ton-mile is the equivalent of shipping one ton of product one mile.

Controls, 2024; Perimeter Solutions, 2019; 2022). Also, none of the chemical components of the foam concentrate are classified by USEPA as hazardous air pollutants under the Clean Air Act[13].

The process of depopulation and off-site disposal of a backyard herd generally can be completed in one day. Typically, heavy machinery is not required, as swine are handled individually, and then transported off-site for disposal at an incinerator or landfill or are buried on site.

As discussed in the Carcass Management EIS (USDA APHIS, 2015a), composting can potentially result in the release of CO_2, ammonia, methane, and other volatile organic compounds. Emissions of any volatiles, such as ammonia, are sufficiently diluted in outdoor environments and when vented from buildings to be of limited to no environmental risk. If composting (including land application of composted material) is done according to site-specific soil characteristics and guidance from Federal and State agencies, potential emissions are expected to be minimal. Although the composting process may take 3 to 6 months (Cortus, 2020), depending on the size of the swine, during the majority of that time the piles are undisturbed, so there are no emissions from the compost pile or from use of heavy machinery (USDA APHIS, 2017b). While equipment, such as a loader or digger, may be needed to create and turn the piles, they would only be used briefly several times during the duration of the composting process. As a result, potential emissions would be short-term and would have minimal impacts on air quality.

Burial would have similar potential impacts to air quality as composting due to the use of heavy equipment that would be needed to dig pits or trenches and cover them. However, the use of heavy equipment would be less as once the site is covered, the process is complete.

Offsite rendering, incineration, and landfill disposal involve permitted facilities that are typically regulated through a Federal or State permitting process. Emission and waste controls are in place at these facilities that would be expected to reduce any potential process emissions to meet air quality requirements (USDA APHIS, 2012).

During an ASF outbreak response, ASF-infected swine carcasses and materials may be transported offsite for disposal. Carcasses would be transported off-premises in sealed containers lined with sealed heavy-duty plastic, covered with a tarp, and disinfected prior to and following transport. USDA APHIS VS may assist in finding contractors to take containers to a landfill, renderer, or other off-site disposal area (Slingluff et al., 2014). The overall emissions from the transportation of carcasses and ASF-contaminated material are not expected to be more than those of routine swine production. As a result, ASF outbreak response activities are not expected to impact the air quality in an area, besides those from short-term, transient emissions on each premises.

Portable incinerators may be used on-site to process carcasses in areas where burial or composting is not allowed due to environmental constraints and where landfill disposal is not available. The emissions from portable incinerators include particulate matter, SO_2, nitrogen

[13] USEPA hazardous air pollutants are listed here: https://www.epa.gov/haps/initial-list-hazardous-air-pollutants-modifications.

oxides, CO_2, CO, and volatile organic compounds. Emission control devices are attached to incinerators as part of an environmental protection plan (USDA APHIS, 2012). The flue gases from incinerators must be cleaned of gaseous and particulate pollutants before they are dispersed into the atmosphere. State, territory, or local permits may be required to operate portable incinerators and would put in place conditions to restrict emissions from incinerators to within acceptable air quality levels. Emissions would be expected to be temporary and would have minimal impacts on air quality due to the permit conditions and emission control devices.

Open air burning is rarely used due to required permits, which are not available in many locations (generally from a county or state fire marshal). Open burning of animal carcasses would result in airborne contaminants similar to those produced by large bonfires, wildfires and agricultural burning. The smoke from these fires is extremely high in particulate matter and produces offensive odors. Soot is the primary air pollutant of concern. Hydrocarbons, CO, oxides of nitrogen, and sulfur dioxide are also emitted (CAL/EPA, 2004; USEPA, 2023).

Swine producers or owners may choose to use an extended fallow period instead of cleaning and disinfection; as a result, no air emissions would be released as part of that process. For other premises, the choice to use a particular disinfectant (e.g., ammonium, hydrogen peroxide, iodine, and chlorinated products) by a producer or owner would likely follow a conversation involving State and federal personnel. The use of disinfectants is regulated by the USEPA through their pesticide registration process under FIFRA. Label directions, including the appropriate concentrations, use sites, and product disposal, are meant to protect pesticide applicators and the surrounding environment. Impacts to air quality are not expected from the use of disinfection products when label directions to safely handle and use the product are followed.

3.2.5.2 Potential Impacts: No Federal Operational Assistance Alternative

Similar depopulation and disposal methods are likely to be used under either alternative, as the method chosen is based on factors including the number of carcasses, the type of premises, and whether on-site space is available for composting.

Under the No Federal Operational Assistance Alternative, it may be possible that without USDA APHIS VS direct assistance, response activities may be delayed or take longer to complete, and further outbreaks could occur as a result. In those instances, the potential air pollutant emissions from the use of equipment, depopulation and disposal, and clean-up and disinfection would occur at new outbreak locations. However, we believe that potential air pollutant emissions from ASF response activities at any outbreak sites would be minimal, transient, and not likely to impact air quality.

3.2.6 Human Health and Safety

Normal activities associated with swine production can present occupational risks to those working around swine, including physical injury and exposure to noise, airborne contaminants, and odors. Odor emissions from swine production operations, mainly from manure storage and manure removal, may affect residences surrounding a facility (Trabue et al., 2019).

The ASF virus not zoonotic (i.e., it cannot be transmitted from swine to humans) and, therefore, it is not a threat to human health or a food safety threat. The primary risk to human health and safety from an ASF outbreak would be to emergency responders from physical injury and psychological trauma. Individuals and contractors may handle swine, remove carcasses, build compost piles, load carcasses into incinerators, transport carcasses to the landfill, clean and disinfect vehicles, equipment, and materials, and clean and disinfect premises. Swine are large animals, and depopulation and disposal efforts will involve many tasks directly handling live swine and carcasses which could result in injury to response workers. Additionally, emergency response can involve tasks that are emotionally stressful in a high-pressure environment. USDA APHIS VS has provided guidance tools and a personnel management structure to minimize inefficiency and mitigate the risk to human health (USDA APHIS, 2018); this information is available to the public for reference and use.

The Occupational Safety and Health Administration mandates that the workplace is free from recognizable hazards that can cause death or physical harm to employees. To accommodate this mandate when responding to an animal health emergency, the Incident Command System incorporates a Safety Officer who reports major health and safety concerns to the Incident Commander. The Safety Officer is responsible for, among other health-related activities, the use, cleaning, maintenance, and assessment of personal protection equipment (PPE). The Safety Officer also provides training prior to and during the responder's activities on-site, identifies and minimizes hazards at the headquarters and field sites, and supervises the development of site-specific Health and Safety Plans. At the incident site, the Safety Officer may select a Site Safety Officer to facilitate a safe work environment on site (USDA APHIS, 2023a).

The AVMA notes that the psychological impact of performing depopulation on observers, operators, and producers is considerable and should not be overlooked (AVMA, 2026). Studies have noted that all personnel involved in euthanasia, slaughter, or depopulation of animals, including veterinarians, other animal-related professionals, producers, owners, animal caretakers, and employees, may be vulnerable to negative psychological impacts, such as anxiety, burnout, distress, depression, and perpetration-inducted traumatic stress, a form of post-traumatic stress disorder (Baysinger and Kogan, 2022; Kollias et al., 2023). Distress may also indirectly result from the perception of and criticism from those not involved in the depopulation, including the public, friends, family, and colleagues. Although the personnel involved may understand the necessity of depopulation, "understanding the rationale does not always mitigate the negative emotional effect" (Baysinger and Kogan, 2022). A study of veterinarians involved in swine depopulation during the COVID-19 infrastructure breakdown indicated that the method of depopulation (eight methods used) significantly impacted depopulation distress, although no details were provided for any specific method (Baysinger and Kogan, 2022). Not everyone who engages in depopulation suffers from emotional trauma. Kollias et al. (Kollias et al., 2023) identified individual factors such as "personality, temperament, preexisting trauma, and cognitive factors, and external factors, including the context of the animal death and separate personal and global circumstances," that can contribute to these psychological effects (Kollias et al., 2023).

Both federal and state mental health resources are made available to ASF incident responders and others involved or affected by these depopulations. Federal employees deployed to work on

the ASF outbreak response may contact the Employee Assistance Program for counseling and support. The USDA National Institute of Food and Agriculture's Farm and Ranch Stress Assistance Network connects individuals who are engaged in farming, ranching, and other agriculture-related occupations to stress assistance programs (see Farm and Ranch Stress Assistance Network (FRSAN) | NIFA (usda.gov)). Also, Federal case managers or site managers may guide producers or families to state or local public health resources.

3.2.6.1 Potential Impacts: Federal Operational Assistance Alternative (Preferred Alternative/No Action Alternative)

Under the Federal Operational Assistance Alternative (Preferred Alternative/No Action Alternative), USDA APHIS VS as the lead federal responder, would provide operational assistance to States, localities, and Tribes, when requested, for depopulation, carcass management, and cleaning and disinfection in response to ASF virus outbreaks. USDA APHIS employees may fill many roles in the response operations, including, but not limited to disease monitoring and surveillance and overseeing or assisting with depopulation, disposal, disinfection, and administration. USDA APHIS VS may also issue contracts with several entities to provide support in the depopulation and disposal of swine and cleaning and decontamination of premises. The additional contribution of USDA APHIS VS resources and experience in responding to animal disease outbreaks would help assure a rapid scale-up of organizational structures, coordination, and resources needed for a timely response to an outbreak and reduce the health and safety risks to responders.

The occupational risks to human health associated with depopulating herds of swine infected with ASF would be directly related to the specific method used. The methods that may be used during an outbreak are discussed in Section 2.1.1.1, Depopulation. The method of depopulation selected will depend on animal considerations (e.g., number, size, age), facility characteristics, disposal method characteristics (practicality, reliability, irreversibility, and compatibility), personnel considerations, carcass considerations, equipment considerations, and the environment where the animals are maintained (USDA APHIS, 2023a). Under both alternatives, all depopulation methods may not be allowed and/or available in every state or county. State and local laws on depopulation must be reviewed and followed, and proper authorities must be contacted.

Depopulation using compressed foam, CO_2 in chambers, and VSD+ require less labor and swine handling than other methods reducing the risk of physical exhaustion and injury. If CO_2 is used during depopulation events, it is vented into the atmosphere where it is not of a sufficient concentration or volume to pose a human health risk. Because CO_2 gas is heavier than air, it will accumulate in higher concentrations indoors near the floor (AAAP, 2021). Risk of worker exposure to CO_2 can be minimized by using the appropriate PPE, wearable gas monitors, and making sure sufficient ventilation time has been given prior to re-entry.

Both water-based and nitrogen-filled foam have non-flammable and non-explosive properties, are used over a short duration, and are not expected to significantly impact human health. The Class A fire-suppression foam concentrates (PHOS-CHEK® WD881 or SILV-EX Plus®) recommended and utilized by USDA APHIS VS do not contain PFAS, which break down very

slowly in the environment and may be linked to harmful health effects in humans and animals (Johnson Controls, 2024; Perimeter Solutions, 2019; 2022). Prolonged or repeated handling of these foam concentrates could result in some irritation of the eyes, skin, nose, and respiratory system. However, the product would not be used for extended periods and following the precautions specified on the labels and safety data sheets, including wearing the appropriate PPE, is expected to prevent exposure and protect human health. Water-based and nitrogen-filled foam can be slippery, presenting a physical hazard to workers; wearing the appropriate PPE and following safety precautions would reduce this risk.

Onsite depopulation using captive bolt, gunshot, electrocution, and injectable euthanasia agents requires swine to be handled individually by responders specifically trained to safely use each method. Although PPE would be worn during any method of depopulation, the increased physical exertion with these methods could result in workers becoming fatigued or overheated if the number and/or size of swine to depopulate are large. These depopulation methods would be limited to small sized herds, or a larger number of workers would be needed, which could delay depopulation.

USDA APHIS evaluated the potential effects of carcass management activities on human health in the Carcass Management EIS (USDA APHIS, 2015a); that information is being incorporated herein by reference. The potential disposal methods that may be used during an outbreak are discussed in Section 2.1.2.2, Carcass Management. The human health and safety risks associated with each disposal method arise from exposure to pathogens (although ASF is not zoonotic, there may be other pathogens present), workplace hazards associated with the equipment, and hazardous materials used or produced during the disposal process. Each disposal method is associated with the production of some level of noise, either through the equipment as it operates, or during loading and off-loading of the carcasses. During normal operations for routine mortalities, these noise levels are expected to be within existing standards for occupational exposure; similar noise levels would be expected during emergency response carcass management.

Decontamination of sites where ASF has been detected requires the use of disinfectants. The choice to use a particular disinfectant (e.g., ammonium, hydrogen peroxide, and chlorinated products) by a producer would likely follow a conversation involving State and federal personnel. Users must follow the disinfection product label directions to safely handle and use the product and avoid potential harm to human health and the environment.

Swine owners could potentially suffer psychologically from the loss of animals, disruptions in community life, and from stress over concern for their financial future. The sights of many carcasses can be emotionally upsetting to humans because human sympathies and compassion are invoked. Depopulation, decontamination, and disposal workers also could suffer psychologically from seeing and smelling the carcasses while they work (USDA APHIS, 2023a). Acute distress is likely to be felt by workers when initially confronted with odors until their olfactory system becomes desensitized during continuous exposure. Using PPE, such as respirators, may minimize the effects. Mental health counseling can help to mitigate psychological health impacts associated with an outbreak (USDA APHIS, 2023a).

Under this alternative, at the onset of an ASF outbreak, USDA APHIS VS would identify a National Incident Coordinator and an Incident Commander and may deploy National IMTs to affected locations. Incident Command Posts would be established, serving as the base of deployment for field personnel (USDA APHIS, 2023a). A Safety Officer would be assigned to an Incident Command Post to ensure the health and safety of all responders (including USDA APHIS employees, temporary employees, or contractors). The Safety Officer would develop a site-specific health and safety plan to establish safe work procedures and has the authority to stop an operation to correct safety or health hazards (USDA APHIS, 2014b). USDA APHIS would provide PPE to its employees and require its contractors to follow all appropriate worker protection standards. Prior to any carcass management work, contracted companies are responsible for briefing their workers on the nature of the disease and training them in specific hygiene requirements.

Many depopulation methods have inherent risks, but training minimizes these risks. For example, USDA APHIS personnel that use firearms are trained and certified in their use, and the associated risks have been analyzed (USDA APHIS, 2019b). Sharps (e.g., needles and scalpels) used to collect samples or inject euthanasia agents can potentially cause injury to the personnel using them; however, USDA APHIS requires training for all employees handling sharps.

Training will be administered to response staff, including teaching safe depopulation techniques, proper PPE usage, and coping mechanisms for the psychological impact of depopulation activities. It is likely that with an established incident response plan, experienced personnel, training, and funding, there is less potential for impacts to human health and safety under this alternative.

Health and safety issues would probably be similar under either of the alternatives if the ASF outbreak is limited in size and location. However, for large outbreaks, USDA APHIS VS experience from other disease outbreaks and resources could result in a more timely and effective response, which in turn could reduce the potential risks to human health.

3.2.6.2 Potential Impacts: No Federal Operational Assistance Alternative

Under the No Federal Operational Assistance Alternative, USDA APHIS VS would not be involved in operational activities including swine depopulation, disposal of carcasses, and cleaning and disinfection of equipment and premises. USDA APHIS VS employees would not be at risk from activities or psychological impacts due to lack of participation in these operational activities. USDA APHIS VS could identify a National Incident Coordinator and Incident Commander, but the State or Tribal authorities and swine producers or owners would oversee the primary on-site operations of depopulation, disposal, disinfection, and necessary transportation.

Variables that could affect the potential risks to human health and safety under this alternative include the extent of the outbreak (i.e., the size of the affected herd(s) and the number of premises involved), previous experience of the State and local entities and producers or owners with dealing with an animal health emergency, and the resources (i.e., personnel and funding) of the State and the producers available to respond to an outbreak. If State and local officials do not have sufficient personnel and resources to quickly respond to an ASF outbreak, the virus may

spread to additional herds and premises. Crews performing disposal and clean-up/disinfection may be overwhelmed and fatigued with the scale of work, leading to mistakes that could lead to injuries.

If State and local officials do not have experience or sufficient personnel and resources to quickly respond to an ASF outbreak, the virus may spread to additional herds and premises. Crews working on depopulation, disposal and clean-up/disinfection may not be experienced or may be overwhelmed with the scale of work, leading to mistakes that could lead to injuries. States or Tribes may choose to consult with USDA APHIS VS for advice during an emergency response and USDA APHIS VS protocols, guidance, and response information are available to the public for reference and use (see (USDA APHIS, 2023a)). State and local resources may be able to handle a small outbreak with little risk to health and safety, but as the size or number of affected premises increases, resources and personnel may be stretched thin, increasing the probability of inadvertent risks to health and safety.

3.2.7 Risks to Wildlife

Wildlife species known to be susceptible to infection from the ASF virus include wild or feral swine (*Sus scrofa*), warthogs (*Phacochoerus* spp.), bush pigs (*Potamochoerus larvatus* and *Potamochoerus porcus*), and giant forest hogs (*Hylochoerus* spp.) (Spickler, 2019). All efforts to infect other animals have been unsuccessful (Oura, 2020). Warthogs, bush pigs, and giant forest hogs are not native to the United States but may be found in the wild in a limited number of areas as a result of importation of animals for hunting. In 2024, feral swine could be found in 29 states and three territories, down from 2018 when feral swine were reported in as many as 34 states.

Wildlife is unlikely to be impacted by depopulation and transportation activities conducted during an ASF response. Disposal methods such as on-site burial, outdoor composting, and landfilling could potentially expose susceptible wildlife to carcasses infected with ASF if they are improperly performed or left uncovered. Covering the carcasses with soil or other material limits wildlife from accessing them and becoming potentially infected with ASF. Properly landfilled and buried carcasses are covered with several feet of soil or other material, and composted carcasses are covered with 8 to 12 inches of clean material such as wood chips. Other methods of disposal, including rendering, incineration, open-air burning, alkaline hydrolysis, and use of an anaerobic biodigester, would not expose wildlife to ASF-infected carcasses.

The use of disinfectants is regulated by the USEPA through its pesticide registration process under FIFRA. Properly followed label directions, including the appropriate concentrations, use sites, and product disposal, are meant to protect pesticide applicators and the surrounding environment, including wildlife. Thus, impacts to wildlife are not expected from the use of cleaning and disinfection products when label directions are followed.

Feral swine (*Sus scrofa*) are not native to North America and are considered an invasive species. They are a combination of escaped domestic swine, Eurasian wild boars, and hybrids of the two. Spill-over and spill-back of the ASF virus between feral swine and domestic swine and vice versa could potentially occur. Currently, with no effective vaccine or treatment, control of ASF in feral swine is reliant on biosecurity measures, feral swine carcass destruction and culling, and

fencing (Palencia *et al.*, 2023). These measures would be protective of domestic swine but also would help prevent contact of feral swine with ASF-infected domestic swine and premises. The Czech Republic and Belgium succeeded in eliminating ASF in their territories through the use of control measures that included the detection and removal of wild boar carcasses; reduction in wild boar density; and the limitation of wild boar movements through the use of fences while the disease spread in other areas of the European Union (Sauter-Louis *et al.*, 2021).

3.2.7.1 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." U.S. Fish and Wildlife Service (USFWS) released a final rule on April 16, 2020, identifying 1,093 birds on the Revised List of Migratory Birds (USFWS, 2020).

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 USFWS that promotes the conservation of migratory bird populations. On August 2, 2012, USFWS and USDA APHIS signed an MOU to facilitate the implementation of this Executive Order (USDA APHIS and USFWS, 2012), The MOU provides USDA APHIS with guidance to avoid and minimize, to the extent practicable, detrimental migratory bird habitat alteration or unintentional take during animal management activities. This includes:

a) Evaluating a reasonable range of alternatives in environmental reviews to avoid and minimize adverse effects to migratory birds or degradation of habitats while still fulfilling the mission to protect American agriculture. Develop practices, in coordination with USFWS, to avoid and minimize impacts to migratory birds and their habitat and determine how to improve evaluation of impacts.

b) Assessing and estimating the effects of proposed actions on migratory birds and their habitats through the project planning process, including NEPA. Use best available demographic, population, behavioral, and habitat data in the assessment of effects upon migratory birds. If sufficient data are unavailable, attempt to acquire necessary data by working with Federal, State, and other partners.

c) Working collaboratively with USFWS and other partners, and developing partnerships with non-federal entities, to monitor migratory birds, as resources allow and within the Agency's capabilities and authorities, to improve and better understand the need for, and effectiveness of, conservation efforts tied to projects under the USDA APHIS authority.

d) Adhering to USDA APHIS policy that a range of approaches and alternatives be considered before bird-damage control programs are selected. This includes considering

the species responsible for the damage and the frequency, extent, and magnitude of the damage. In addition to damage confirmation and assessment, consideration will be given to the status of target and potential non-target species, local environmental conditions, relative costs of applying management techniques, environmental impacts, and social and legal concerns. This includes using non-lethal alternatives prior to implementing lethal control programs, when possible, and implementing measures to minimize impacts to non-target species.

e) Complying with regulation and permit conditions that identify the type of ammunition, firearm, and other methods available for use while conducting management activities. Compliance with regulations and permit conditions that limit the use of lead ammunition during migratory bird take actions will reduce the amount of lead in migratory bird habitats.

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. The Birds of Conservation Concern 2021 List (USFWS, 2021) (located at BCC2021.indd (fws.gov)) identifies the migratory nongame bird species that represent USFWS highest conservation priorities, following those that are listed as threatened or endangered.

3.2.7.2 Eagle Protection

Bald and golden eagles are protected by the Bald and Golden Eagle Protection Act, as amended (16 U.S.C. 668 et seq.), the MBTA, and the Lacey Act of 1907, as amended (16 U.S.C. 3371-3378). The regulations implementing these Acts prohibit take of bald or golden eagles unless permitted by USFWS. For these birds, the term "*take*" means "*pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, or disturb*" (50 CFR 22.3). Disturb means "*to agitate or bother to a degree that causes, or is likely to cause . . . injury . . . a decrease in its productivity or nest abandonment by substantially interfering with normal breeding, feeding, or sheltering behavior*" (50 CFR 22.3).

The bald eagle (*Haliaeetus leucocephalus*) has a widespread distribution in North America and is flourishing in the United States. The largest North American breeding populations are in Alaska, Canada, in the Great Lakes States, Florida, the Pacific Northwest, the Greater Yellowstone area, and the Chesapeake Bay region. Bald eagles are opportunistic feeders that occupy and defend their territories against intrusion by other eagles. Although fish comprise much of their diet, they also eat carrion, birds, small mammals, and turtles. They will also feed on carcasses along roads, in landfills, and at feedlots (USFWS, 2007).

Golden eagles (*Aquila chrysaetos canadensis*) can be found from the tundra, through grasslands, forested habitat and woodland-brushlands, south to arid deserts, including Death Valley, California. They are aerial predators and eat small to mid-sized reptiles, birds, and mammals up to the size of mule deer (*Odocoileus hemionus*) fawns and coyote (*Canis latrans*) pups (USFWS, 2011). They scavenge and eat carrion, particularly during the winter (Watson et al., 2019).

Bald and golden eagles locate fresh carcasses quickly, which makes them susceptible to secondary poisoning when food sources contain lead contaminants (Watson et al., 2019) or are left uncovered after being euthanized with sodium pentobarbital or other barbiturates (USFWS, 2007). Eagle and other species deaths have been reported in at least 16 states and in Canada as a result of scavenging on carcasses of euthanized farm animals or pet horses left in the field, or small animal carcasses that were unburied or exposed at landfills (Krueger and Krueger, 2000). There are also many reports of bald and golden eagle poisonings and deaths from exposure to lead ammunition from carcass feeding (e.g., (Cruz-Martinez et al., 2012; Fisher et al., 2006; Gill and Langelier, 1994; Langelier et al., 1991; Pattee et al., 1981; Slabe et al., 2022; Stauber et al., 2010; Wayland and Bollinger, 1999)). A recent study found high frequencies of lead poisoning of eagles via lead ammunition use, both chronic (46 to 47% of bald and golden eagles) and acute (27 to 33% of bald eagles and 7 to 35% of golden eagles), and that poisoning at this level may suppress population growth rates for bald eagles (Slabe et al., 2022). Use of CO_2 gas, captive bolt, electrocution, and VSD+, would not expose eagles to toxic substances because none are used with these depopulation methods.

The presence of bald and golden eagles across the United States makes it likely that eagles will be located in the vicinity of large swine operations. Expeditious management of carcasses can be a necessity if carcasses are contaminated with veterinary medications or lead ammunition. Many states require treatment and/or disposal within a short time interval for carcasses. These requirements minimize the amount of time that scavengers and carrion-feeders feed upon carcasses. An additional mitigation for minimizing the time that eagles are able to feed upon carcasses includes only euthanizing as many animals as can be immediately managed. When carcasses are treated and/or disposed of, incineration is the best method to protect eagles from pentobarbital poisoning (Krueger and Krueger, 2000). The use of nontoxic shot would minimize potential impacts to scavenging eagles. Positioning carcass disposal sites away from known eagle breeding or wintering areas would minimize their access to carcasses. Labels on euthanasia drugs should also be reviewed and closely followed. The FDA label includes an environmental warning label to euthanasia solutions containing pentobarbital (NIH, 2022). The label states, “ENVIRONMENTAL HAZARD: This product is toxic to wildlife. Birds and mammals feeding on treated animals may be killed. Euthanized animals must be properly disposed of by deep burial, incineration, or other method in compliance with State and local laws, to prevent consumption of carcass material by scavenging wildlife.”

Activities in nesting areas of eagles during the breeding season can affect the nesting success and could cause eagles to abandon the nest. Disturbance of eagle roosting and foraging areas can also negatively affect bald eagles. However, disturbance of eagle nesting, roosting, and foraging sites from depopulation, disposal, and decontamination is unlikely because the areas around commercial swine production facilities are busy areas and composting and burial sites will be only placed on farmed croplands. Eagles are unlikely to be disturbed by routine use of roads, homes, and other facilities when the use in that area pre-dates the eagles’ successful nesting activity. For this reason, USFWS guidelines recommend that in most cases, ongoing existing uses may proceed with the same intensity with little risk of disturbing eagles (USFWS, 2007). However, USFWS recommends that human activities should be kept as far away from nest trees as possible, and that potentially disruptive activities should be minimized, including

development in the eagles' direct flight path between their nest and roost sites and important foraging areas (USFWS, 2007).

3.2.7.3 Threatened and Endangered Species and Critical Habitat

Section 7 of the Endangered Species Act (16 U.S.C. §§1531-1544) and its implementing regulations require federal agencies to ensure that their actions are not likely to jeopardize the continued existence of threatened or endangered (listed) species or result in the destruction or adverse modification of critical habitat.

ASF affects members of the swine family (Suidae). There are no species in the family Suidae federally listed or proposed for listing in the United States or its Territories. Thus, the spread of ASF or exposure of listed species to ASF-infected carcasses is not expected to have an effect on listed or proposed species or designated critical habitat in the United States or its Territories.

There are many potential adverse effects to threatened and endangered species from consuming carcasses containing sodium pentobarbital (euthanasia solution) or lead ammunition. Secondary poisoning due to sodium pentobarbital has been documented in wild animals, and in particular, species that feed communally can be impacted by a single contaminated carcass (Wells et al., 2020). In a review of secondary pentobarbital poisonings, most wild animals found to be poisoned by pentobarbital were scavenging bird species (Wells et al., 2020). In the study, 79% of the 125 poisoning cases evaluated, the source of the euthanized carcass was a livestock animal, including euthanized swine (Wells et al., 2020). Following several secondary poisoning incidents, the FDA updated its euthanasia solution regulations to state "euthanized animals must be properly disposed of by deep burial, incineration, or other method in compliance with the state and local laws to prevent consumption of carcass material by scavenging wildlife" in 2003 (21 CFR § 522.900 2017).

Carcasses contaminated with lead-based ammunition have been recognized as sources of health effects on wildlife for more than a century (Rattner et al., 2008). The ingestion of lead from spent ammunition can kill birds and other wildlife (Eisler, 1988; Fisher et al., 2006). The endangered California condor is the largest flying land bird in North America and is an opportunistic scavenger, feeding only on the carcasses of dead animals (USFWS, 1996). Most of the condor diet consists of dead cattle, domestic sheep, ground squirrels, mule deer, and horses (USFWS, 1996). It was nearly driven to extinction, in large part, because of lead poisoning (USFWS, 1996). Captive breeding programs and reintroduction into the wild in locations in California, Arizona, and Baja California in Mexico have been successful in bringing back the condor from the brink of extinction, but only with intensive management. Lead from spent ammunition continues to be the leading cause of death of the California condor (Bindman, 2022) despite the State of California outlawing the use of lead ammunition in the range of the condor by 2019 (Audubon, 2013). Exposure to lead has been documented among raptor species worldwide (Haig et al., 2014; Monclus et al., 2020), primarily via ingestion of prey items containing lead fragments (Katzner et al., 2018). Fisher et al. (2006) list other species of international conservation status known to have ingested or been poisoned by lead shot or bullet fragments in the wild, including white-tailed eagle (*Haliaeetus albicilla*), northern bobwhite quail (*Colinus virginianus*), Stellar's sea-eagle (*Haliaeetus pelagicus*), Spanish imperial eagle (*Aquila*

adalberti), whooping crane (*Grus americana*), and white-rumped vulture (*Gyps bengalensis*). Of these, the whooping crane is federally listed as endangered in the United States. Over the course of tens to hundreds of years, lead ammunition degrades slowly in terrestrial and aquatic environments (Pain et al., 2019). Once it degrades, its environmental fate suggests that the small amounts of lead that may be present in the environment would not have an adverse impact the environment (USDA APHIS, 2022b). Risks to nontarget animals, including avian species, are reduced when carcasses are removed and when non-lead ammunition can be used (USDA APHIS, 2022b).

Critical habitat consists of specific geographic areas that contain features essential to the conservation of an endangered or threatened species and that may require special management and protection. Critical habitat may also include areas that are not currently occupied by the species but will be needed for its recovery. Critical habitat contains physical or biological features needed for life processes such as:

- space for individual and population growth and for normal behavior;
- cover or shelter;
- food, water, air, light, minerals, or other nutritional or physiological requirements;
- sites for breeding and rearing offspring; and
- habitats that are protected from disturbances or are representative of the historical geographical and ecological distributions of a species (USFWS, 2017).

3.2.7.4 Potential Impacts to Wildlife, Federally Listed Species, and Critical Habitat

USDA APHIS VS considered the potential effects of its actions under both alternatives on wildlife, federally-listed threatened and endangered species, and designated critical habitat. The following sections discuss the potential impacts of depopulation, disposal, and decontamination.

Birds are not susceptible to ASF but could potentially be adversely impacted by stressors such as vegetation removal, human disturbance, and noise. Conservation measures, such as surveying for nests prior to vegetation removal, avoiding parking equipment in vegetation where migratory birds are nesting, and minimizing vegetation removal, can reduce the impacts of these stressors on migratory birds. Carcass management of ASF-infected swine is likely to take place on previously cleared private property. While the presence of humans may increase during ASF outbreak response activities, any birds frequenting swine production properties are already likely acclimated to the presence of humans. Likewise, the temporary increase in noise associated with carcass management activities will likely have a negligible impact on migratory birds at affected facilities.

The ASF virus can be transmitted to swine through other swine, fomites, or vectors. The *Ornithodoros* spp. of soft ticks and *A. Pueroricensis* can potentially serve as biological vectors of the virus, either through bites or when they are eaten by swine. Evidence from the current spread of ASF across Europe and Asia suggests that ticks may not play a significant role (if any) in the persistence or transmission of the disease (Heath et al., 2020; USDA APHIS, 2023a). However, several species of *Ornithodoros* ticks found in North America have shown the ability to transmit ASF to swine in laboratory settings (e.g., (Pereira De Oliveira et al., 2020)). Research in the

United States in ongoing (Saldana, 2024). For example, researchers are evaluating the potential, or vector competency, of the southern *O. turicata* tick, found in several southern states and common in Texas, to transmit the ASF virus (Golnar et al., 2019).

Since wildlife, including birds, small mammals, and reptiles, could potentially transport these soft ticks or virus-infected materials, if they are present on the infected premises or in the Control Area or Surveillance Zone, USDA APHIS and State officials would need to determine if control measures are necessary and/or cost-effective. As part of onsite biosecurity while responding to an outbreak, federal and state personnel, swine owners and producers, and contractors would monitor farms and conduct wildlife damage management activities, such as preventing wildlife, as well as insects, from entering and exiting barns with nonlethal (e.g., harassment, exclusion, and trapping) and lethal (e.g., shooting, trapping and euthanizing) methods to minimize the spread of the ASF virus. Biosecurity measures designed to clean, exclude, and control against wild birds, rodents, insects, and other animals would continue while swine housing is allowed to sit fallow. Rodent control measures and plans, such as using rodent traps and bait stations, would continue to be used and monitored so that adjustments are made as needed. Likewise, wild bird and insect control measures would continue and be adjusted as needed.

Depopulation: USDA APHIS would follow strict protocols when euthanizing an animal to prevent exposure to nontarget species (USDA APHIS, 2024b).

Animals depopulated with euthanasia agents such as sodium pentobarbital can be toxic to scavengers. In a review of secondary pentobarbital poisonings, most wild animals found to be poisoned by pentobarbital were scavenging bird species (Wells et al., 2020). Nontarget animals that ingest tissue contaminated with pentobarbital may become disoriented or comatose, and death may occur (Krueger and Krueger, 2000). Following several secondary poisoning incidents, the FDA updated its euthanasia solution regulations in 2003 stating "Euthanized animals must be properly disposed by deep burial, incineration, or other method in compliance with the state and local laws to prevent consumption of carcass material by scavenging wildlife" (21 CFR 522.900). Well-vascularized organs, such as the liver, have the highest concentrations of pentobarbital; subsequently, the degree of intoxication will depend on the amount and type of tissue ingested. Animals that ingest tissue contaminated with pentobarbital may become disoriented or comatose, and death may occur (Krueger and Krueger, 2000). Thus, euthanized animals must be disposed of appropriately and stored prior to disposal in a secured location that scavengers cannot access.

USDA APHIS WS evaluated the risks to nontarget animals associated with the euthanasia agents potassium chloride and sodium pentobarbital in "Human Health and Ecological Risk Assessment For the Use of Wildlife Damage Management Methods by APHIS-Wildlife Services, Chapter XXVII, Use of Immobilization and Euthanasia Drugs in Wildlife Damage Management" (USDA APHIS, 2024b); that information is being incorporated herein by reference. The risk assessment concluded that direct and indirect risk to nontarget mammals, birds, reptiles, and aquatic organisms from the use of euthanasia agents is expected to be negligible based on the use patterns and lack of exposure. USDA APHIS would administer a lethal euthanasia solution injection directly into the target animal through a needle and syringe, not a dart. Personnel would

monitor the animal post-injection, remove euthanized animals from the environment, and follow the appropriate regulations regarding disposal. As a result, use of euthanasia agents on swine during an ASF outbreak would be expected to present negligible risk to wildlife.

Avian predators and scavengers can be susceptible to lead poisoning when they ingest pellets or pellet fragments in the tissues of animals wounded or killed by lead-based ammunition (Clark and Scheuhammer, 2003; Craighead and Bedrosian, 2008; Hunt et al., 2006; Kelly and Johnson, 2011; Kendall et al., 1996). Studies also have shown that many species of birds, including wildfowl, some other water birds and game birds across Europe, North America and other countries, may ingest spent ammunition from soil or mud (Pain et al., 2019). At least 59 terrestrial bird species have been documented to have ingested lead or suffered lead poisoning from ammunition sources, most commonly raptor species from ingestion of lead ammunition in carcasses (Fisher et al., 2006).

USDA APHIS WS also evaluated the risks to nontarget animals associated with the use of lead ammunition in "Human Health and Ecological Risk Assessment For the Use of Wildlife Damage Management by APHIS-Wildlife Services, Chapter XII, Use of Lead in Wildlife Damage Management" (USDA APHIS, 2022b); that information is being incorporated herein by reference. The greatest potential for exposure and risk from the use of lead ammunition is to nontarget predators and scavengers that inadvertently consume whole gunshot/bullets or lead ammunition fragments remaining on the ground or from scavenging carcasses. Lead ammunition degrades slowly in terrestrial and aquatic environments likely over the course of tens to hundreds of years (Pain et al., 2019). Once it degrades, its environmental fate suggests that the small amounts of lead that may be present in the environment would not have an adverse impact to soil, air or water quality (USDA APHIS, 2022b). Most projectiles will remain in the animals and carcasses are retrieved and disposed of properly, so the amount of lead in the environment from depopulation of swine is expected to be minimal. Non-lead ammunition may be used under certain circumstances, removing the risk of lead exposure. Also, the use of gunshot is likely to be limited to depopulating small commercial herds; as a secondary depopulation method; or for feral swine within a Control Area or Surveillance Zone. Risks to nontarget animals, including avian species, are reduced when carcasses are removed and when non-lead ammunition can be used (USDA APHIS, 2022b).

Although wildlife scavengers and predators could potentially experience adverse effects if they are able to consume carcasses contaminated with euthanasia agents or lead particles from ammunition used to depopulate ASF-affected swine, USDA APHIS would follow strict protocols when using these methods during an ASF outbreak, thereby preventing exposure to nontarget wildlife species. USDA APHIS personnel would monitor swine after an injection or gunshot, remove the carcass from the environment, secure the carcass prior to disposal, and follow the appropriate regulations regarding disposal.

Use of compressed foam for depopulation is not expected to impact wildlife, federally listed species, or critical habitat. The foam is readily biodegradable in the environment, and the nitrogen dissipates into the ambient air. The Class A fire-suppression foam concentrate (e.g., Phos-Chek® WD881 or Silv-Ex Plus® Class A Foam Concentrate) USDA APHIS VS uses or recommends does not contain PFAS which break down very slowly in the environment and

may be linked to harmful health effects in humans and animals. Undiluted Class A foam concentrates can be toxic to aquatic life if in the water in significant concentrations. However, the foam concentrate is mixed with large volumes of water to create foam for depopulation, resulting in very low concentrations in foam; for example water solutions with PHOS-CHEK WD881 used to generate foam only contain 0.1 to 1.0 percent of concentrate product by volume (Perimeter Solutions, 2019). Any spills of concentrate would be contained/absorbed to prevent runoff into sewer systems or bodies of waters. All applicable federal, state, and local regulations would be followed when using these products.

Use of compressed foam, CO_2 gas, captive bolt, electrocution, and VSD+ would not result in any toxic substances remaining within carcasses or potential risk to wildlife. Overall, the risks to wildlife, including threatened or endangered species, are expected to be negligible from depopulation of swine.

Disposal: During an ASF outbreak, swine carcasses would be securely gathered and disposed of properly, which reduces the risks associated with exposure of scavenging and predatory birds to lead or other toxins.

Landfill disposal, on-site burial, and outdoor composting could potentially expose scavenging birds to carcasses if they are left uncovered. However, promptly covering the carcasses with soil or other material prevents wildlife from accessing them. Hydrated lime delays scavenging for up to a week and can be used on carcasses if there is a time lag before disposal. Composted carcasses are covered with 8 to 12 inches of clean material, such as wood chips.

Improper disposal of carcasses could potentially expose listed species to carcasses where toxic depopulation substances (lead ammunition, sodium pentobarbital or other barbiturates) have been used. The concerns regarding secondary poisoning of wildlife, including listed species, are discussed above under "Depopulation". As noted in Section 2.1.1.2., Federal Operational Assistance Alternative, Disposal, Feral Swine Carcass Removal, in cases involving the depopulation of feral swine found within the Control Area or Surveillance Zone of an ASF-affected premises, USDA APHIS VS, USDA APHIS WS, and its cooperators, to the extent possible, will retrieve and dispose of carcasses in a manner that would limit the exposure of scavenging wildlife to toxic depopulation substances. Feral swine carcass disposal will depend on the location, environmental assessment, and resource availability (USDA APHIS, 2023b); options may include:

- Removal from the affected area – carcasses are taken to a central area for disposal or performed onsite (e.g., mobile incineration).
- Above or below ground burial – requires environmental and logistical assessment.
- Leave in place – may use if carcass(es) cannot be accessed due to terrain or if other options are not possible.

Although statutes regarding carcass management methods are promulgated at the State and local level, efforts will be made to ensure that scavengers do not have access to carcasses, especially if euthanized with a barbiturate or lead ammunition. This may be accomplished through deep burial, incineration, rendering, or other method in compliance with State and local laws to

prevent scavenger consumption (USDA APHIS, 2015a). Burial procedures must sufficiently preclude the access of wildlife to contaminated carcasses. Carcasses need to be adequately punctured and/or buried to a proper depth for two major reasons: (1) gas buildup during decomposition must not unearth the carcasses, and (2) burial must be deep enough so other animals do not unearth the carcasses. The liner systems in commercial landfills prevent leachate discharge to the environment. With the implementation of proper disposal methods that are available to USDA APHIS and its cooperators, there would be no effect on listed scavenging species, especially birds.

Incineration, landfill disposal, and rendering would have no effect on designated critical habitat because this would involve disposing of carcasses in already existing facilities, thus not modifying critical habitat. However, outdoor burial, burning, or compost sites could potentially adversely modify the critical habitat of a listed species if the disposal method unfavorably affects the physical and biological features that benefit the species. However, USDA APHIS VS or its cooperators will not compost or bury carcasses within the proposed or designated critical habitat of listed species. Outdoor composting or burial would occur on developed farm fields, which are generally not critical habitat for listed species. If a listed species occurs in a given area, USFWS will be contacted to provide maps to ensure critical habitat will not be altered (although most areas are expected to be developed upland habitat with minimal chance of being critical habitat).

Decontamination: There are many commercial USEPA-registered disinfectant products available that may be used to disinfect outdoor areas, vehicles, PPE, equipment, supplies, manure/urine/saliva, and buildings. When using disinfectants to treat swine facilities, USDA APHIS VS, and State and private partners, comply with all applicable Federal and State laws which minimize the risk to wildlife. USDA APHIS VS and its cooperators would follow product labeling for the use of commercial disinfectants. Label instructions provide for proper application of registered disinfectant products to prevent potential environmental impacts, including not allowing their use around water bodies that could be contaminated by runoff. Wildlife, including Federally listed species, will not be exposed to cleaning and disinfection products because, as indicated by USDA APHIS guidelines, disinfectant containment must occur (USDA APHIS, 2014a). Therefore, there would be no potential effects on wildlife or listed species, including fish, reptiles, amphibians, mussels, crustaceans, or other aquatic species, from exposure to disinfectants for the ASF virus.

Feral Swine: USDA APHIS WS conducts opportunistic disease surveillance, including ASF surveillance, as a part of their feral swine control activities. USDA APHIS WS monitors feral swine for ASF by testing serum and whole blood samples collected as part of its feral swine control activities to reduce agricultural and natural resource damage. When feral swine are found sick or dead due to non-traumatic events (disease, starvation, old age, etc.), USDA APHIS VS tests for ASF by viral antigen testing through FAD investigations.

In the event of an ASF outbreak in domestic swine, Federal and State personnel, farm managers/owners, and contractors will monitor farms and conduct wildlife damage management activities to prevent contact between feral swine in the affected area and infected domestic swine and use appropriate disposal measures to minimize the exposure of feral swine to infected carcasses and materials. If necessary, qualified Federal and State personnel, farm

managers/owners, and/or contractors would strategically implement feral swine population control and reduction activities in the Control Area and Surveillance Zone and remove the carcasses of feral swine killed and found dead to the extent possible as these swine are a potential transmission source of ASF virus to susceptible domestic and feral swine (USDA APHIS, 2023b). Depending on the location and outbreak situation, feral swine populations in the affected area may not be included in response activities and would not be disturbed.

3.2.7.5 Potential Impacts: Federal Operational Assistance Alternative (Preferred Alternative/No Action Alternative)

Under the Federal Operational Assistance Alternative (Preferred Alternative/No Action Alternative), surveillance, quarantine, environmental sampling, depopulation, disposal, and cleaning and disinfection of commercial and backyard herds is expected to have negligible effects on wildlife populations when standard protocols for personnel conducting ASF outbreak response activities, keeping swine disease free, biosecurity, and disinfecting areas to minimize spread of ASF are followed (USDA APHIS, 2022a; 2022d; 2023a). Transportation of swine carcasses is not likely to further expose wildlife to diseases because carcasses that are transported off-site are moved on trucks in a controlled manner that mitigates the risk of spreading diseases. Each truck carrying infected carcasses would follow state requirements and be issued a USDA permit to move outside of the quarantine zone (USDA APHIS, 2015a). In addition, USDA APHIS VS 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, 2022a; 2022d; 2023a).

3.2.7.6 Potential Impacts: No Federal Operational Assistance Alternative

Under the No Federal Operational Assistance Alternative, USDA APHIS VS would just provide minimal support, namely, technical assistance with most activities associated with depopulation, disposal, cleaning and disinfection, and transportation to off-site facilities, if needed. Either a State or USDA APHIS VS Official would be present for depopulation to ensure that it is completed. USDA APHIS VS would conduct surveillance, environmental sampling, approve indemnity for depopulation, disposal, and cleaning and disinfection. The State would allow quarantine release after it was determined that ASF was stamped out. USDA APHIS VS activities providing minimal technical support would have negligible effects on wildlife populations. Transportation of swine carcasses is not likely to further expose wildlife to ASF because carcasses that are transported off-site are moved on trucks in a controlled manner that mitigates the risk of spreading disease. Each truck carrying infected carcasses would follow state requirements and be issued a USDA permit to move outside of the quarantine zone (USDA APHIS, 2015a). In addition, USDA APHIS VS employs several layers of safety measures and carefully monitors all cleanup and disposal activities to ensure that they are done in compliance with USDA protocols.

3.2.8 Other Considerations

This section considers the potential environmental impacts as they relate to children health risks, Tribes, and historic and cultural resources. The following executive orders (EOs) require

consideration of the potential impacts of federal actions on children health risks, Tribes, and historic and cultural resources:

EO 13045 – Protection of Children from Environmental Health Risks and Safety Risks
Children may suffer disproportionately from environmental health and safety risks due to their developmental stage, higher metabolic rates, and behavior patterns, as compared to adults. In general, children are more susceptible to pollution because they typically have higher intake rates (per unit body weight) for environmental media (such as soil, dust, food, water, air, and paint) than adults, since they are more likely to play in dirt and put their hands and other objects in their mouths. In 2020, the U.S. population of persons under the age of 18 numbered 73.1 million—or 22.1% of the total population (USCB, 2022).

Consistent with EO 13045, USDA APHIS considered the potential for disproportionately high or adverse environmental health and safety risks to children. ASF does not affect humans, so there are no expected disease-related adverse impacts to the health of children from an ASF outbreak. ASF is not a food safety issue; pork and pork products that are properly handled and cooked are safe to consume.

Neither alternative poses a risk of disproportionately high and adverse indirect effects on children because they are not likely to be exposed to ASF outbreak response actions. Following biosecurity measures, children would not have access to areas where carcass management activities may occur. If quarantined facilities appear to be near play areas, access would be restricted to discourage non-biosecure activities. Any pollutants released during an outbreak response would be diluted over a larger distance before coming into contact with a child. In addition, any environmental hazards, such as fire or heavy machinery, will not impact them provided they are kept off the site.

USDA APHIS VS actions would not occur when children are present in the immediate area and would not occur on, in, or near school properties. Children residing on a quarantined farm are more likely to be exposed to the sights, smells, and emotional impacts associated with control actions. However, swine production facilities tend to not be adjacent to farm residences or in backyard play areas.

EO 13175 – Consultation and Coordination with Indian Tribal Governments
Executive departments and agencies are charged with engaging in consultation and collaboration with Tribal governments; strengthening the government-to-government relationship between the United States and Tribes; and reducing the imposition of unfunded mandates upon Indian Tribes. Per the EO, federal agencies will communicate and collaborate with Tribal officials when proposed federal actions have potential Tribal implications.

Tribes within the 50 states and territories that could be affected by ASF will be notified of this EA. All Tribes that contact USDA APHIS VS will be assisted if they have an ASF outbreak. Some of the carcass management options may require consultation with Tribal Historic Preservation Officers to determine the best options for a disposal site. If USDA APHIS VS finds any Native American sites or if artifacts are unearthed during composting or burial activities, the appropriate individuals will be notified.

As a supplement to the 2017 Census of Agriculture, a report was published with agricultural operation and producer data for 73 selected American Indian reservations (USDA NASS, 2019). For each selected reservation, the data included the total number of farms and the number of farms operated by American Indians or Alaska Natives with swine inventory and the number of swine sold. Some of the larger farms are found on the following reservations: Blackfeet (47,100 inventory/28,495 sold); Omaha (9,058 inventory/22,664 sold); (22,944 inventory/39 sold); Winnebago (9,203 inventory/24,101 sold).

The USDA Office of Tribal Relations (OTR) works with Tribes, Tribal organizations, and Tribal citizens to ensure access to USDA programs and services and enhances delivery methods through various approaches to improve the coordination and effectiveness of federal programs, services, and actions affecting Tribes, Tribal organizations, and Tribal citizens. USDA APHIS Office of National Tribal Liaison (ONTL) works with Tribal partners and Native American communities to help protect livestock and crops from disease, pests, and wildlife damage. Should an ASF outbreak occur, USDA APHIS ONTL will send notifications to Tribal contacts within each new state affected by an ASF outbreak.

USDA ONTL will reach out to Tribes to inform them of this PEA, provide details of what the purpose is, and answer questions that the Tribes may have. ASF response activities are not expected to adversely affect Tribal entities. As noted in this PEA, there are no significant risks to human health and welfare associated with an ASF outbreak and control efforts (see Section 3.2.6, Human Health and Safety). Tribes are recognized as independent governments and any ASF control activities on Tribal lands would be conducted in cooperation with the Tribe. USDA APHIS VS would rely on the owner or operator of the affected premises to self-identify as a member of a Tribe, and/or identify Tribal interests pertinent to the land. USDA APHIS VS actions on Tribal lands would occur only if the affected swine production premises are located on Tribal land and the pertinent Tribal authorities (such as the Tribal Historic Preservation Officer) request assistance from USDA APHIS VS. USDA APHIS VS expects Tribal members with infected swine would be directly affected by program activities. Individual Tribal members with infected swine would be equally impacted in comparison to other swine owners in the area because USDA APHIS program activities affect swine herds in the same manner.

Historic and Cultural Resources

The National Historic Preservation Act (NHPA) of 1966, as amended (16 U.S.C. 470 et seq.) requires federal agencies to protect archeological sites and historic buildings on public lands in the United States in their actions to the environment. In compliance with the NHPA, USDA APHIS VS considers the preservation of historic properties during its program activities.

USDA APHIS has determined that there are several hundred thousand historic properties in the United States. Listing these thousands of historic properties in this document would not be helpful for the purposes of analysis. To find the list of historical sites on the National Register of Historic Places please refer to the following National Park Services website location https://www.nps.gov/subjects/nationalregister/database-research.htm#table.

USDA APHIS VS proposed activities (depopulations of ASF-infected swine, carcass management, and disinfection of premises, etc.) would not affect any human-made structures, nor will they alter, change (restore or rehabilitate), modify, relocate, abandon, or destroy any

historic buildings, edifices, or nearby infrastructure; therefore, USDA APHIS VS's proposed action would not directly or indirectly affect characteristics of any historic property included or eligible for inclusion in the National Register of Historic Places (36 CFR 63, 800). Moreover, ASF outbreak response activities do not have the potential to cause long-term visual, atmospheric, or audible changes that would result in effects on the character or use of historic properties based on the nature and types of activities occurring on privately owned swine production property.

Registered historic properties may be near pork production locations, and ASF eradication activities could be associated with short-term visual (dust), olfactory (offensive odors), or audible (noise) elements that would impact people near the historic properties depending on the distance between the historic site and the private swine-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. In addition, most states have laws that have setbacks for such activities (burials, composting) to minimize spill-over to other properties. 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 disturbances will cease when the emergency action ends. States and swine owners would be responsible for ensuring that carcass management is correctly done and that the necessary State Historic Preservation Office are contacted if any historic properties may be affected by ASF response activities.

3.3 Reasonably Foreseeable Actions

An assessment of reasonably foreseeable actions takes into consideration the potential effects that future Agency actions may have on the human environment. These potential effects are considered in combination with effects resulting from the Proposed Action to identify any additive impacts or future trends that could influence potential impacts from implementation of the Proposed Action. Future impacts would be considered significant if they rise to a level of significance.

While responding to a detection or outbreak of ASF in swine, USDA APHIS may be involved in other animal disease outbreak responses in the vicinity of the ASF-infected premises. For example, since February 8, 2022, outbreaks of highly pathogenic avian influenza (HPAI) have continued to occur across the United States, impacting commercial poultry facilities and backyard flocks in all 50 states and Puerto Rico. In addition to domestic and wild birds, HPAI has been detected in some mammals, including two domestic swine (see https://www.aphis.usda.gov/livestock-poultry-disease/avian/avian-influenza/hpai-detections/mammals), causing illness, including severe symptoms and death, in some cases.

While other animal disease outbreaks are not likely to occur on the same premises where domestic swine may be affected by ASF, these additional disease outbreaks could occur concurrently in the same counties or areas of a state. As a result, various resources, materials, or personnel that may be necessary for responding to an ASF outbreak could be limited by the increased demand. These limited resources could affect the depopulation and disposal methods that could be used, as well as the ability to conduct a rapid response. Premises may need to be

prioritized based on the highest risk for disease spread. Following best management practices and enhancing biosecurity measures over the long-term reduces the likelihood of negative total impacts (USDA APHIS, 2017b). Effective elimination of disease at the local level (reducing disease prevalence in the area) and reducing the likelihood of exposure for the next generation of swine also reduces the potential for additive environmental impacts.

USDA APHIS VS uses a surveillance strategy to maintain a national disease-free designation for U.S. domestic swine and define areas where risks are located. Surveillance is a critical component of how the disease detection programs find new cases of infection that may be transmitted among herds, between swine and wildlife, or introduced from imports into the United States. Surveillance would be conducted under all alternatives, causing minimal impacts, and would not cause additive impacts.

4 Agencies Contacted

Environmental and Risk Analysis Services
Policy and Program Development
Animal and Plant Health Inspection Service
U.S. Department of Agriculture
5601 Sunnyside Ave.
Beltsville, MD 20705

Veterinary Services
Animal and Plant Health Inspection Service
U.S. Department of Agriculture
1400 Independence Ave., S.W.
Whitten Building
Washington, D.C. 20250

Wildlife Services
Animal and Plant Health Inspection Service
U.S. Department of Agriculture
5601 Sunnyside Ave.
Beltsville, MD 20705

5 Agency Certifying Statement

Agency Certifying Statement for EA Page Limit and Deadline

The APHIS Responsible Official certifies that this EA:

- Demonstrates the agency has thoroughly considered the factors mandated by the National Environmental Policy Act (NEPA);
- Represents the agency's good-faith effort to prioritize documentation of the substantive issues and most important considerations required by NEPA within the congressionally mandated page limits;
- Reflects the agency's expert judgment;
- Addressed briefly, or left unaddressed, any issues or considerations that were, in the agency's judgment, comparatively not of a substantive nature;
- Represents the agency's good-faith effort to fulfill NEPA's requirements within the Congressional timeline (or within the minimally extended timeline) and this effort is substantially complete; and
- Contains analysis that is adequate to inform and reasonably explain the responsible official's final decision regarding the proposed action or selected alternative.

Appendix A. References

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Appendix B. Depopulation, Disposal, and Decontamination Guidance - Option Matrices and Considerations

The following tables were prepared by USDA APHIS to provide a summary of the depopulation, disposal, and decontamination methods appropriate for use in an ASF outbreak and presented in: ASF Response: Depopulation, Disposal, and Decontamination Guidance – Option Matrices and Considerations (USDA APHIS, 2019a). Depopulation information was updated to reflect 2026 AVMA Guidelines for the Depopulation of Animals (AVMA, 2026).

DEPOPULATION

	Inhalant (CO_2 gas)	Gun Shot*	Nonpenetrating Captive Bolt	Penetrating Captive Bolt	Electrocution Head to Heart	Veterinarian Administered Anesthetic Overdose (Injectable)	Ventilation Shutdown (VSD)†	Compressed Foam
AVMA Tier	1	1	1	1	1	1	3	1
Swine SizeΔ	S	S,M,L	S	M,L	M,L	S,M,L	S,M,L	S.M.L
Risk to Human Safety	Moderate	High	Moderate	Moderate	Low if proper lock out/tag out procedure is followed	Low if proper animal restraint is used	Low	Low
Skill Required	Moderate to low, based on equipment design	Moderate to high	Moderate	Moderate	Moderate	High, veterinary administration only	Low, must understand the system and human safety	Moderate
Aesthetics	Bloodless, some excitatory movement or vocalization possible	Discharge of blood from wound	Operator / observer impact, may have some blood	Discharge of blood from wound	Muscle contraction	No blood discharge, limited pig movements	Vocalization possible	Bloodless, some excitatory movement or vocalization possible
Limitations	• Currently only studied by US on small pigs up to 70 lbs. • Improved methods being evaluated for larger animals. • Scarcity of CO_2.	• Security of firearms. • Legal restrictions. • Scarcity of trained people with sufficient equipment and supplies. • Maintenance.	• Use only in suckling and nursery pigs. • Requires proper restraint. • Scarcity of trained operators and suitable equipment.	• May be a two-step process depending on equipment design. • Requires proper restraint. • Scarcity of trained operators and suitable equipment.	• Adequate amperage needed. • Commercial hog stunner recommended. • Head only is a two-step process. • Scarcity of trained personnel, equipment and power supply.	• Applicable agents available only to licensed veterinarians. • Limits carcass disposal options. • Scarcity of enough drugs for whole farm.	• Only if Tier 1 or Tier 2 methods cannot reasonably be implemented. • Significant labor requirement (disposal). • Enclosure must have ability to be adequately sealed. • May not be 100% effective.	• Scarcity of trained operators and suitable equipment. • Scarcity of water in some locations. • Scarcity/cost of nitrogen.
Carcass Disposal Restrictions	No	No	No	No	No	Yes	No	No
Biosecurity Risk – Blood Contamination?	No	Yes	No	Yes	No	No	No	No

Table adapted from Carthage System Professional Swine Management, LLC.

* Not for suckling pigs.

** Head to Heart applications can be one step if done properly. Head only electrocution requires secondary method be applied within 15 seconds (e.g., heart electrocution, exsanguination).

† Ventilation shutdown involves closing up the house, closing all inlets, and turning off fans. The animals die from hyperthermia. VSD can only be used in facilities that can adequately be sealed to increase air temperature. The Plus component is the addition of supplemental heat or CO_2 to better achieve a high death rate. Per AVMA, VSD+ should only be used if Tier 1 or Tier 2 methods cannot reasonably be implemented and when the risk of doing nothing is likely to have a reasonable chance of resulting in significantly more animal suffering than that associated with the proposed depopulation method.

Δ S = small pigs up to 100 pounds; M = medium pigs between 100 and 300 pounds; and L = large pigs over 300 pounds

DISPOSAL

Carcass Management Options—An Overview (from L.P. Miller, USDA, 2018)

1. Test negative animals to slaughter or non-infected disposal
2. Composting – likely to inactivate ASFv by multiple mechanisms
3. Above Ground Burial – likely to inactivate ASFv by multiple mechanisms
4. Deep Burial – unlikely to inactivate ASFv
5. Burning:
    a. Open burning – likely to inactivate ASFv, but also potential to cause adverse human health impacts
    b. Mobile incineration – safer then open burning but limited throughout
6. Landfill – negligible risk if leachate goes into wastewater treatment step; prioritize ASF-negative herds for landfill to virtually eliminate risk
7. Rendering – prioritize ASF-negative herds for rendering if renderers will accept non-infected material from infected premises or control area
8. Incineration/energy-from-waste – highly likely to inactivate ASFv but requires packaging carcasses

Carcass Management Considerations (state disposal laws at https://www.vetca.org/lacd/index.php)

	Applicability	Efficacy/Effectiveness	Limitations	References
Controlled Marketing	• Test-negative animals	• Would greatly reduce the amount of material for disposal and conserve a valuable protein resource.	• Currently no validated whole-herd test available; challenging to collect samples from individual animals. • Consumers may reject products from control areas.	
Separate Test Negative animals for non-infected disposal and infected animals for on-site management or off-site infected disposal	• If permitted by AHOs. • If negative status can be certified as required by disposal facility. • If premises can be separated into clean/dirty areas. • If strict biosecurity can be maintained.	• Would reduce amount of material for on-site or infected off-site management, provide more disposal options, and reduce disposal costs.	• Currently no validated whole-herd test available; challenging to collect samples. • Disposal facilities may reject products from control areas.	
Burial - Deep	• If allowed by state environmental regulators. • In an area deemed to have suitable soils. • Allowed by property owner.	• Removes carcasses from view, but not likely to destroy ASF or biomass.	• Results in permanent burial site which may require recording on property deed (0.1 acres per (1200) 200-pound pigs). • Does not inactivate pathogens or destroy biomass. • Allows leachate to discharge directly to environment.	• Borchardt et al, "Avian Influenza Virus RNA in Groundwater Wells Supplying Poultry Farms Affected by the 2015 Influenza Outbreak", Environmental Science and Technology Letters, American Chemical Society, 2017. • Freedman et al, "Water Quality Impacts of Burying Livestock Mortalities", Ridgetown College, University of Guelph, 2003. • MacArthur, et al, "Leachate characteristics and management requirements arising from the foot and mouth operations in Scotland", Journal of Swine Health and Production, 2001. • Pratt et al, "Livestock Mortalities Burial Leachate Chemistry after Two Years of Decomposition", Biocycle, 2009. • Qi et al, "Potential Water Quality Impacts Originating from Land Burial of Cattle Carcasses", University of Nebraska, 2013.

	Applicability	Efficacy/Effectiveness	Limitations	References
Burning - Open/Air Curtain	• If allowed by state environmental regulators and public health authorities. • If allowed by fire control authorities.	• Destroys ASF and biomass resulting in 5 % ash.	• Logistically challenging. • Slow. • Potential public health risk.	• Watkiss et al, "Cost Benefit Analysis of Foot and Mouth Disease Control Strategies: Environmental Impacts", AEA Technology Environment Report, 2004.
Burning - Mobile gasifier or similar	• If allowed by state environmental regulators and public health authorities. • If allowed by fire control authorities.	• Destroys ASF and biomass resulting in 5 % ash. • Safer than open burning/air curtain.	• Limited availability. • Processes up to 2 tons/hour.	
Composting	• If allowed by state environmental regulators. • In an area with suitable soils.	• Likely to destroy ASF. • Converts biomass to useful by-product.	• Requires 1:1 ratio of wood chips to carcass weight. • Requires adequate space for windrows (1 acre per (1200) 200-pound pigs). • Takes up to a year for whole carcasses to fully compost. • Requires routine temperature monitoring. • Requires expertise to properly construct windows. • Not yet validated for ASF inactivation.	• Glanville et al. Environmental Impacts of Emergency Livestock Mortality Composting—Leachate Release and Soil Contamination (Iowa State University, 2006) • Bonhotal et al. Evaluating Pathogen Destruction in Road Kill Composting. Cornell University. BioCycle, 47(11):49-51, 2006. • Guan et al. Degradation of foot-and-mouth disease virus during composting of infected pig carcasses. Can J Vet Res. 2010.
Burial - Above Ground	• If allowed by state environmental regulators. • In an area with suitable soils.	• Experimental – may destroy ASF. • Experimental – may decompose biomass over time.	• Requires 1:5 ratio of wood chips to carcass weight. • Requires adequate space for plots (0.3 acres per (1200) 200-pound pigs). • Takes up to a year for whole carcasses to fully decompose if abdomen is lanced. • Requires routine maintenance of plots. • Not yet studied for ASF inactivation.	• Flory et al. Mesophillic Static Pile Composting Of Animal Carcasses. BioCycle March/April 2017, Vol. 58, No. 3, p. 65.
Landfill	• For non-infected carcasses from control area. • If infected carcass transport is permitted by veterinary health authorities. • If landfill will accept infected carcasses.	• Removes carcasses from view, but does not destroy ASF biomass. • Protective of public health if landfill in compliance with permit requirements.	• Does not inactivate pathogens or destroy biomass. • Requires trucks to be lined.	
Rendering	• For non-infected carcasses from control area if renderer accepts. • If infected carcass transport is permitted by veterinary health authorities. • If rending plant will accept infected carcasses.	• Destroys pathogens. • Converts biomass to useful byproducts. • Designed for carcass management.	• Infected material may disrupt rendering company business. • Unlikely to be fully biosecure. • Requires trucks to be lined.	• Hayes, Mary, "Validation of Thermal Destruction of Pathogenic Bacteria in Rendered Animal Products" (2013).
Incineration/ energy-from-waste	• If infected carcass transport is permitted by veterinary health authorities. • If incinerator will accept infected carcasses.	• Destroys ASF and biomass. • Produces energy.	• Limited availability. • Requires packaging carcasses into 1 cubic yard lined boxes.	

DECONTAMINATION

	Treatment	Applicability	Efficacy/Effectiveness	Limitations	References
Outdoor Areas	Chemical Disinfectants (except hydrated lime)	Not recommended because presence of soil reduces disinfection efficacy and due to potential environmental			Calfee, W. Effectiveness of Spray-Based Decontamination Methods for Spores and Viruses on Heavily Soiled Surfaces. EPA. 2016.
	Heat Disinfection	Possible; some use of flame on earthen surfaces	High temperatures inactivate pathogens	• Limited availability of equipment and fuel. • Risk of fuel. • Surface treatment only.	
	Hydrated Lime	Applicable	Inactivates pathogens except pseudomonas sp.	• Surface treatment only • Human health risks when handling.	Schotsmans et al. Short-term effects of hydrated lime and quicklime on the decay of human remains using pig cadavers as human body analogues: Laboratory experiments. 2014.
	Fallowing	Applicable	Urine non-infective at 4ºC after 15.3 days		Davies et al. Survival of African Swine Fever Virus in Excretions from Pigs Experimentally Infected with the Georgia 2007/1 Isolate. Pirbright Institute. 2015.

	Treatment	Applicability	Efficacy/Effectiveness	Limitations	References
Structures	Cleaning and Disinfection (C&D)*, followed by application of an EPA registered antimicrobial**	Interior surfaces of barns	Routinely shown effective during outbreaks with post C&D sampling analysis.	• Generates large volumes of wastewater for collection/treatment. • Labor intensive. • Relatively expensive.	• APHIS HPAI guidance can be found at https://www.aphis.usda.gov/animal_health/emergency_management/downloads/hpai/cleaning_disinfection.pdf. • Approved ASF Disinfectants can be found at https://www.aphis.usda.gov/animal_health/emergency_management/downloads/asf-virus-disinfectants.pdf.
		Interior surfaces of packing plants	Disinfection of pork packing plants should be done with acid-based disinfectants (such as CD631) following manufacturer's instructions particularly regarding pre-washing procedures.	Hypochlorite based disinfectants such as XY12 and bleach should be avoided when organic load (e.g. blood, feces) is high.	https://www.pork.org/research/disinfection-of-foreign-animal-disease-viruses-on-surfaces-relevant-to-the-pork-packing-industry/
	Dry cleaning and heat△	Interior surfaces of barns	Usually shown effective during outbreaks with post C&D sampling and analysis.	May require auxiliary heaters/equipment that must be decontaminated.	APHIS HPAI guidance can be found at https://www.aphis.usda.gov/animal_health/emergency_management/downloads/hpai/cleaning_disinfection.pdf.
	Fumigation (ClO2)	Interior surfaces of barns	Effective for HPAI and MS2 phage	• Can corrode metals. • Only works on clean surfaces.	EPA/The Sabre Companies, available upon request

* The removal of gross contamination, organic material, and debris from the premises, via mechanical means like sweeping (dry cleaning) and/or use of water and soap or detergent (wet cleaning).
** See reference column for registered antimicrobials; application rates and contact times are found on product labels.
△ The removal of gross contamination, organic material, and debris from the premises, via mechanical means like sweeping (dry cleaning) followed by heating at 100ºF - 120ºF for 7 days total.

	Treatment	Applicability	Efficacy/Effectiveness	Limitations	References
Vehicles/ Equipment	Wet cleaning & disinfection	All exterior vehicle surfaces	Shown effective during field trials with post C&D sampling and analysis	• Generates wastewater possibly requiring collection/treatment. • Labor intensive unless automated. • Relatively expensive.	Guan et al. Vehicle and Equipment Decontamination During Outbreaks of Notifiable Animal Diseases in Cold Weather. 2017.
	"Baking"	Used by the pork industry for livestock trailers and PEDv	Unknown effectiveness for ASF	May require auxiliary heaters/equipment that must be decontaminated	Holtkamp et al. Evaluation of time and temperature sufficient to inactivate porcine epidemic diarrhea virus in swine feces on metal surfaces. 2014

	Treatment	Applicability	Efficacy/Effectiveness	Limitations	References
Manure/ Slurry	Heat – slurry	Efficacious after 24 hours @ 50ºC (122ºF) or 15 minutes @ 60ºC (140ºF)	Depends on solids concentration.	May pose logistical challenges – needs field validation.	Turner et al. Laboratory-scale inactivation of African swine fever virus and swine vesicular disease virus in pig slurry. Pirbright Institute. 1999.
	Heat – manure, urine, saliva	Efficacious after 15.3 days @ 4ºC (40ºF)			Davies et al. Survival of African Swine Fever Virus in Excretions from Pigs Experimentally Infected with the Georgia 2007/1 Isolate. Pirbright Institute. 2015.
	1% Sodium or Calcium Hydroxide wt/volume - slurry	Efficacious after 5 minutes @ 4ºC (40ºF)	Depends on solids concentration	Worker health/safety risk from potential chemical burns and inhalation chemicals	Turner et al. Laboratory-scale inactivation of African swine fever virus and swine vesicular disease virus in pig slurry. Pirbright Institute. 1999.