



Animal Welfare Institute

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Submitted via regulations.gov

Regulatory Analysis and Development
Policy and Program Development
Animal and Plant Health Inspection Service
Station 3A-03.8
4700 River Road, Unit 118
Riverdale, MD 20737-1238

Re: Comments on Notice of Intent to Prepare an Environmental Impact Statement for Highly Pathogenic Avian Influenza Control in the United States (Docket No. APHIS-2022-0055)

Dear Administrator Shea:

The Animal Welfare Institute (AWI) and undersigned organizations appreciate the opportunity to comment on the Animal and Plant Health Inspection Service's (APHIS) notice of intent (NOI) to prepare an environmental impact statement (EIS) for highly pathogenic avian influenza (HPAI) control in the United States.¹ Since its founding in 1951, AWI has been dedicated to reducing animal suffering caused by people, and we continually work to improve conditions for the billions of animals raised and slaughtered each year for food in the United States. As a result, AWI is very concerned about the impact on animal welfare of both HPAI and the methods used to control it.

I. Background - The Current HPAI Outbreak

As of February 16, 2023, HPAI has been confirmed in 316 commercial and 447 backyard flocks in 47 states, resulting in the depopulation of more than 58 million domestic birds.² In addition,

¹ Notice of Intent to Prepare an Environmental Impact Statement for Highly Pathogenic Avian Influenza Control in the United States, 88 Fed. Reg. 2877 (Jan. 18, 2023) (hereinafter Notice of Intent).

² 2022-2023 *Confirmations of Highly Pathogenic Avian Influenza in Commercial and Backyard Flocks*, U.S. DEP'T AGRIC., ANIMAL AND PLANT HEALTH INSPECTION SERV., <https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/avian/avian-influenza/hpai-2022/2022-hpai-commercial-backyard-flocks> (last modified Jan. 18, 2023).

the virus has been detected in more than 6,000 wild birds in every state and 15 species of terrestrial and marine mammals.³ The current outbreak dwarfs the previous one from December 2014 to June 2015, which affected a total of 211 commercial flocks, 21 backyard flocks, and 50.4 million birds (including only 98 detected wild birds)⁴ in 21 states. Prior to the current outbreak, the 2014-15 outbreak was considered the nation’s “largest animal health emergency.”⁵

According to APHIS’s website, the types of commercial birds that have been depopulated during the current outbreak include turkey meat birds, turkey breeder hens, table egg layers, table egg breeders, table egg pullets, chicken meat birds (broilers), upland gamebirds, duck meat birds, and duck breeder birds.⁶ In response to Freedom of Information Act (FOIA) requests, AWI has so far received information about the depopulation methods used in 311 of the 319 commercial depopulations listed on APHIS’s website. The records indicate that, during 2022, ventilation shutdown (VSD) plus heat, alone or in combination with other methods, was used in at least 143 of 311 commercial depopulations (46 percent); at least 44.6 million birds (85 percent) were killed in these 143 depopulations.⁷ By contrast, there is no evidence that either VSD or VSD plus heat was used at all during the 2014-15 outbreak, and it was used only four times for HPAI-related depopulation in January 2016.⁸ The sudden widespread use of VSD plus to depopulate flocks is alarming because it causes death by heatstroke, a method “likely to involve prolonged suffering.”⁹ APHIS’s reliance on VSD plus heat deviates from the American Veterinary Medical Association’s (AVMA) *Guidelines for the Depopulation of Animals*, which state that “the use of

³ *Bird Flu Current Situation Summary*, CTRS. FOR DISEASE CONTROL AND PREVENTION, <https://www.cdc.gov/flu/avianflu/avian-flu-summary.htm> (last updated Feb. 8, 2023); *States with HPAI detections in Wild Birds*, U.S. DEP’T AGRIC., ANIMAL AND PLANT HEALTH INSPECTION SERV. (Feb. 8, 2023), https://www.aphis.usda.gov/animal_health/animal_diseases/avian/images/hpai-wild-birds-map.png; *2022-2023 Detections of Highly Pathogenic Avian Influenza in Mammals*, U.S. DEP’T AGRIC., ANIMAL AND PLANT HEALTH INSPECTION SERV. (Feb. 9, 2023).

⁴ *HPAI 2014/15 Confirmed Detections*, ANIMAL AND PLANT HEALTH INSPECTION SERV., https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/avian/sa_detections_by_states/hpai-2014-2015-confirmed-detections (last modified Aug. 31, 2021); U.S. DEP’T AGRIC., ANIMAL AND PLANT HEALTH INSPECTION SERV., *HIGH PATHOGENICITY AVIAN INFLUENZA CONTROL IN COMMERCIAL POULTRY OPERATIONS – A NATIONAL APPROACH* 1, 7, 36 (2015).

⁵ *2014-2015 HPAI Outbreak*, U.S. DEP’T AGRIC., ANIMAL AND PLANT HEALTH INSPECTION SERV., <https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/avian/2014-2015-hpai-outbreak> (last modified Aug. 31, 2021).

⁶ *2022-2023 Confirmations of Highly Pathogenic Avian Influenza in Commercial and Backyard Flocks*, U.S. DEP’T AGRIC., ANIMAL AND PLANT HEALTH INSPECTION SERV., <https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/avian/avian-influenza/hpai-2022/2022-hpai-commercial-backyard-flocks> (last modified Jan. 18, 2023) (hereinafter *2022-2023 Confirmations of HPAI*).

⁷ U.S. DEP’T AGRIC., ANIMAL AND PLANT HEALTH INSPECTION SERV., Responses to FOIA Requests Numbers 2017-APHIS-03546-F, 2022-APHIS-02403-F, 2022-APHIS-02981-F, 2022-APHIS-03427-F, 2022-APHIS-03876-F, 2022-APHIS-04627-F, 2022-APHIS-04840-F, 2022-APHIS-05330-F, and 2022-APHIS-05448-F, (hereinafter *RESPONSES TO FOIA REQUESTS*).

⁸ *Id.*

⁹ Gwendolen Reyes-Illg et al., *The Rise of Heatstroke as a Method of Depopulating Pigs and Poultry: Implications for the US Veterinary Profession*, 13 *ANIMALS* 140 (2022).

less preferred methods [such as VSD plus heat] should not become synonymous with standard practice.”¹⁰

Of the approximately 311 commercial depopulations carried out during 2022, 56 (18 percent) involved operations where 100,000 or more birds were killed.¹¹ At least 40 commercial depopulations (13 percent) required more than 48 hours between positive test confirmation and completion of depopulation, and therefore did not meet the USDA’s goal of completing depopulations within 24-48 hours¹² of the time of presumptive diagnosis. And at least 29 of the 56 depopulations (52 percent) involving a minimum of 100,000 birds exceeded 48 hours.¹³ These depopulations involved at least 37.8 million birds, with an average of more than 1.3 million birds per depopulation.¹⁴ Operations with less than 100,000 birds were far less likely to miss the 48-hour deadline to complete depopulation. AWI analysis indicates that, of the 38.1 million birds who were killed in depopulations that exceeded 48 hours between test confirmation and completion, premises with fewer than 100,000 birds contributed only 330,600, or less than 1 percent, of the total. At least 8 of the top 12 largest depopulations took 10 days or longer.¹⁵

Some humans have also become infected with the virus. According to the World Health Organization, there have been 868 cases of human illness from avian influenza Type A (H5N1) reported in 21 countries since 2003.¹⁶ Of these cases, 457 (53 percent) were fatal. According to the Centers for Disease Control and Prevention, there has been one human infection in the United States associated with the current outbreak, reported in April 2022.¹⁷

Pursuant to the National Environmental Policy Act (NEPA) (42 U.S.C. §§ 4321 et seq.), APHIS published a draft environmental assessment (Draft EA) in April 2022 in order to evaluate the environmental impacts of its emergency response to the HPAI outbreak in the seven states where outbreaks had occurred as of February 24, 2022.¹⁸ It published a Final EA and finding of no

¹⁰ AM. VETERINARY MED. ASS’N, AVMA GUIDELINES FOR THE DEPOPULATION OF ANIMALS: 2019 EDITION 45 (2019).

¹¹ 2022-2023 *Confirmations of HPAI*, *supra* note 6.

¹² *See, e.g.*, U.S. DEP’T AGRIC., ANIMAL AND PLANT HEALTH INSPECTION SERV., APHIS-2022-0031-0012, EMERGENCY RESPONSE FOR HIGHLY PATHOGENIC AVIAN INFLUENZA OUTBREAKS IN SEVEN STATES: FINAL ENVIRONMENTAL ASSESSMENT i, 1 fn. 1 (2022) (hereinafter *Final EA*) (“VS sets a goal of 24-48 hours for depopulation to ensure minimal spread . . .”).

¹³ RESPONSES TO FOIA REQUESTS, *supra* note 7; 2022-2023 *Confirmations of HPAI*, *supra* note 6.

¹⁴ *Id.*

¹⁵ *Id.*

¹⁶ AVIAN INFLUENZA WEEKLY UPDATE NUMBER 880, WORLD HEALTH ORG. 1 (2023), https://www.who.int/docs/default-source/wpro---documents/emergency/surveillance/avian-influenza/ai_20230127.pdf?sfvrsn=22ea0816_23#:~:text=Of%20these%20cases%2C%20135%20were.reported%20from%20China%20since%202015.

¹⁷ U.S. *Case of Human Avian Influenza A(H5) Virus Reported*, CTRS. FOR DISEASE CONTROL AND PREVENTION (Apr. 28, 2022, 11:00 PM), <https://www.cdc.gov/media/releases/2022/s0428-avian-flu.html>.

¹⁸ U.S. DEP’T AGRIC., ANIMAL AND PLANT HEALTH INSPECTION SERV., APHIS-2022-0031-0001, EMERGENCY RESPONSE FOR HIGHLY PATHOGENIC AVIAN INFLUENZA OUTBREAKS IN SEVEN STATES: DRAFT ENVIRONMENTAL ASSESSMENT (2022) (hereinafter *Draft EA*).

significant impact in September 2022.¹⁹ APHIS is now preparing an EIS to supplement the final EA and cover states where HPAI outbreaks have occurred since February 24, 2022.²⁰

II. Legal Framework

A. National Environmental Policy Act

NEPA was enacted “to ensure Federal agencies consider the environmental impacts of their actions in the decision-making process.” 40 C.F.R. § 1500.1(a). For every “major Federal action[] significantly affecting the quality of the human environment,” NEPA requires the federal agency responsible to prepare an environmental impact statement (EIS) assessing, among other things, “the environmental impact of the proposed action” and “alternatives to the proposed action.” 42 U.S.C. § 4332(C)(i), (iii); 40 C.F.R. § 1508.1(j). An EIS must “provide full and fair discussion of significant environmental impacts and shall inform decision makers and the public of reasonable alternatives that would avoid or minimize adverse impacts or enhance the quality of the human environment.” 40 C.F.R. § 1502.1. *See also Baltimore Gas and Elec. Co. v. Natural Res. Def. Council*, 462 U.S. 87, 97 (1983):

NEPA has twin aims. First, it “places upon an agency the obligation to consider every significant aspect of the environmental impact of the proposed action.” Second, it ensures that the agency will inform the public that it has indeed considered environmental concerns in its decisionmaking process.

(Internal citations omitted). NEPA is intended to “ensure that [federal agencies] . . . will have detailed information concerning significant environmental impacts” and “guarantee[] that the relevant information will be made available to the larger [public] audience.” *Blue Mountains Biodiversity Project v. Blackwood*, 161 F.3d 1208, 1212 (9th Cir. 1998).

In enacting NEPA, Congress required that agencies “take a ‘hard look’ at the environmental consequences before taking a major action.” *Id.* (citing *Kleppe v. Sierra Club*, 427 U.S. 390, 401, n. 21 (1976)). Nationwide actions undertaken by APHIS to formulate “response strategies to combat future widespread outbreaks of animal . . . diseases,” such as the present HPAI outbreak, normally require an EIS. 7 C.F.R. § 372.5.

The law defines the “human environment” as “comprehensively the natural and physical environment and the relationship of present and future generations of Americans with that environment.” 40 C.F.R. § 1508.1(m). NEPA defines “effects or impacts” to include direct, indirect, and cumulative effects. 40 C.F.R. § 1508.1(g). Effects can include “ecological . . . , aesthetic, historic, cultural, economic, social, or health” impacts. *Id.* § 1508.1(g)(4).

¹⁹ *Final EA*, *supra* note 12, at 1; U.S. DEP’T AGRIC., ANIMAL AND PLANT HEALTH INSPECTION SERV., APHIS-2022-0031-0013, DECISION AND FINDING OF NO SIGNIFICANT IMPACT: ENVIRONMENTAL ASSESSMENT: EMERGENCY RESPONSE FOR HPAI OUTBREAKS IN SEVEN STATES (2022).

²⁰ *Final EA*, *supra* note 12, at 9; Notice of Intent, *supra* note 1, at 2877.

B. Animal Health Protection Act

Under the Animal Health Protection Act (AHPA) (7 U.S.C. §§ 8301 et seq.), the Secretary of Agriculture—through APHIS Veterinary Services (VS)—is “authorized to protect the health of livestock, poultry, and aquaculture populations in the United States by preventing the introduction and interstate spread of serious diseases and pests of livestock, poultry, and aquaculture, and for eradicating such diseases within the United States when feasible.”²¹

The AHPA further authorizes the Secretary to compensate the owner of any animal that the Secretary requires to be destroyed. 7 U.S.C. § 8306(d). To implement this authority, APHIS has promulgated rules that require producers to comply with certain conditions to be eligible for indemnity payments. For example, to be compensated for poultry destroyed due to HPAI infection, producers with larger flock sizes must have an approved poultry biosecurity plan. 9 C.F.R. § 53.11(e), 53.10(g)(2).

III. The EIS Should Consider an Alternative in which APHIS Conditions Indemnification on Restocking at Smaller Flock Sizes and Lower Densities.

As discussed above, an EIS must consider “reasonable alternatives that would avoid or minimize adverse impacts or enhance the quality of the human environment.” 40 C.F.R. § 1502.1. In addition to the alternatives identified in the NOI, the EIS should assess an alternative in which depopulation indemnification payments are conditioned on producers restocking at smaller flock sizes and lower flock densities.

The NOI identifies three proposed alternatives for consideration in the EIS: 1) a no action alternative; 2) a standard procedures alternative; and 3) an adaptive management alternative.²² Under the no action alternative, APHIS would conduct nationwide surveillance of commercial and backyard flocks for HPAI and provide technical guidance upon request.²³ Under the standard procedures alternative, APHIS would conduct the same activities as under the no action alternative, but would also assist with depopulation, carcass management, and premises cleaning and disinfection.²⁴ The NOI states that depopulation methods could include the use of “water-based foam, carbon dioxide (CO₂) and other approved gasses, ventilation shutdown plus (VSD+) heat or CO₂, cervical dislocation, decapitation, captive bolt, injectable euthanasia agents, and gunshot.”²⁵ Finally, under the adaptive management alternative, APHIS would conduct the same activities as under the standard procedures alternative and would also use “any new HPAI outbreak response methods or other existing methods not previously listed that become more

²¹ Notice of Intent, *supra* note 1, at 2877.

²² *Id.* at 2878.

²³ *Id.*

²⁴ *Id.*

²⁵ *Id.*

useful due to changes in technology or in outbreak scenarios” after conducting a separate risk assessment.²⁶

Either as a component of one of the three proposed alternatives, or as an additional fourth alternative, the EIS should also consider an approach in which APHIS incentivizes restocking at smaller flock sizes and lower flock densities. As described above, the AHPA gives APHIS the authority to indemnify poultry producers for expenses associated with the depopulation of flocks exposed to disease. *See* 7 U.S.C. § 8306(d). One condition APHIS requires prior to making these indemnification payments is that producers have a poultry biosecurity plan approved by the agency. *See* 9 C.F.R. § 53.11(e), 53.10(g)(2). An additional stipulation that APHIS should consider placing on these payments is a requirement that, following a depopulation event, producers restock with smaller flock sizes and lower flock densities. Such a condition would help reduce the susceptibility of the flocks to future outbreaks of HPAI and other diseases and curb the number of birds that must be depopulated in the event of flock infection, thus helping to “minimize adverse impacts” and “enhance the quality of the human environment.” 40 C.F.R. § 1502.1. This approach would also further the goals of the AHPA to promote the health of animals, people, and the environment. *See* 7 U.S.C. § 8301(1).

Studies suggest that larger and denser flocks are more vulnerable to diseases such as HPAI. As Leibler et al. (2009) explained, “industrial food animal production generates unique ecosystems—environments that may facilitate the evolution of zoonotic pathogens.”²⁷ The authors observed that, for example, the probability of a mutation from low pathogenicity avian influenza (LPAI) to HPAI “is amplified in the setting of industrial poultry production due to the rapid viral replication that occurs in an environment of thousands of confined, susceptible animals.”²⁸ Mutation of LPAI to HPAI occurred on a commercial turkey farm in South Carolina in 2020.²⁹ Public health researchers have observed that “the emergence of avian influenza viruses is linked to intensification of the poultry sector [...and] in high-income countries, [] evidences link de-novo HPAI emergences to intensive poultry production systems.”³⁰

Similarly, a 2020 United Nations Environment Programme report identifies “[u]nsustainable agricultural intensification” as one of “[s]even major anthropogenic drivers of zoonotic disease emergence.”³¹ The report explains that the “intensification and industrialization of animal production” results in “large numbers of genetically similar animals,” which are “more

²⁶ *Id.*

²⁷ Jessica H. Leibler et al., *Industrial Food Animal Production and Global Health Risks: Exploring the Ecosystems and Economics of Avian Influenza*, 6 *ECOHEALTH* 58, 58 (2009).

²⁸ *Id.* at 62.

²⁹ Sungsu Youk et al., *Highly Pathogenic Avian Influenza A(H7N3) Virus in Poultry, United States, 2020*, 26 *EMERGING INFECTIOUS DISEASES* 2966 (2020).

³⁰ Marius Gilbert et al., *Intensifying Poultry Production Systems and the Emergence of Avian Influenza in China: A ‘One Health/Ecohealth’ Epitome*, *ARCHIVES PUB. HEALTH*, Nov. 27, 2017, at 1.

³¹ DELIA GRACE RANDOLPH, U.N. ENV’T PROGRAMME, *PREVENTING THE NEXT PANDEMIC: ZOOONOTIC DISEASES AND HOW TO BREAK THE CHAIN OF TRANSMISSION* 15 (2020).

vulnerable to infection than genetically diverse populations, because the latter are more likely to include some individuals that better resist disease.”³²

According to author and New York University professor Matthew Hayek, “the intensification of animal agricultural production, in its most common forms, entails the concentration and confinement of animal bodies and their wastes,” which can result in “multiple well-documented and potentially cascading risks for zoonotic disease emergence.”³³ Similarly, Graham et al. (2008) cautioned that “industrial-scale operations involving high densities of confined animal populations . . . may influence the emergence and transfers of avian influenza virus among wild and domestic species, and from avians to human populations.”³⁴ Nearly two decades ago, Stegeman et al. (2004) recommended “reducing the flock density of commercial flocks, to reduce the probability of another [HPAI] epidemic” like the one that occurred in the Netherlands in 2003 that affected hundreds of flocks and led to the depopulation of 30 million birds³⁵—similar to the outbreak we are experiencing today.

In its Final EA, APHIS acknowledged that “APHIS and the poultry industry agree that the impact of an HPAI outbreak is amplified where poultry production is highly concentrated or networked” and committed to “encourage farmers to consider reducing the number of birds in poultry houses as part of their base management practices.”³⁶ Consistent with this approach, and in light of the evidence above, the EIS should analyze an alternative in which APHIS takes the next step and incentivizes smaller or lower-density flocks by conditioning indemnification payments on these post-depopulation changes. Doing so would also help achieve APHIS’s goal of depopulating within 48 hours.³⁷ As APHIS has acknowledged, “[t]he larger poultry facilities may struggle to meet this goal due to the sheer volume of poultry that need to be depopulated.”³⁸ Appropriate flock size could be determined by ability to comply with this 48-hour timeframe.

IV. The EIS Should Also Consider an Alternative in which APHIS Encourages Higher-Welfare Depopulation Methods.

The EIS should also evaluate an approach in which APHIS incentivizes higher-welfare depopulation methods—such as high-expansion nitrogen gas-filled foam—and discourages more inhumane methods—such as VSD plus heat—by conditioning indemnification payments on the use of higher-welfare techniques. Once again, the analysis could either be included within one of the three proposed alternatives or conducted as a separate fourth or fifth alternative.

³² *Id.*

³³ Matthew N. Hayek, *The Infectious Disease Trap of Animal Agriculture*, SCI. ADVANCES, Nov. 2, 2022, at 1.

³⁴ Jay P. Graham et al., *The Animal-Human Interface and Infectious Disease in Industrial Food Animal Production: Rethinking Biosecurity and Biocontainment*, 123 PUB. HEALTH REPS. 282, 296 (2008).

³⁵ Arjan Stegeman et al., *Avian Influenza A Virus (H7N7) Epidemic in The Netherlands in 2003: Course of the Epidemic and Effectiveness of Control Measures*, 190 J. INFECTIOUS DISEASES 2088, 2088 (2004).

³⁶ *Final EA*, *supra* note 12, at 77.

³⁷ *Id.* at 41.

³⁸ *Id.*

VSD is a depopulation method that involves “closing up the house, shutting inlets, and turning off the fans.”³⁹ Body heat from the animals inside “raises the temperature in the house until animals die of hyperthermia,” or heatstroke.⁴⁰ However, it may be impossible to achieve sufficient mortality rates with VSD alone.⁴¹ To achieve 100 percent mortality, “additional heat sources or the addition of CO₂ may be needed.”⁴² This method is known as “VSD plus.” However, the USDA does not consider VSD plus CO₂ to be a practical option for depopulation, and VSD plus heat may not achieve 100 percent mortality even after many hours.⁴³ Thus, despite its increased use during the current HPAI outbreak, VSD plus methods that rely on heatstroke as the killing mechanism should not be considered a viable or humane option. Indeed, VSD plus heat is not recognized as an acceptable depopulation method by the World Organisation for Animal Health,⁴⁴ and it is designated as only “permitted in constrained circumstances” by the AVMA.⁴⁵ With HPAI increasingly recognized as an endemic disease in wild birds, it is expected that HPAI-related depopulations will continue to occur;⁴⁶ therefore, it is not acceptable to use methods intended for “constrained circumstances” to be utilized for HPAI-related depopulations.

In contrast to VSD plus heat, studies indicate that the use of nitrogen gas-filled foam with a high expansion ratio (i.e., 300:1 or higher) is both an effective and higher-welfare approach to depopulation.⁴⁷ Most research on high-expansion nitrogen gas-filled foam has been conducted in the United Kingdom and the European Union. In 2018, a study conducted, in part, by APHIS VS and USDA’s Agricultural Research Service, tested the use of compressed air foam, compressed air foam with 50 percent carbon dioxide, and compressed air foam with 100 percent nitrogen on laying hens to determine the effect each treatment had on the birds’ physiological stress and time to cessation of movement.⁴⁸ Although the foam used in this study had a medium-expansion ratio, the researchers found that birds subjected to the nitrogen-based foam had lower corticosterone and higher serotonin serum levels than those subjected to the air- and carbon dioxide-based foams, indicating that they had a lower anxiety and fear response than birds in the other treatment groups.⁴⁹ The authors also found that it took significantly less time for the hens

³⁹ AM. VETERINARY MED. ASS’N, *supra* note 10, at 45.

⁴⁰ *Id.*

⁴¹ *Id.*

⁴² *Id.*

⁴³ Reyes-Illg et al., *supra* note 9, at 4.

⁴⁴ WORLD ORGANISATION FOR ANIMAL HEALTH, *Killing of Animals for Disease Control Purposes*, in TERRESTRIAL ANIMAL HEALTH CODE 1, 5–6 (2022).

⁴⁵ AM. VETERINARY MED. ASS’N, *supra* note 10, at 76.

⁴⁶ Erik Stokstad, *Deadly Bird Flu Establishes a Foothold in North America*, 377,6609 SCI. 912 (2022); Terrence O’Keefe, 5 ‘Opportunities’ Challenging US Egg Producers in 2023, 128 EGG INDUS., Jan. 2023, at 3–4.

⁴⁷ Søren Saxmose Nielse et al., *Killing for Purposes Other Than Slaughter: Poultry*, EFSA J., Nov. 13, 2019, at 1; Dorothy McKeegan, *Mass Depopulation*, in ADVANCES IN POULTRY WELFARE 351 (J.A. Mench, ed. 2018); Dorothy McKeegan et al., *Physiological and Behavioral Responses of Poultry Exposed to Gas-Filled High Expansion Foam*, 92 POULTRY SCI. 1145 (2013); A.B.M. Raj et al., *Novel Method for Killing Poultry in Houses with Dry Foam Created Using Nitrogen*, 162 VETERINARY REC. 722 (2008).

⁴⁸ Shailesh Gurung et al., *Carbon Dioxide and Nitrogen Infused Compressed Air Foam for Depopulation of Caged Laying Hens*, 8 ANIMALS 6, 6 (2018).

⁴⁹ *Id.* at 7–9.

subjected to the nitrogen-based foam to cease movement.⁵⁰ In addition to providing higher-welfare outcomes, the nitrogen-based foam also proved to be higher quality than the carbon-dioxide-based foam; because nitrogen-filled foam has a higher expansion ratio, it is more viscous, drains less quickly, and remains stable longer, enabling it to more effectively kill birds by hypoxia.⁵¹

European researchers have noted numerous advantages of high-expansion nitrogen gas-filled foam over other depopulation methods, including the low- and medium-expansion airway-occluding foam currently in widespread use in the US:

“High expansion gas-filled foam shares the biosecurity and practical advantages of low expansion foam, and birds near the leading edge of the foam are unaffected until submerged, which means that poultry houses can be tackled in sections reducing the risk to welfare of a technical failure. The structural properties of high expansion foam allow it to build up to much greater heights than low-medium expansion foam, opening up the possibility of its use in non-floor reared birds and in three-dimensional housing.... From a welfare perspective, high expansion anoxic foam is preferable because it acts more quickly to induce unconsciousness than low-medium expansion foam and indeed other gas-based depopulation approaches.”⁵²

Analogously, in a project funded by the Pork Checkoff, Williams (2022) demonstrated that nitrogen-filled foam could be used for large-scale depopulation of pigs.⁵³ In a similar 2020 study, researchers found that pigs stunned with high-expansion nitrogen-based foam did not show any strong aversive behaviors.⁵⁴ The researchers noted that stunning with nitrogen gas is known to be less aversive than with carbon dioxide, and suggested that delivering high-expansion foam to a closed container to stun pigs could be a feasible and innovative way to humanely stun pigs and improve pig welfare.⁵⁵ (Like pigs, chickens demonstrate aversive signs to CO₂ inhalation, but not to nitrogen.⁵⁶)

The AVMA’s 2019 depopulation guidelines failed to review high-expansion nitrogen gas-filled foam, instead stating that compressed air foam equipment is not currently available at “field scale.”⁵⁷ However, according to the Humane Slaughter Association (HSA), this method “is suitable for the killing of large numbers of poultry during a disease outbreak. It has previously

⁵⁰ *Id.* at 10.

⁵¹ *Id.* at 7.

⁵² McKeegan, *supra* note 47, at 351.

⁵³ Todd Williams, NAT’L PORK BD., VALIDATION AND DEMONSTRATION OF UTILIZING HIGH EXPANSION NITROGEN FOAM FOR LARGE SCALE DEPOPULATION OF SWINE 1 (2022).

⁵⁴ Cecilia Lindahl et al., *Responses of Pigs to Stunning with Nitrogen Filled High-Expansion Foam*, 10 ANIMALS 2210 (2020).

⁵⁵ *Id.*

⁵⁶ AM. VETERINARY MED. ASS’N, *supra* note 10, at 57.

⁵⁷ *Id.*

been used on-farm with chickens and successfully trialed with waterfowl and turkeys.”⁵⁸ It is also allowed as a depopulation method for poultry in the United Kingdom and European Union,⁵⁹ and there are currently companies in North America working to develop this and similar technology and make it commercially viable.⁶⁰ In 2021, the USDA’s National Animal Disease Preparedness and Response Program funded a project conducted by the University of Minnesota to “evaluate use of high expansion nitrogen foam on swine, turkey, and dairy farms for use as a humane method of euthanasia and for mass depopulation”⁶¹ According to the project summary:

This approach is used in other countries and is considered safe, easy to use, and scalable. Results will enhance U.S. capacities for large-scale and rapid depopulation during [a foreign animal disease] outbreak.⁶²

Moreover, the HSA has identified several advantages to using nitrogen foam over other depopulation methods. For example, unlike with whole-house gassing, the poultry house structure does not need to be airtight because foam can fill gaps.⁶³ In addition, the method offers a higher-welfare alternative because “[t]he birds do not appear to be startled by the presence of foam, nor do they try to escape from it once in contact.”⁶⁴ APHIS itself has acknowledged that “[i]nert gases, such as nitrogen and argon, are not detected by poultry and do not elicit direct aversive responses.”⁶⁵

In its Draft EA, APHIS claimed to have “little control” over the types of depopulation methods used by producers and declined to consider an alternative in which specific depopulation methods would be selected or not used.⁶⁶ However, whether APHIS can control the use of certain methods, the agency can certainly encourage it. As discussed above, APHIS clearly has the authority to impose conditions on the receipt of depopulation indemnification payments. Exercising this authority would create a powerful incentive for the industry to switch to more humane depopulation methods and ensure that the methods selected “consider animal welfare to the extent practicable,” as required by APHIS’s Red Book.⁶⁷

⁵⁸ *Gaseous Methods*, HUMANE SLAUGHTER ASS’N, <https://www.hsa.org.uk/gaseous-methods/gaseous-methods>.

⁵⁹ Reyes-Illg et al., *supra* note 9, at 17.

⁶⁰ For example, Gary Bergen, the technical resource team leader at the Prairie Agricultural Machinery Institute, delivered a presentation entitled “Design, operation and lessons learned of a nitrogen gas-based swine depopulation system” at the AVMA Humane Endings Symposium in Chicago, Illinois (Jan. 27-29, 2023).

⁶¹ NATIONAL ANIMAL DISEASE PREPAREDNESS AND RESPONSE PROGRAM (NADPRP) 2019-2021 PROJECTS, U.S. DEP’T AGRIC., ANIMAL AND PLANT HEALTH INSPECTION SERV. 10 (2022).

⁶² *Id.*

⁶³ *Gaseous Methods*, *supra* note 58.

⁶⁴ *Id.*

⁶⁵ *Draft EA*, *supra* note 18, at 17.

⁶⁶ *Id.* at 27.

⁶⁷ *Id.* at 15; U.S. DEP’T AGRIC., HIGHLY PATHOGENIC AVIAN INFLUENZA RESPONSE PLAN: THE RED BOOK 5–42 (2017).

V. The EIS Should Carefully Consider Impacts to Poultry and Human Welfare Resulting from its HPAI Response Activities.

Finally, as part of its examination of the impacts of its HPAI response activities, APHIS should carefully assess the impacts to affected poultry flocks and the welfare of individual birds. As discussed above, NEPA requires APHIS to consider impacts to the “human environment.” 42 U.S.C. § 4332(C)(i), (iii); 40 C.F.R. § 1508.1(j). Chickens, turkeys, ducks, and other birds raised by humans, fed by humans, housed in human-built structures (often located in residential communities), transported in human-driven vehicles, slaughtered and processed by human-constructed machines, and at times killed en masse (depopulated) by human devices or chemicals to prevent the spread of disease, are undeniably an integral part of the human environment. As one commentator observed:

The phrase “human environment” is sufficiently expansive to encompass animal welfare and for impacts to farmed animals . . . to trigger the need for an EIS Animals’ very existence, whether on farms, in cages or in the wild, is inextricably linked to the economic, social, and ecological landscape. . . . Harm to any animals—domestic or wild—is harm to the environment and should be recognized as such under NEPA.⁶⁸

Further, NEPA requires an agency to consider the aesthetic and health effects of its proposed actions. Indeed, “[h]uman contemplation of [animal] suffering constitutes aesthetic harm, a judicially recognized trigger for NEPA review.”⁶⁹ See, e.g., *Lujan v. National Wildlife Federation*, 497 U.S. 871, 872 (1990) (identifying “aesthetic enjoyment” as among the types of interests that NEPA was designed to protect); *Fund for Animals v. Lujan*, 962 F.2d 1391, 1396-97 (9th Cir. 1992) (in the context of NEPA claims, recognizing the psychological injury suffered by plaintiff members who observed bison being killed as arising from a “direct sensory impact of a change in their physical environment”); *Metropolitan Edison Co. v. People Against Nuclear Energy*, 460 U.S. 766, 779 (1983) (Brennan, J., concurring) (“There can be no doubt that psychological injuries are cognizable under NEPA.”); *Humane Society of the United States v. Hodel*, 840 F.2d 45, 52 (D.C. Cir. 1988) (finding that “witness[ing] animal corpses” and enjoying fewer opportunities to view wildlife constituted “classic aesthetic interests, which have always enjoyed protection under standing analysis” for NEPA claims).

Recently, the *Journal of the American Veterinary Medical Association* published an article discussing depopulations’ “tremendous burden on the physical, mental, and emotional status of the veterinarians in charge,” as well as others involved.⁷⁰ Numerous studies have detailed negative psychological impacts experienced by depopulation workers, particularly when methods

⁶⁸ David N. Cassuto & Tala DiBenedetto, *Suffering Matters: NEPA, Animals, and the Duty to Disclose*, 42 HAW. L. REV. 41, 63–64 (2020).

⁶⁹ *Id.* at 64.

⁷⁰ Nathaniel S. Kollias et al., *Psychological Implications of Humane Endings on the Veterinary Profession*, 261 J. AM. VETERINARY MED. ASS’N 185–92 (2023).

resulting in poor animal welfare are used, including moral distress, perpetration-induced traumatic stress, burnout, and emotional detachment.⁷¹

Indeed, the 2022 Final EA recognizes and analyzes “psychological impacts” that could result from depopulation activities.⁷² For example, “[d]epopulation, decontamination, and disposal workers could suffer psychologically from seeing and smelling the carcasses while they work,” and “[t]he general public is likely to be impacted if pictures of dead poultry permeate the public media.”⁷³ Many members of the public who care deeply about animal welfare would likely be distressed upon learning about depopulation events, whether accompanied by photographs or not, particularly when the methods used cause severe or prolonged animal suffering. The EIS must thoroughly assess such animal welfare-related impacts and how they could be mitigated or avoided.

VI. Conclusion

For the reasons discussed above, the EIS should consider alternatives wherein APHIS would condition indemnity payments on poultry producers: 1) using higher-welfare depopulation methods, such as high expansion nitrogen gas-filled foam; and 2) restocking flocks at smaller sizes and lower densities so as to meaningfully reduce the risk of another HPAI outbreak. In addition, the EIS should thoroughly consider the impacts of depopulation activities on the welfare of the affected poultry, as well as the aesthetic and psychological harms that such activities have on poultry farm workers, residents living near poultry producers, depopulation workers, members of the public, and others who may be impacted by the suffering of the animals who are killed.

Thank you for considering our comments.

Sincerely,



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⁷¹ Angela Baysinger & Lori R. Kogan, *Mental Health Impact of Mass Depopulation of Swine on Veterinarians During COVID-19 Infrastructure Breakdown*, FRONTIERS VETERINARY SCI., Apr. 5, 2022, at 1; Cori Bussolari et al., *Mass Depopulation of Swine During COVID-19: An Exploration of Swine Veterinarians' Perspectives*, 9 VETERINARY SCI. 563 (2022); Terry L. Whiting & Colleen R. Marion, *Perpetration-Induced Traumatic Stress - A Risk for Veterinarians Involved in the Destruction of Healthy Animals*, 52 CAN. VETERINARY J. 794 (2011); Miranda Olf et al., *Impact of a Foot and Mouth Disease Crisis on Post-Traumatic Stress Symptoms in Farmers*, 186 BRIT. J. OF PSYCHIATRY 165 (2005).

⁷² *Final EA*, *supra* note 12, at 33–34.

⁷³ *Id.* at 33.

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