Animal Welfare Institute

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September 30, 2024

Submitted via regulations.gov

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

Re: Comments on Notice of Availability of a Draft Programmatic EIS for Outbreak Response Activities for HPAI Outbreaks in Poultry in the United States and U.S. Territories (Docket No. APHIS-2022-0055)

Dear Administrator Watson:

The Animal Welfare Institute (AWI) appreciates the opportunity to comment on the U.S. Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) Veterinary Service's (VS) Draft Programmatic Environmental Impact Statement (EIS) for outbreak response activities for highly pathogenic avian influenza (HPAI) in the United States and U.S. territories. 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.

In the comments that follow, we identify a number of ways in which the EIS is factually inaccurate and legally insufficient. The EIS fails to consider multiple reasonable alternatives, including ones that would: (1) incentivize the development of audited HPAI response plans to facilitate quicker and more humane depopulation activities; (2) condition indemnity on restocking with smaller flock sizes to help prevent future infections; and (3) incorporate the use of vaccines in APHIS' HPAI response activities. The EIS also lacks adequate analysis of significant environmental impacts, including the impacts of certain depopulation methods on human and animal welfare. These shortcomings violate the National Environmental Policy Act (NEPA) and must be corrected in the agency's final EIS.

I. Background

A. The current HPAI outbreak

The United States and countries around the world are currently in the midst of a widespread outbreak of HPAI. In the U.S., the impacts of the 2022-2024 outbreak have far exceeded those of the preceding 2014-2015 outbreak, which was previously the largest HPAI event ever recorded and arguably the nation's most significant animal health event. As of September 30, 2024, HPAI has been confirmed in 509 commercial and 667 backyard flocks in 48 states, resulting in the depopulation, or mass killing, of 100.78 million domestic birds.[1] Additionally, the virus was officially detected by the USDA in dairy cattle in March 2024, and has since been confirmed in 242 dairy herds across 14 states.[2] So far, there have been 15 reported human cases, including most recently in a Missouri patient with no known occupational exposure to sick or infected animals who may have spread the virus to multiple other people.[3]

The virus' effect on wildlife has also been significant; HPAI has been confirmed in over 10,000 wild birds[4] and 23 species of terrestrial and marine mammals in the U.S.[5] Given the scale of spread in the U.S., which has slowed during certain periods but has not shown signs of abating completely, scientists are increasingly concerned that the virus has already become endemic in birds and may become endemic in cattle in the future.[6] The threat of endemicity is a key characteristic of this outbreak that speaks to the potential longevity of the virus' presence in animals and differentiates it from previous HPAI outbreaks experienced in the U.S. It therefore needs to be a central underlying consideration when assessing different action alternatives and their environmental impacts, as the duration of time in which these actions will be necessary is likely to extend beyond the timeframe of previous large-scale outbreaks.

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[1] *Confirmations of Highly Pathogenic Avian Influenza in Commercial and Backyard Flocks, List of Detections by Day*, U.S. DEP'T AGRIC., ANIMAL AND PLANT HEALTH INSPECTION SERV., https://www.aphis.usda.gov/livestock-poultry-disease/avian/avian-influenza/hpai-detections/commercial-backyard-flocks.

[2] *HPAI Confirmed Cases in Livestock*, U.S. DEP'T AGRIC., ANIMAL AND PLANT HEALTH INSPECTION SERV., https://www.aphis.usda.gov/livestock-poultry-disease/avian/avian-influenza/hpai-detections/hpai-confirmed-cases-livestock.

[3] *CDC Confirms Human H5 Bird Flu Case in Missouri*, CENTERS FOR DISEASE CONTROL AND PREVENTION (Sept. 6, 2024), https://www.cdc.gov/media/releases/2024/s0906-birdflu-case-missouri.html.; *CDC A(H5N1) Bird Flu Response Update September 27, 2024*, CENTERS FOR DISEASE CONTROL AND PREVENTION (Sept. 27, 2024), https://www.cdc.gov/bird-flu/spotlights/h5n1-response-09272024.html#:~:text=To%20date%2C%20only%20one%20case,for%20influenza%20A(H5N1).

[4] *Detections of Highly Pathogenic Avian Influenza in Wild Birds*, U.S. DEP'T AGRIC., ANIMAL AND PLANT HEALTH INSPECTION SERV, https://www.aphis.usda.gov/livestock-poultry-disease/avian/avian-influenza/hpai-detections/wild-birds.

[5] *Detections of Highly Pathogenic Avian Influenza in Mammals*, U.S. DEP'T AGRIC., ANIMAL AND PLANT HEALTH INSPECTION SERV, https://www.aphis.usda.gov/livestock-poultry-disease/avian/avian-influenza/hpai-detections/mammals.

[6] U.S. DEP'T OF AGRIC., ANIMAL AND PLANT HEALTH INSPECTION SERV, APHIS-2022-0055, OUTBREAK RESPONSE ACTIVITIES FOR HIGHLY PATHOGENIC AVIAN INFLUENZA OUTBREAKS IN POULTRY IN THE UNITED STATES AND U.S. TERRITORIES: DRAFT PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT (2024) (hereinafter Draft EIS) at 64; Reardon, S. (2024). Bird flu in US cows: where will it end?.*Nature*, 629, 515-516.

B. Events leading to development of the EIS

Pursuant to its authority under the Animal Health Protection Act (AHPA) (7 U.S.C. § 8301 et seq.), discussed at greater length below, APHIS VS—in coordination with States, Tribes and poultry producers—plays a significant role in efforts to detect, control, and eradicate the spread of HPAI. Activities APHIS VS engages in to this effect include but are not limited to: surveillance, monitoring and testing; coordination of incident response; quarantine and movement control; policy and guidance development; and deployment of resources for depopulation, disposal, and disinfection.[7] Additionally, the USDA is authorized to provide indemnity payments to producers for birds and eggs that are destroyed during disease response, as well as compensation for depopulation, disposal, and virus elimination activities. 7 U.S.C. § 8306 (2008); 9 C.F.R § 53.11. According to records received by AWI through Freedom of Information Act (FOIA) requests, the department has used this authority to provide a staggering $852 million to producers in indemnity payments alone since the start of the current outbreak.

The draft EIS is the latest step in a long process dating back to 2015 when the U.S. was in the throes of the last major outbreak of HPAI. Pursuant to NEPA, in July 2015 APHIS VS prepared a draft Environmental Assessment (EA) in connection with its HPAI control plan.[8] Subsequently, the agency issued a Finding of No Significant Impact (FONSI)[9] and invited public comment on its findings, which AWI provided. In February 2016, APHIS issued a final EA, declining to prepare an EIS.[10] In 2020, the Humane Society of the United States (HSUS) filed suit against APHIS VS alleging that its EA and FONSI were arbitrary and capricious and that the agency failed to fulfill its obligations under NEPA.[11] APHIS VS ultimately withdrew the EA, reached a settlement agreement with HSUS, and committed to preparing an EIS.[12] In January 2023, APHIS VS published a notice of intent (NOI) to prepare an EIS and invited the public to comment on its scope.[13] AWI and other groups did. On August 16, 2024, APHIS VS published the EIS.

While the EIS looks at many aspects of how the USDA responds to HPAI outbreaks, it fails to adequately consider reasonable alternatives and significant environmental impacts as required by

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[7] U.S. DEP'T AGRIC., ANIMAL AND PLANT HEALTH INSPECTION SERV, HIGHLY PATHOGENIC AVIAN INFLUENZA (HPAI) RESPONSE PLAN: THE RED BOOK (2017), https://www.aphis.usda.gov/sites/default/files/hpai_response_plan.pdf, (hereinafter THE RED BOOK).

[8] U.S. DEP'T. OF AGRIC., ANIMAL AND PLANT HEALTH INSPECTION SERV, APHIS-2015-0058, HIGH PATHOGENICITY AVIAN INFLUENZA CONTROL IN COMMERCIAL POULTRY OPERATIONS – A NATIONAL APPROACH: ENVIRONMENTAL ASSESSMENT (July 2015).

[9] Availability of an Environmental Assessment and Finding of No Significant Impact, 80 Fed. Reg. 53,485 (September 4, 2015).

[10] High Pathogenicity Avian Influenza Control in Commercial Poultry Operations – A National Approach: Environmental Assessment 81 Fed. Red. 6,828 (February 9, 2016).

[11] First Amended Complaint, *Humane Soc'y of the U.S. v. U.S. Dep't of Agric.*, No. 2:20-cv-03258-AB-GJS (C.D. Cal. May 31, 2022).

[12] Settlement Agreement, *Humane Soc'y of the U.S. v. U.S. Dep't of Agric.*, No. 2:20-cv-03258-AB-GJS (C.D. Cal. May 31, 2022).

[13] 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).

NEPA.[14] Further, the EIS mischaracterizes or completely glosses over key aspects of AWI's previous comments. In the discussion that follows, we reiterate these important points and offer additional analysis and recommendations based on new research and developments.

II. Legal Framework

A. National Environmental Policy Act

i. Overview

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 EIS assessing, among other things, the environmental impacts of the proposed action and reasonable alternatives. 40 C.F.R. §§ 1500.1(a), 1502.1. 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; *cf. 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 "ensures that the agency . . . will have available, and will carefully consider, detailed information concerning significant environmental impacts" and "guarantees 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." *Baltimore Gas and Elec. Co.*, 462 U.S. at 97 (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). Finally, "[r]easonable alternatives means a reasonable range of alternatives that are technically and economically feasible, and meet the purpose and need for the proposed action." *Id.* § 1508.1(z).

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[14] Animal Welfare Institute, Comment Letter on Notice of Intent to Prepare an Environmental Impact Statement for Highly Pathogenic Avian Influenza Control in the United States (Docket Number APHIS-2022-0055) (Feb. 17, 2023), https://awionline.org/sites/default/files/uploads/documents/AWI-Scoping-Comments-APHIS-HPAI-Control.pdf, (hereinafter AWI Comment Letter).

ii. Applicable NEPA regulations

APHIS should apply the NEPA regulations that went into effect on May 20, 2022, prior to the initiation of the EIS. APHIS states that, because the EIS "was started prior to the July 1, 2024, effective date of the newly amended Council on Environmental Quality (CEQ) NEPA regulations," the EIS "complies with the July 2020 regulations." This ignores the April 2022 NEPA regulations that went into effect on May 20, 2022, before the EIS was begun.

In 2020, NEPA regulations were "overhauled for the first time since 1978." *350 Montana v. Haaland*, 50 F.4th 1254, 1284 n. 2 (9th Cir. 2022) (Nelson, J., dissenting). The 2020 revisions went into effect on September 14, 2020.[15] Less than two years later, in April 2022, the CEQ revised the regulations again to "generally restore provisions that were in effect for decades before being modified in 2020."[16] The 2022 amendments included changes to NEPA's requirement of a purpose and need statement and its definitions of "reasonable alternatives" and "effects or impacts."[17] The effective date of the April 2022 amendments was May 20, 2022.[18]

As discussed above, the EIS stems from a settlement agreement reached between APHIS and HSUS and other organizations resulting from litigation over APHIS' 2015 EA. The agreement is dated May 31, 2022, and states in part, "APHIS-Veterinary Services *will prepare* an Environmental Impact Statement ("EIS") consistent with NEPA on its High Pathogenicity Avian Influenza ("HPAI") outbreak response activities in commercial poultry operations."[19] The language "will prepare" indicates that, as of the date of the settlement agreement, APHIS had not yet begun preparing the EIS. Consequently, because the EIS was prepared after May 20, 2022, the EIS must comply with the NEPA regulations that were in effect as of that date—not, as the EIS suggests, the regulations in effect as of July 2020.[20]

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. §

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[15] 85 Fed. Reg. 43304, 43372 (July 16, 2020) ("The regulations in this subchapter apply to any NEPA process begun after September 14, 2020.").
[16] 87 Fed. Reg. 23453, 23453 (Apr. 20, 2022).
[17] *Id.*
[18] *Id.*
[19] *See Humane Soc'y of the U.S.* at 2 (emphasis added).
[20] All citations to NEPA regulations in this document are to those that were in effect on May 20, 2022.
[21] Notice of Intent at 2877.

53.11(e), 53.10(g)(2).

III. The EIS Should Consider Additional Reasonable Alternatives.

A. The EIS should consider an alternative in which APHIS incentivizes the development of audited response plans that help facilitate quicker and more humane depopulation activities.

As discussed above, to fulfill its obligations under NEPA, APHIS 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. One such alternative would be to require poultry owners or contract growers to develop a plan for rapidly and humanely depopulating animals as an additional condition for payment of indemnity claims. Such a requirement would lessen the environmental impact of depopulation activities by ensuring depopulation occurs more quickly, thus leaving less time for the virus to spread to other barns or flocks. It would also help ensure that inhumane depopulation methods such as VSD or VSD+ are avoided.

i. Incentivizing an HPAI preparedness plan

Incentivizing a preparedness plan would be more impactful than the "preferred" alternative—"Federal Operational Assistance with Biosecurity Incentive Alternative"—analyzed in the EIS.[22] Under the preferred alternative, indemnity and/or compensation for a premises' first outbreak of HPAI would be provided in the same manner it has throughout the current outbreak and in line with the "no action" alternative.[23] However, with respect to any future detections of HPAI on the same premises during the same outbreak, APHIS VS "may" condition a producer's eligibility for indemnity and/or compensation on that producer's ability to demonstrate compliance with the existing site-specific written biosecurity plan as required under federal regulations.[24]

It is unclear why the preferred alternative would only apply to operations that have already been infected, rather than to all operations, especially given the alarming statistics provided in the EIS on the number of premises that were infected multiple times and the amount of indemnity payments they received. Specifically, according to APHIS VS, since 2022, "APHIS has spent approximately $171 million on indemnity payments to premises that have been infected multiple times. A total of 58 unique commercial poultry premises have been infected at least twice with HPAI during the current outbreak, including 18 premises that have been infected 3 or more times."[25] It is also unclear why the EIS indicates APHIS VS "may" impose such a condition on indemnification, rather than requiring that such a condition be met.

We agree with APHIS that its current regulations have proven ineffective; however, the corrective action APHIS proposes—potentially requiring additional oversight of the plans and their implementation only after an initial infection—seems counterintuitive to the reasoning behind

[22] Draft EIS at 32-35.
[23] *Id.*
[24] *Id.* at 34.
[25] *Id.*

incentivizing biosecurity in the first place. APHIS' reinfection statistics and the overall gravity of the ongoing outbreak demonstrate that HPAI represents a known, predictable hazard to domestic poultry flocks and should be planned for accordingly—including by producers themselves, who are aware that they will be expected to depopulate their animals in the event of an outbreak on their farm and that they will likely receive taxpayer funds for doing so.

APHIS asserts that it rejected analyzing alternatives recommended by previous commenters and instead chose to focus on biosecurity incentives because it "decided that tying payments to biosecurity measures would be more effective at decreasing the chance of the HPAI virus being introduced or reintroduced to a premises."[26] While biosecurity is important, it is not the only incentive that would reduce the adverse impacts of HPAI. APHIS should also analyze an alternative in which the agency incentivizes a quicker[27] and more humane response that in turn may lessen impacts to the environment and decrease the potential for further spread. In fact, this seems to be more in line with APHIS' stated goals than solely incentivizing biosecurity and would apply to all producers rather than just those who have already experienced an infection. In APHIS' own words, "the benefit of completing HPAI virus eradication activities as fast as possible is that it would decrease the risk of HPAI spreading to nearby premises or wild birds that may infect other flocks thereby preventing additional environmental impacts from future HPAI outbreaks and HPAI outbreak responses."[28] Increased planning can help achieve this goal.

In promulgating the federal regulations referenced above, APHIS has made the determination that conditioning indemnity payments on the development and implementation of a biosecurity plan is within the scope of the agency's authority.[29] APHIS should analyze an alternative in which it would use this same authority to condition indemnity payments on the development and implementation of an audited HPAI response plan that should include: 1) a detailed strategy for depopulating animals within 24-48 hours of a presumptive positive classification using methods known to rapidly render animals unconscious and that ensure all animals are deceased within 1 hour of introduction of any of the killing elements into the animals' environment; 2) a detailed explanation of how the use of controversial, low welfare methods, such as ventilation shutdown plus heat (VSD+) will be avoided; and 3) an explanation of how pain and distress from catching, handling, and confinement would be minimized during depopulation procedures.

ii. The importance of avoiding VSD+

The first element of this plan is particularly important considering APHIS' goal of completing depopulation with 24-48 hours of a presumptive positive classification. This goal was established

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[26] *Id.* at 32-33.

[27] USDA data indicates that many large commercial premises do not even begin depopulation until well after the 48-hour deadline has passed. Advance planning would help reduce that response time. *See 2022–2023 Highly Pathogenic Avian Influenza Outbreak: Summary of Depopulation Methods and the Impact on Lateral Spread,* U.S. DEP'T OF AGRIC., ANIMAL AND PLANT HEALTH INSPECTION SERV, *https://www.aphis.usda.gov/sites/default/files/hpai-2022-2023-summary-depop-analysis.pdf*, at 17.

[28] *Id.* at v.

[29] Conditions for Payment of Highly Pathogenic Avian Influenza Indemnity Claims; Final Rule, 83 Fed. Reg. 40436, 40437 (Aug. 15, 2018) (to be codified at 9 C.F.R. 53).

following the 2014-2015 outbreak, after which the agency determined there were significant challenges in rapidly depopulating flocks in a timely manner, especially as the outbreak progressed. It is generally recognized that delays result in increased virus shedding and amplification, environmental contamination, and further disease spread.[30] This in turn means more birds die or are depopulated, creating more carcasses, the disposal of which creates additional environmental impacts.

The agency's 24- to 48-hour depopulation goal is also the basis for sanctioning the use of VSD+, which is an extremely controversial method that is not recognized under the World Organisation for Animal Health's (WOAH) Terrestrial Animal Health Code given its negative welfare implications. Use of VSD+ results in prolonged animal suffering as animals die via heatstroke, or hyperthermia—a pathological condition that causes tissue damage throughout the body, including to the muscles, gastrointestinal tract, lungs, circulatory system, and, ultimately, the brain—though in birds, consciousness is typically maintained until close to the time of death, particularly in turkeys.[31,32] The resulting affective states experienced by the animal include pain, respiratory distress, nausea, helplessness, and exhaustion.[33] In its opinion on the practice, the United Kingdom's governmental Animal Welfare Committee includes the following description of the physical and psychological experience of birds who are killed via VSD+:

> In the case of VSD, the increases in ambient temperature and humidity cause a "thermal load" that overwhelms a bird's ability to cool itself down (hence supplemental heat can hasten death by hyperthermia). When the ambient temperature exceeds the thermal comfort zone, the birds will start to experience distress and suffering. As heat stress progresses, continuous panting alters the acid-base balance in the blood (respiratory alkalosis) and triggers a physiological stress response. Increased circulation to the skin and respiratory tract surface for thermoregulation results in under perfusion of other tissues/organs (e.g., kidney, liver, intestine) which leads to tissue damage and dysfunction. Panting causes dehydration and falling effective blood volume, which, coupled with circulatory changes, further compromises tissue perfusion. Acute heat stress also causes muscle damage which induces weakness and fatigue and releases myoglobin into the circulation causing renal failure. Collectively, these extreme physiological challenges cause multiple organ failure, compromising cardiac, respiratory and cerebral function. Ultimately, death is likely to be caused by heart failure or respiratory failure, secondary to central nervous system dysfunction**.** *This complex process may be assumed to represent a profoundly negative experience for the bird, and potential welfare harms are likely*

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30 U.S. DEP'T. OF AGRIC., ANIMAL AND PLANT HEALTH INSPECTION SERV, *Final Report for the 2014–2015 Outbreak of Highly Pathogenic Avian Influenza (HPAI) in the United States*, https://www.aphis.usda.gov/media/document/2086/file, at 32.
31 Reyes-Illg, G., Martin, J. E., Mani, I., Reynolds, J., & Kipperman, B. (2022). The Rise of Heatstroke as a Method of Depopulating Pigs and Poultry: Implications for the US Veterinary Profession. *Animals: an open access journal from MDPI*, *13*(1), 140. https://doi.org/10.3390/ani13010140
32 Anderson, K.E., Eberle-Krish, K.N., Malheiros, R.D., et al. (2019). Evaluating the environmental and physiological effects of ventilation shutdown, with or without the addition of heat or carbon dioxide, on turkeys and broiler chicken. Available at https://www.uspoultry.org/programs/research/search-abstracts/repository/BRF008%20Final%20Report.pdf Accessed September 17, 2024.
33 Reyes-Illg, G., et al. (2022).

to include anxiety, fear, pain, malaise, and breathlessness."[34]

Additional concerns regarding VSD+ include the length of time required for animals to die and the frequency of survivors. Numerous state records indicate that VSD+ is typically carried out for at least 3 to 4 hours, and often far longer.[35] According to a report on depopulation methods prepared by the USDA, operators may start VSD+ in the evening and not return to check on the birds until the next morning.[36] This report also notes that, in more than half of all cases when it is used in practice, VSD+ fails to achieve 100% mortality, and a secondary method is required to kill animals who are sickened and weakened, but not killed, by severe heat stress.[37] In fact, in 74% of commercial egg houses in which VSD+ was used, a secondary method was required due to the existence of survivors.[38] USDA records indicate that, in some cases, it took up to 5 days to kill VSD+ survivors, a situation that was not observed with any other depopulation method.[39] Due to the damage heatstroke does to the body, survivors of VSD+ would be expected to suffer severely until their deaths.[40]

In the draft EIS, APHIS states that VSD+ is only used in "the rare circumstance," which is factually incorrect. The USDA's depopulation analysis mentioned above, which reviewed records from 2022 and 2023, notes that the "primary depopulation method of commercial table egg premises" is VSD+. It states, "During the 2022–2023 outbreak, VSD+ was used alone, or in combination with other methods, on 49 percent of commercial turkey, 85 percent of commercial table egg, 44 percent of commercial broiler, and 29 percent of commercial duck premises."[41] Additional data within the analysis that focuses on individual houses on commercial operations shows that 68% of table egg houses were depopulated with VSD+, as were 33% of turkey houses, 35% of broiler houses, and 18% of duck houses.[42]

Further, AWI's analysis of depopulation methods, based on records received via FOIA requests, found that from the start of the U.S. HPAI outbreak through July 2024, 81,677,935 birds, or 82.2% of the total, were killed in depopulations in which VSD+ was used as the sole method or as one of multiple methods used on the same premises.

Numerous times throughout the EIS, APHIS attempts to both downplay the widespread use of

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[34] Department for Environment, Food and Rural Affairs (Defra), Animal Welfare Committee, Advice on emergency culling for the depopulation of poultry affected by high pathogenic avian influenza (HPAI) – consideration of ventilation shutdown (VSD), (June 2023) available at: https://assets.publishing.service.gov.uk/media/65eae0965b652445f6f21a98/Advice_on_emergency_culling_for_the_depopulation_of_poultry_affected_by_high_pathogenic_avian_influenza__HPAI___consideration_of_ventilation_shutdown__VSD_.pdf, at 10-11, (emphasis added).

[35] Kentucky Department of Agriculture Public Records Related to HPAI (2022), obtained via Public Records Request by Animal Outlook, https://awionline.org/sites/default/files/uploads/documents/KY-Public-Records-re-HPAI-Depop-2022.pdf.

[36] *2022–2023 Highly Pathogenic Avian Influenza Outbreak: Summary of Depopulation Methods and the Impact on Lateral Spread*, U.S. DEP'T OF AGRIC., ANIMAL AND PLANT HEALTH INSPECTION SERV, https://www.aphis.usda.gov/sites/default/files/hpai-2022-2023-summary-depop-analysis.pdf, at 30, (hereinafter *Summary of Depopulation Methods*).

[37] *Id.* at 31 (Table 5).

[38] *Id.*

[39] *Id.* at 32 (Figure 12).

[40] Reyes-Illg, G., et al. (2022).

[41] *Summary of Depopulation Methods* at 1.

[42] *Id.* at 13 (Table 2).

VSD+ (as highlighted above) and absolve the agency of its role in facilitating its use. APHIS first says, "under the Federal Operational Assistance [(No Action)] Alternative, states, Tribes, and poultry owners and producers make their own choices based on site-specific considerations."[43] APHIS then says (again under the no action alternative), "State partners, Tribes, and the poultry owner or producer, not USDA APHIS VS, make the ultimate decision as to which depopulation method(s) is used. The poultry owners and producers perform the depopulation activities, if possible, or request assistance from the state, local, or Tribal authorities or USDA APHIS VS. If poultry owners and producers choose to assist in depopulation or hire their own contractors, *USDA APHIS must concur* with the method(s) selected in order for poultry owners or producers to get reimbursed for the costs."[44] And finally, in perhaps the most confusing and contradictory way in which APHIS explains its role in decisions regarding the use of VSD+, it states, "Decisions on using VSD+ are handled on a premises-by-premises basis, with close coordination and collaboration by state or Tribal and USDA APHIS VS officials, and poultry owners and producers. The state or Tribe and poultry owners and producers ultimately choose the method used, but USDA APHIS VS *may concur* with the use of VSD+ in constrained circumstance" then in the very next breath states, "USDA APHIS VS *requires the following* [criteria] *in order for VSD+ to be used*."[45] APHIS' claim that decisions regarding which depopulation methods to use primarily rest with state officials and producers may be *technically* accurate; however, it misrepresents the influence the agency has over those decisions given the fact that APHIS has a specific policy on VSD+ that it not only expects states, Tribes, and producers to comply with, but *requires* them to comply with as a condition for receiving indemnity. Clearly, if express approval is required for use of a method, then the agency has a direct role in deciding whether to use that method.

In attempting to justify why it has chosen to reject a Federal Operational Assistance with Prohibition of Certain Depopulation Methods Alternative, APHIS VS asserts that it already discourages the use of VSD+ because it has issued a policy outlining operational factors that must be considered and criteria that must be met to use the method.[46] However, based on the extent to which VSD+ has been used throughout the current outbreak, it is clear this policy statement has not been an effective deterrent. A requirement in which producers take actual steps prior to an emergency to prepare to use other depopulation methods would be a stronger incentive that APHIS VS should assess within its EIS. Such an alternative could both decrease depopulation timelines and avoid additional adverse impacts to animal and human welfare from using a low welfare method. It could also lead to USDA depopulation policies more closely aligning with the intent of the American Veterinary Medical Association's *Guidelines for the Depopulation of Animals*, which states that "The use of less preferred methods should not become synonymous with standard practice" and places a heavy emphasis on the need to plan for depopulation prior to an emergency.[47]

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[43] Draft EIS at 29.
[44] *Id.* at 30 (emphasis added).
[45] *Id.* at 42 (emphasis added).
[46] *Id.* at 64.
[47] AM. VETERINARY MED. ASS'N, GUIDELINES FOR THE DEPOPULATION OF ANIMALS, 2019 ED., (2019), at 7, 13.

B. APHIS should consider in detail an alternative that would condition indemnity on restocking with smaller flock sizes and lower flock densities.

In the draft EIS, APHIS states that it considered, but ultimately rejected, an Incentivized Production Methods Alternative, including an alternative proposed by AWI in our 2023 comments on APHIS' NOI that suggested conditioning indemnity on restocking with smaller flock sizes and lower flock densities.[48] In doing so, the agency claimed it was "because (1) the scientific studies are inconclusive about the effect of restocking density and bird housing practices on disease transmission and (2) current outbreak data suggests no correlation between production type and disease risk." For the reasons outlined below, we disagree and think APHIS must fully analyze this alternative.

First, it is important to note that while the EIS specifically references AWI's suggestion regarding flock size, APHIS' arguments as to why an Incentivized Production Methods Alternative was rejected focus primarily on stocking density and production type, while glossing over flock and farm size almost entirely. Second, APHIS' reasoning for rejecting this alternative fails to account for the potential that reducing flock sizes would reduce the adverse impacts of key response activities, such as the depopulation and disposal of large numbers of birds in one location. It instead only considers these suggestions within the context of disease transmission and disease risk.

Further, the evidence provided in this section is unpersuasive. The research presented is outdated and fails to consider the scale of many U.S. poultry operations, especially commercial table egg operations, that can house up to 7 million birds. There is no analysis of the current HPAI outbreak in the U.S. to assess for an association between larger flock size and increased probability of HPAI infection. In fact, the EIS mischaracterizes the available data to suggest small backyard flocks may be more at risk for HPAI. Additionally, recommendations from global HPAI experts are ignored.

i. Experts on human, avian, and wildlife health recommend reducing poultry farm sizes to reduce HPAI risk.

Multiple scientific expert panels convened by international agencies have recommended reducing poultry farm sizes as a strategy for curbing HPAI.

The One Health High-Level Expert Panel (OHHLEP) is a scientific and strategic advisory group for the World Health Organization (WHO), the WOAH, the Food and Agriculture Organization of the United Nations (FAO), and the United Nations Environment Program (UNEP). It is comprised of over two dozen international experts in One-Health, including representatives from the United States. In late 2023, OHHLEP released a report entitled "The Panzootic Spread of Highly Pathogenic Avian Influenza H5N1 Sublineage 2.3.4.4b: A Critical Appraisal of One Health Preparedness and Prevention." In it, they note, "There has been a huge body of work on the early detection and response to emerging disease outbreaks following spillover of animal viruses to humans, but far less focus on primary prevention. Primary prevention starts before the first cases

[48] AWI Comment Letter.

of human illness occur."[49] They note that HPAI H5N1 viruses "evolved in poultry farming." Among their suggestions is "reducing poultry farm sizes and stocking densities."[50]

In July 2023, a statement with a similar recommendation was released by the Scientific Task Force on Avian Influenza and Wild Birds.[51] The task force was co-convened by the Convention on the Conservation of Migratory Species of Wild Animals (CMS) and FAO, and includes representatives from WOAH, FAO, WHO and the Royal Veterinary College, among other organizations.[52] The Task Force's aims to "bring together the best scientific advice on the conservation impact of the spread of avian influenza… issue advice on the root causes of the epidemic…[and] technically sound measures to combat it and to develop early warning systems."[53] The Task Force states, "Reassessment of the nature and sustainability of poultry production systems is required," and recommends several reforms of poultry production systems.[54] It notes that "HPAI risks are high where [poultry] production occurs in high-density settings,"[55] and states, "As a minimum, improved standards of hygiene and a reduction of the density of commercial poultry farms is recommended," especially in "densely populated poultry areas."[56] While this statement does not delve into flock size per se, it is clear that extremely populous poultry farms, as are becoming increasingly common in the U.S., result in geographical areas of exceptionally high poultry density.

CMS acknowledged the importance of reducing flock sizes in its February 2024 resolution on avian influenza.[57] Recognizing HPAI's "significant and concerning mortality in waterbirds, seabirds, raptors and avian scavengers, as well as a number of mammal species on multiple continents" and the potential for "future spread to other populations of migratory and other species already under multiple pressures," the CMS notes that reforms to the poultry sector have been recommended, including "reduction of size and density of poultry farms." It goes on to request that CMS parties "adopt measures to reduce the risk of transmission of avian influenza between wildlife and poultry by . . . reassessing intensive production where risks have been identified."[58]

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[49] *The Panzootic Spread of Highly Pathogenic Avian Influenza H5N1 Sublineage 2.3.4.4b, A Critical Appraisal of One Health Preparedness and Prevention*, THE ONE HEALTH HIGH-LEVEL EXPERT PANEL, (2023), https://cdn.who.int/media/docs/default-source/one-health/ohhlep/the-panzootic-spread-of-highly-pathogenic-avian-influenza.pdf?sfvrsn=205b68bd_16&download=true, at 1 (hereinafter *A Critical Appraisal of One Health Preparedness and Prevention).*
[50] *Id.* (OHHLEP report) at 9.
[51] *Scientific Task Force on Avian Influenza and Wild Birds statement on: H5N1 High pathogenicity avian influenza in wild birds - Unprecedented conservation impacts and urgent needs*, CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS AND THE FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (FAO) CO-CONVENED SCIENTIFIC TASK FORCE ON AVIAN INFLUENZA AND WILD BIRDS, (July 2023), https://www.cms.int/sites/default/files/publication/avian_influenza_2023_aug.pdf (hereinafter *Scientific Task Force on Avian Influenza and Wild Birds statement*).
[52] *Id.*
[53] *Scientific Task Force on Avian Influenza and Wild Birds*, Convention on the Conservation of Migratory Species of Wild Animals, (July 2023),https://www.cms.int/en/workinggroup/scientific-task-force-avian-influenza-and-wild-birds.
[54] *Scientific Task Force on Avian Influenza and Wild Birds statement*, at 3, 22.
[55] *Id.* at 3.
[56] *Id.* at 13.
[57] Resolution 14.18, UN ENVIRONMENT PROGRAMME, CONVENTION ON MIGRATORY SPECIES, (February 2024), https://www.cms.int/sites/default/files/document/cms_cop14_res.14.18_avian-influenza_e.pdf, (hereinafter CMS Resolution 14.18).
[58] *Id.* at 1, 3.

As pointed out in CMS's updated resolution on Wildlife Health and Migratory Species, also adopted in February 2024, "intensive animal farming can provide opportunities for pathogens (from whatever source) to be amplified to epidemic proportions and/or transformed . . . into more virulent and/or transmissible variants" that may spill over into wildlife, causing high mortality.[59]

While the U.S. is not party to CMS, it does engage with CMS via the Association for Fish and Wildlife Agencies (AFWA), a group of state, provincial, and territorial fish and wildlife agencies in North America.[60] AFWA supported the content of both of these resolutions, and recommended no changes to the language related to farm size and intensive farming in either of the draft resolutions.[61]

ii. Peer-reviewed research supports a link between increased intensification of poultry production and increased risk of HPAI panzootics.

The statement by the CMS Scientific Task Force on Avian Influenza and Wild Birds notes that "growth and intensification of the poultry sector has been associated with [an] increase in HPAI pandemics."[62] This conclusion is supported by numerous peer-reviewed research studies.[63,64,65]

While wild birds are often "blamed" for HPAI outbreaks, this is misleading. Some species of wild birds are the natural reservoir of low-pathogenicity avian influenza viruses, which generally cause little or no disease and do not impact host survival. The currently circulating H5N1 virus is not one that naturally arose in the wild, but rather is a mutant of a low path avian influenza (LPAI) virus that became highly pathogenic via a conversion event on a commercial goose farm in 1996.[66] Over the past 65 years, such conversions have been documented 39 times—37 of which occurred in commercial poultry production systems, typically on poultry farms located within high poultry density areas.[67] It is hypothesized that intensive poultry rearing conditions increase the odds of LPAI-to-HPAI conversion events because of the high contact rates and low genetic diversity of flocks, factors which may enable widespread transmission of even the most virulent mutants.[68,69]

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[59] Resolution 12.6, UN ENVIRONMENT PROGRAMME, CONVENTION ON MIGRATORY SPECIES, (February 2024), https://www.cms.int/sites/default/files/document/cms_cop14_res.12.6_rev.cop14_wildlife-health-and-migratory-species_e.pdf, at 2, (hereinafter CMS Resolution 12.6).
[60] *International Relations Committee Briefing Paper, Convention on Migratory Species 14th Conference of the Parties: Draft Recommendations*, ASSOCIATION OF FISH & WILDLIFE AGENCIES, (2024), https://www.fishwildlife.org/application/files/6517/0431/0201/AFWA_IR_Committee_CMS_briefing_paper_2024.pdf, at 2, (hereinafter *International Relations Committee Briefing Paper*).
[61] *Id.* at 2, 4.
[62] Dhingra, M. S., Artois, J., Dellicour, S., et al. (2018). Geographical and Historical Patterns in the Emergences of Novel Highly Pathogenic Avian Influenza (HPAI) H5 and H7 Viruses in Poultry. *Frontiers in veterinary science*, *5*, 84. https://doi.org/10.3389/fvets.2018.00084
[63] *Id.*
[64] Mace, J. L., & Knight, A. (2023). Influenza risks arising from mixed intensive pig and poultry farms, with a spotlight on the United Kingdom. *Frontiers in Veterinary Science*, *10*. https://doi.org/10.3389/fvets.2023.1310303
[65] Kessler, S., Harder, T. C., Schwemmle, M., & Ciminski, K. (2021). Influenza A Viruses and Zoonotic Events-Are We Creating Our Own Reservoirs?. *Viruses*, *13*(11), 2250. https://doi.org/10.3390/v13112250
[66] Dhingra, M. S., et al. (2018).
[67] *Id.*
[68] *Id.*
[69] Gilbert, M., Xiao, X., & Robinson, T. P. (2017). Intensifying poultry production systems and the emergence of avian influenza in China: a 'One Health/Ecohealth' epitome. *Archives of public health = Archives belges de sante publique*, *75*, 48. https://doi.org/10.1186/s13690-017-0218-4

iii. *In the U.S., larger flocks have a higher probability of becoming infected with HPAI.*

The draft EIS states, "[C]urrent outbreak data suggests no correlation between production type and disease risk," and appears to substantiate this claim by citing the following statistic: "As of July 9, 2024, HPAI has been detected in a total of 1,161 flocks in 48 states. Over half (57.5%) those flocks infected with the HPAI virus are backyard flocks, which are typically in a low-density environment."[70] However, this is very misleading, as it does not consider the *total number* of flocks of different sizes or production types, which is required to understand the relationship between flock size and probability of HPAI infection.

For example, according to the 2022 U.S. Census of Agriculture, in 2022, there were 347 commercial egg production operations with an inventory of 100,000 or more layer hens; these 347 farms housed 292,875,342 hens in total.[71] In that same year, 28 commercial table egg layer operations, or more than 8%, were infected with HPAI.

The Census of Agriculture only tracks backyard flocks if they reside on a "farm," defined as "any place from which $1,000 or more of agricultural products were produced and sold, or normally would have been sold, during the census year."[72] However, we can still estimate the total number of "backyard" flocks in the U.S. A 2013 USDA report entitled "Urban Chicken Ownership in Four US Cities" determined that in the metro areas of Denver, Los Angeles, Miami, and New York City, 0.8% of households owned chickens.[73] The percentage was lowest in New York City, where only 0.1% of households owned chickens, and highest in Miami, where 1.3% did so. It is likely that a higher percentage of rural households have flocks of backyard chickens, but this data is not available. Extrapolating the data from the 2013 USDA report on urban backyard chickens (0.8% of households own chickens), we can arrive at a conservative estimate for the number of backyard chicken flocks across the 131.43 million households (as of 2023[74]) in the U.S.: 1,051,440 backyard flocks.

In 2022, there were 406 cases of HPAI in poultry flocks classified as "backyard." This number includes "backyard" flocks classified as both WOAH Poultry and WOAH Non-Poultry; due to the USDA's classification scheme, some of these "backyard" flocks have thousands or even tens of thousands of chickens, and would not have been classified as "household chickens" in the USDA's 2012 report. However, even when we overestimate the number of HPAI-infected "backyard flocks" and underestimate the total number of such flocks in the U.S., it appears that, at most, 0.039% of backyard flocks contracted HPAI in 2022, compared with 8% of commercial egg operations with 100,000 or more hens. Thus, commercial table egg flocks with 100,000 or more

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[70] Draft EIS at 66.
[71] *2022 Census of Agriculture, United States Summary and State Data, Volume 1, Geographic Area Series, Part 51* U.S. DEP'T OF AGRIC., NATIONAL AGRICULTURAL STATISTICS SERV, (February 2024), https://www.nass.usda.gov/Publications/AgCensus/2022/Full_Report/Volume_1,_Chapter_1_US/usv1.pdf, at 23.
[72] *Id.* at VIII.
[73] *Urban Chicken Ownership in Four U.S. Cities*, U.S. DEP'T OF AGRIC., ANIMAL AND PLANT HEALTH INSPECTION SERV, VETERINARY SERV, (2012), https://www.aphis.usda.gov/sites/default/files/poultry10_dr_urban_chicken_four.pdf.
[74] *Historical Household Tables, Table HH-1. Households by Type: 1940 to Present*, U.S. CENSUS BUREAU (November 2023).

hens have a 205 times greater risk of becoming infected with HPAI, compared with backyard flocks.

This is remarkable, given that backyard flocks generally have far poorer biosecurity than larger commercial operations. It also suggests that the USDA must provide substantiation for its dubious claim in the draft EIS, that "[l]ow-density production practices could reduce the number of birds infected with or exposed to HPAI since poultry numbers at many premises would be reduced, but it would not likely reduce the number of premises that [become] infected with HPAI."[75]

The USDA has studied, to a limited degree, factors that increase risk of HPAI infection. It found that being within the 10-km control zone established around an infected premises is a risk factor for HPAI, supporting the conclusion of numerous international expert panels that increased density of poultry operations increases HPAI risk.[76,77] Flock size as an independent risk factor for HPAI infection has not been the central focus of any U.S.-based research on the current outbreak. However, both U.S. and international research supports the contention that larger flock/herd sizes and higher densities of farms (both scenarios that result in larger numbers of susceptible farm animals per geographical unit) are associated with increased virus transmission risk and larger epidemics.[78] For example, a 2018 study funded by the USDA describes some key findings:[79]

> Susceptible host density is a key factor that influences the success of invading pathogens. However, for diseases affecting livestock, there are two aspects of host density: livestock and farm density, which are seldom considered independently ....

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[75] Draft EIS at 67-68.

[76] In this case-control study of egg farms, control farms (farms NOT infected with HPAI) had a median flock size of 480,000 birds, while case farms (farms infected with HPAI) had a median flock size of nearly twice that (900,000). This provides further evidence that flock size as a risk factor for HPAI should be further investigated using APHIS data. *See*, Green, A. L., Branan, M., Fields, V. L., et al. (2023). Investigation of risk factors for introduction of highly pathogenic avian influenza H5N1 virus onto table egg farms in the United States, 2022: a case-control study. *Frontiers in veterinary science*, *10*, 1229008. https://doi.org/10.3389/fvets.2023.1229008.

[77] Patyk, K. A., Fields, V. L., Beam, A. L., et al. (2023). Investigation of risk factors for introduction of highly pathogenic avian influenza H5N1 infection among commercial turkey operations in the United States, 2022: a case-control study. *Frontiers in veterinary science*, *10*, 1229071. https://doi.org/10.3389/fvets.2023.1229071

[78] Bauzile, B., Durand, B., Lambert, S., et al. (2023). Impact of palmiped farm density on the resilience of the poultry sector to highly pathogenic avian influenza H5N8 in France. *Veterinary research*, *54*(1), 56. https://doi.org/10.1186/s13567-023-01183-9; Boender, G.-J., Hagenaars, T. J., Bouma, et al. (2005). Risk maps for the spread of highly pathogenic avian influenza in poultry. *PLoS Computational Biology*, *preprint*(2007), e71-. https://doi.org/10.1371/journal.pcbi.0030071.eor; Boender, G. J., van den Hengel, R., van Roermund, H. J., & Hagenaars, T. J. (2014). The influence of between-farm distance and farm size on the spread of classical swine fever during the 1997-1998 epidemic in The Netherlands. *PloS one*, *9*(4), e95278. https://doi.org/10.1371/journal.pone.0095278; Keeling, M. J., Woolhouse, M. E. J., Shaw, D. J., et al. (2001). Dynamics of the 2001 UK Foot and Mouth Epidemic: Stochastic Dispersal in a Heterogeneous Landscape. *Science (American Association for the Advancement of Science)*, *294*(5543), 813–817. https://www.science.org/doi/10.1126/science.1065973; Le Menach, A., Legrand, J., Grais, R. F., et al. (2005). Modeling spatial and temporal transmission of foot-and-mouth disease in France: identification of high-risk areas. *Veterinary research*, *36*(5-6), 699–712. https://doi.org/10.1051/vetres:2005025; Bessell, P. R., Shaw, D. J., Savill, N. J., & Woolhouse, M. E. (2010). Statistical modeling of holding level susceptibility to infection during the 2001 foot and mouth disease epidemic in Great Britain. *International journal of infectious diseases : IJID : official publication of the International Society for Infectious Diseases*, *14*(3), e210–e215. https://doi.org/10.1016/j.ijid.2009.05.003

[79] Meadows, A. J., Mundt, C. C., Keeling, M. J., & Tildesley, M. J. (2018). Disentangling the influence of livestock vs. farm density on livestock disease epidemics. *Ecosphere (Washington, D.C)*, *9*(7). https://doi.org/10.1002/ecs2.2294

> We took steps to disentangle these densities and study their relative influences on epidemic size .... By reducing the correlation between farm and livestock density in factorial simulations, we were able to clearly demonstrate the increase in epidemic size that occurred as farm sizes grew larger (i.e., through increasing county-level cattle populations), across levels of farm density. These results suggest livestock production trends in many industrialized countries that concentrate livestock on fewer, but larger farms have the potential to facilitate larger livestock epidemics.

In addition, with regard to HPAI in particular, several research papers focusing on long-distance transmission in the U.S. have noted that the probability of HPAI infection increases with flock size. For example, a 2019 study that utilized data from the 2014-2015 HPAI outbreak found that "[f]or turkey, layer and pullet farms, the probability of airborne infection was higher for larger flocks within the same type of poultry."[80]

A 2023 study in the journal *Nature* analyzed data from farms infected early in the current U.S. outbreak of HPAI.[81] The focus of the study was to examine the potential for long-distance airborne transmission of HPAI via dust particles. However, as part of the study, the authors reviewed data obtained from APHIS on 168 cases of HPAI in commercial poultry operations (72% of the national total for that time period). It noted, "[l]arger flocks were found to have a higher chance of infection, while smaller flocks were at low infection risk."[82]

The draft EIS neglects to adequately review the scientific literature regarding association between flock size and risk of infection with HPAI. For example, research on the 1999–2000 HPAI H7N1 epidemic in Italy found that "[t]he hazard of HPAI was significantly greater for flocks with size > median number of birds (n = 18,000) and such an effect was stronger for species other than turkey."[83] A 2009 study noted that "large(r) industrial flocks appear to be overrepresented in the list of HPAI H5N1 outbreaks reported to OIE as compared to outbreaks in backyard/village flocks, in relation to their respective shares of total national flocks. Around 40% of the HPAI H5N1 outbreaks in domestic poultry reported to OIE between late 2005 and early 2007 occurred in poultry units of 10,000 birds or more (more than 25% occurred in units of more than 10,000 birds), while, even in many OECD countries (e.g., Germany, France, UK, and Belgium), less than 10% of flocks consist of more than 10,000 birds."[84] In addition, several previous studies have found a tendency for farms with larger animal populations to have a greater infection risk for various infectious disease.[85]

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[80] Zhao, Y., Richardson, B., Takle, E., et al. (2019). Airborne transmission may have played a role in the spread of 2015 highly pathogenic avian influenza outbreaks in the United States. *Scientific reports*, *9*(1), 11755. https://doi.org/10.1038/s41598-019-47788-z

[81] Nguyen, X. D., Zhao, Y., Lin, J., Purswell, J. L., et al. (2023). Modeling long-distance airborne transmission of highly pathogenic avian influenza carried by dust particles. *Scientific reports*, *13*(1), 16255. https://doi.org/10.1038/s41598-023-42897-2

[82] *Id.*

[83] Mannelli, A., Ferrè, N., & Marangon, S. (2006). Analysis of the 1999–2000 highly pathogenic avian influenza (H7N1) epidemic in the main poultry-production area in northern Italy. *Preventive Veterinary Medicine*, *73*(4), 273–285. https://doi.org/10.1016/j.prevetmed.2005.09.005

[84] Leibler, J. H., Otte, J., Roland-Holst, D., et al. (2009). Industrial food animal production and global health risks: exploring the ecosystems and economics of avian influenza. *EcoHealth*, *6*(1), 58–70. https://doi.org/10.1007/s10393-009-0226-0

[85] Kaneene, J. B., Bruning-Fann, C. S., Granger, L. M., Miller, R., & Porter-Spalding, B. A. (2002). Environmental

None of the studies cited in the draft EIS refute the correlation between larger flock size and increased risk of HPAI infection. For example, the Bos study cited in the EIS examined the influence of risk factors on *within-flock transmission* for HPAI H7N7 in the Netherlands in 2003.[86] While they did not find that flock size impacted transmission *within* the flock, the paper mentions a different research study of the same outbreak[87] that instead analyzed "risk factors for the introduction of HPAI virus into a flock."[88]:

> In our study, we did explore farm size as a risk factor for introduction of HPAI virus. The number of houses was significantly associated with the presence of HPAI virus (OR = 1.93, 95% CI = 1.34–2.79), and also the number of animals (OR = 2.08, 95% CI = 1.45–3.00).

The authors of the study also proposed a reason for this observation:

> The mechanism behind this risk factor is that although the probability of infection of an individual bird as such is generally very small, on large farms with many animals and many animal contacts, the chance of actual infection of the herd is greater than on small farms with a limited number of animals.

Inexplicably, the draft EIS cites this study, but fails to mention these findings.

It is important to note that the sizes of farms, flocks, and houses in both the Bos and Thomas papers are orders of magnitude smaller than what is typical in the U.S. For example, the Bos paper indicates that the largest flock they studied contained 59,930 birds.[89] The Thomas paper indicates that the largest farm in their study had 193,257 birds and 9 houses.[90] By comparison, the largest flock depopulated in the U.S. during the current outbreak had 5,347,511 chickens,[91] and an analysis of depopulation methods prepared by the USDA found that the mean number of barns (houses) per commercial table egg premises was 10, with some egg farms having as many as 41 barns on one premises.[92] The USDA analysis also notes that, among poultry farms infected with HPAI in 2022 and 2023, the maximum number of birds in a single house was 425,000.[93] This means that a single

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and farm management factors associated with tuberculosis on cattle farms in northeastern Michigan. *Journal of the American Veterinary Medical Association*, *221*(6), 837–842. https://doi.org/10.2460/javma.2002.221.837; Thomas, M. E., Bouma, A., Ekker, H. M., et al. (2005). Risk factors for the introduction of high pathogenicity Avian Influenza virus into poultry farms during the epidemic in the Netherlands in 2003. *Preventive Veterinary Medicine*, *69*(1), 1–11. https://doi.org/10.1016/j.prevetmed.2004.12.001; Dewey, C., Carman, S., Pasma, T., Josephson, G., & McEwen, B. (2003). Relationship between group A porcine rotavirus and management practices in swine herds in Ontario. *Canadian Veterinary Journal*, *44*(8), 649–653.

[86] Bos, M. E., Nielen, M., Koch, G., et al. (2009). Back-calculation method shows that within-flock transmission of highly pathogenic avian influenza (H7N7) virus in the Netherlands is not influenced by housing risk factors. *Preventive veterinary medicine*, *88*(4), 278–285. https://doi.org/10.1016/j.prevetmed.2008.12.003

[87] Thomas, M. E., et al. (2005) at 83.

[88] *Id.*

[89] Bos, M. E., et al. (2009), at 282 (Table 3b).

[90] Thomas, M. E., et al. (2005), at 6 (Table 3).

[91] U.S. DEP'T AGRIC., ANIMAL AND PLANT HEALTH INSPECTION SERV., Response to FOIA Request Number 24-02606.

[92] *Summary of Depopulation Methods*, at 23.

[93] *Id.* at 13 (Table 2).

poultry barn in the U.S. may contain more birds in it than many of the farms in the research studies relied upon by the draft EIS to dismiss larger flock size as a risk factor for HPAI infection.

Despite the extensive scientific evidence indicating that larger flock sizes increase the probability of infection with highly contagious infectious diseases (including HPAI) and make outbreaks harder to control, the USDA has failed to analyze flock size as an independent risk factor for contracting HPAI.

iv. Excessively large flock size results in depopulation delays and makes it impossible to meet APHIS' 48-hour depopulation goal.

As noted in the draft EIS, "Under all alternatives, the overall goal is to depopulate as quickly as possible, ideally within 24 to 48 hours, because poultry are shedding virus while they are alive."[94] HPAI virus produced by infected birds can infect other farms or wild birds, whether via fomites or via airborne routes when virus is carried by fine particulate matter.[95,96] According to the USDA HPAI Response Plan (The Red Book), the strategy of "stamping out" HPAI relies on several critical goals, including "within 24 hours of (or as soon as possible after) a presumptive positive classification [i.e., positive classification by a National Animal Health Laboratory Network laboratory] infected poultry are depopulated in the quickest, safest, and most humane way possible."[97] The risk of virus amplification is used as a justification for using depopulation methods that result in poor animal welfare when other, more humane methods "will not be available in a timely manner."[98]

However, excessively large poultry operations are nearly impossible to depopulate within 24 hours of a presumptive diagnosis of HPAI, as called for the in Red Book,[99] or even within APHIS' stated goal of 24-48 hours.

AWI's analysis of depopulation records obtained under FOIA indicates that there were no poultry operations with more than 418,500 birds that were able to meet the 48-hour depopulation deadline. For the 33 operations with one million or more birds on one farm, depopulation was not completed until between 3 and 22 days after presumptive diagnosis, even though all but two farms utilized VSD+ as either their sole depopulation method or one of multiple methods. The average number of days between presumptive diagnosis to completion of depopulation, relative to size of farm, is summarized in the chart below.

94 Draft EIS at 37.
95 Zhao, Y., et al. (2019).
96 Nguyen, X. D., et al. (2023).
97 THE RED BOOK at 4-6.
98 Draft EIS at 42.
99 THE RED BOOK at 4-6.

Size of Farm	Average # of days between presumptive diagnosis & completion of depopulation[100] (number of premises)	Average # of days between presumptive diagnosis & completion of depopulation when outliers removed (number of premises)	Range/Range with outliers removed (days)
10,000-25,000	1.86 (100)	1.52 (99) Outlier: pheasant farm that req. 35 days	0-35/0-6
25,001-50,000	1.88 (161)	1.8 (160) Outlier: pheasant farm that required 16 days	0-16/ 0-8
50,001-75,000	2.15 (71)	No outliers	0-9
75,001-100,000	2.30 (27)	No outliers	1-7
100,001-500,000	3.11 (54)	No outliers	0-14
500,001-1,000,000	6.00 (12)	No outliers	1-15
1,000,001-5,500,000	9.54 (28)	No outliers	3-22

In light of APHIS' goals of quickly eradicating HPAI and completing depopulation within 48 hours of presumptive diagnosis, there is good reason to incentivize restocking at smaller flock sizes for all flocks over approximately 50,000, with a particular emphasis on farms housing more than one million birds at one premises.

It is also worth noting that farms and barns with high bird populations are the most likely to utilize VSD+. For example, according to USDA records obtained through FOIA, of the 33 farms with 1 million or more birds, all but 2 utilized VSD+ during depopulation (i.e., 92.3%). For operations with 100,000 to 1 million birds, 37 of 69, or 53.6%, of operations utilized VSD+. For operations with 10,000 or fewer birds, only 0.08% of premises utilized VSD+.

This information clearly demonstrates the risk that larger poultry operations pose in driving HPAI outbreaks, given their role in allowing low pathogenicity avian influenza viruses to convert to high pathogenicity variants as well as their increased risk of becoming infected with HPAI. In addition, such operations endanger both public health, poultry populations on other farms, and wildlife due to the enormous challenge of completing depopulation activities within 24 to 48 hours of presumptive diagnosis.

The draft EIS argues that "the husbandry methods to raise poultry are not regulated under the

[100] For operations where date of presumptive diagnosis and date of depopulation completion were provided by FOIA documents, from beginning of outbreak in February 2022 until July 2024.

AHPA (7 U.S.C. § 8301 *et seq*.) or the Animal Welfare Act (7 U.S.C. § 2131, *et seq*.) meaning USDA APHIS VS has limited authority to regulate poultry production practices."[101] However, APHIS is not being asked to "regulate husbandry methods," but rather to utilize its permissive indemnification program to encourage operations to restock at population levels less likely to worsen the HPAI situation. Doing so has the potential to reduce impacts to the environment and thus warrants analysis within the EIS.

C. The EIS should consider an alternative in which APHIS incorporates vaccines into its response activities.

The EIS should consider an alternative in which HPAI vaccination is incorporated as one of several elements of its HPAI response strategy, rather than the all-or-nothing Vaccination Only Alternative that would solely involve vaccination of poultry and "encourage producers to provide treatment to diseased poultry to reduce or prevent the disease."[102] AWI agrees with APHIS VS' position that this alternative does not warrant consideration in the EIS, given HPAI's high mortality rate in affected poultry and the obvious importance of other HPAI control measures. However, as discussed below, the EIS fails to provide any legitimate rationale for failing to consider an alternative that incorporates vaccination alongside strategies such as advance planning, improved biosecurity, and "stamping out" utilizing humane methods of depopulation and euthanasia.

Were such an alternative to be properly developed, it is likely the agency would find that it could significantly reduce negative environmental impacts in virtually all the dimensions assessed (soil, air, water quality, vegetation health, human environment, etc.), as well as other important dimensions, such as animal welfare. Vaccination would very likely reduce the number of outbreaks, the number of birds affected by disease or depopulation, the risk of lateral spread, and the amount of HPAI virus produced by the U.S. poultry industry.

It is widely recognized that shifts in HPAI's disease ecology and epidemiology, including the virus having become endemic in many wild bird populations,[103] mean that "all available tools" for its control must be considered.[104] As one such tool, vaccines can be used in different ways, such as for prevention in areas where the disease is not yet present or for emergency protection in areas around an HPAI outbreak, and objectives differ for different strategies.[105]

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[101] Draft EIS at 66.
[102] *Id.* at 61.
[103] Pohlmann, A., King, J., Fusaro, A., et al. (2022). Has Epizootic Become Enzootic? Evidence for a Fundamental Change in the Infection Dynamics of Highly Pathogenic Avian Influenza in Europe, 2021. *mBio*, *13*(4), e0060922. https://doi.org/10.1128/mbio.00609-22.
[104] *Policy Brief: Avian influenza vaccination: why it should not be barrier to safe trade,* WORLD ORGANISATION FOR ANIMAL HEALTH, (2023), https://www.woah.org/app/uploads/2023/12/en-woah-policybrief-avianinfluenzavaccinationandtrade.pdf.
[105] EFSA Panel on Animal Health and Animal Welfare (AHAW), European Union Reference Laboratory for Avian Influenza, Nielsen, S. S., Alvarez, J., Bicout, D. J., et al. (2023). Vaccination of poultry against highly pathogenic avian influenza - part 1. Available vaccines and vaccination strategies. *EFSA journal. European Food Safety Authority*, *21*(10), e08271, https://doi.org/10.2903/j.efsa.2023.8271, at 33.

i. The draft EIS contains outdated, inaccurate, and misleading information about HPAI vaccination.

The draft EIS makes several claims related to HPAI vaccines and vaccination that either lack necessary context or fail to be informed by the latest science. It is important that these inaccuracies be corrected and that all relevant information be included in the above suggested alternative so that environmental impacts are adequately assessed.

For example, the draft EIS states, "Currently, there are no vaccines authorized for use in the United States for HPAI in poultry."[106] While this statement is technically true, it lacks important context. According to Dr. Erica Spackman, the Acting Research Leader for USDA's Exotic & Emerging Avian Viral Diseases Research program, there are several different types of HPAI vaccinations licensed in the U.S., including inactivated virus vaccines, replicating vector vaccines, and RNA particle vaccines.[107] The USDA Center for Veterinary Biologics includes several avian influenza vaccines on its "List of Licensed Veterinary Biological Products."[108] APHIS is authorized to approve vaccination with available vaccines.

The draft EIS also states that "[v]accination does not prevent poultry from being infected with the HPAI virus."[109] It is true that, as is the case for most respiratory virus vaccines (regardless of the animal species in which they are used), many HPAI vaccines don't completely prevent infection with the virus, particularly at the extraordinarily high "challenge" doses often given in experimental trials.[110] However, some vaccines have been documented to either prevent infection[111,112] or greatly increase the infectious dose of the virus, meaning that vaccinated birds will not become infected as easily as unvaccinated birds.[113,114] More importantly, HPAI vaccines enable the bird's immune system to contain the virus at the initial site of infection, prevent it from spreading throughout the body, and drastically reduce—or even eliminate—shedding (excretion)

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106 Draft EIS at 62.

107 Spackman, E. (2024). Highly Pathogenic Avian Influenza: Vaccines and Vaccination Programs for Poultry. Veterinary Association for Farm Animal Welfare Webinar Series. August 21, 2024.

108 The list includes the following: 1057.R3 H5N3 Subtype, Killed Virus 190 (Zoetis); 1L81.R0 H5 Subtype, Serotype 3, Live Marek's Disease Vector (Boehringer Ingelheim Animal Health USA Inc.); 1061.R0 H5 Subtype, Live Fowl Pox Vector (Boehringer Ingelheim Animal Health USA Inc.); 1062.R0 H5 Subtype, Serotype 3, Live Marek's Disease Vector (Ceva Animal Health, LLC); A057.R1 H5 Subtype, Killed Baculovirus Vector (Boehringer Ingelheim Animal Health USA Inc.); 1057.D0 H5 Subtype, DNA (Huvepharma; conditionally licensed) 1057.R1 H5N1 Subtype, Killed Virus (Zoetis; conditionally licensed). *See, Veterinary Biological Products*, *Licensees and Permittees*, U.S. DEP'T OF AGRIC., ANIMAL AND PLANT HEALTH INSPECTION SERV, VETERINARY SERV, (August 8, 2024), https://www.aphis.usda.gov/sites/default/files/currentprodcodebook.pdf.

109 Draft EIS at 62.

110 Cohen, J. (2023). Bird shots. *Science (American Association for the Advancement of Science), 380*(6640), 24–27. https://doi.org/10.1126/science.adi1004

111 Germeraad, E.A., Bouwman, K.M., Jansen, C.A., et al. (2024). Progress report: Transmission study testing HVT-based H5 vaccine against highly pathogenic avian influenza (HPAI) H5N1 virus (clade 2.3.4.4b) First report, 8-weeks post vaccination with VAXXITEK. First Report, Project No. BO-43-111-083, Wageningen Bioveterinary Research. Available at: https://edepot.wur.nl/656515. Accessed September 23, 2024.

112 *Id.*

113 Capua, I., Terregino, C., Cattoli, G., & Toffan, A. (2004). Increased resistance of vaccinated turkeys to experimental infection with an H7N3 low-pathogenicity avian influenza virus. *Avian pathology : journal of the W.V.P.A*, *33*(2), 158–163. https://doi.org/10.1080/03079450310001652077

114 Hasan, N. H., Ignjatovic, J., Peaston, A., & Hemmatzadeh, F. (2016). Avian Influenza Virus and DIVA Strategies. *Viral Immunology*, *29*(4), 198–211. https://doi.org/10.1089/vim.2015.0127

of virus by the animal; this greatly reduces or even stops virus transmission, dramatically decreases environmental contamination with HPAI virus, and prevents spread between farms.[115] In addition to protecting the health of workers, the public, and wildlife on or around the farm, this dramatic decrease in viral shedding would, in effect, prevent many poultry infections. This is because USDA research has found that 31% of HPAI outbreaks on commercial farms have been categorized as resulting from "common source or lateral transmission" (spread from nearby farms),[116] and being within the 10-km control zone established around an infected premises is a risk factor for infections.[117] Based on France's experience with HPAI vaccination (described in more detail below),[118] were vaccination incorporated into the U.S. HPAI response, it is likely that millions of fewer poultry would die due to HPAI each year.

The draft EIS also expresses concerns that "[v]accine use could also interfere with USDA APHIS' ability to detect the disease quickly before the virus spreads," and raises the concern that "incomplete protection at the flock level can cause the silent spread of the virus within and between flocks," citing a 2007 paper (Tiensin et al) about an HPAI epidemic in Thailand.[119] The focus of this research article was not HPAI vaccination per se, and the quoted statement is taken from a section that notes the need for "appropriate management" of vaccination, including ensuring that at least 80% of the flock is vaccinated.[120] The Tiensin paper cites a different research study entitled "Silent spread of H5N1 in vaccinated poultry"; however, this paper's concerns about "silent spread" are based on modeling studies in which (1) an inadequate fraction of birds were vaccinated and (2) the only means of HPAI surveillance was placing "sentinel birds" (birds not vaccinated for HPAI) in vaccinated flocks.[121]

Given the outdatedness of the research cited, it is not surprising that silent spread of HPAI among vaccinated flocks is not a concern harbored by HPAI experts at this time, at least for countries like

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[115] *Id.;* Mo, J., Spackman, E., & Swayne, D. E. (2023). Prediction of highly pathogenic avian influenza vaccine efficacy in chickens by comparison of in vitro and in vivo data: A meta-analysis and systematic review. *Vaccine*, *41*(38), 5507–5517. https://doi.org/10.1016/j.vaccine.2023.07.076; Lee, J., Lee, C. W., Suarez, D. L., et al. (2024). Efficacy of commercial recombinant HVT vaccines against a North American clade 2.3.4.4b H5N1 highly pathogenic avian influenza virus in chickens. *PloS one*, *19*(7), e0307100. https://doi.org/10.1371/journal.pone.0307100; Palya, V., Tatár-Kis, T., Walkóné Kovács, E., et al. (2018). Efficacy of a Recombinant Turkey Herpesvirus AI (H5) Vaccine in Preventing Transmission of Heterologous Highly Pathogenic H5N8 Clade 2.3.4.4b Challenge Virus in Commercial Broilers and Layer Pullets. *Journal of immunology research*, *2018*, 3143189. https://doi.org/10.1155/2018/3143189

[116] *Summary of Depopulation Methods*, at 33.

[117] Draft EIS, at 33; Green, A. L., et al. (2023); Patyk, K. A., al. (2023).

[118] Gruber, P. (2024). France Sees Success Vaccinating Ducks Against Avian Flu. Available at: https://www.lancasterfarming.com/farming-news/poultry/france-sees-success-vaccinating-ducks-against-avian-flu/article_c88adc58-75e3-11ef-a0d1-87928be5869d.html?itm_source=parsely-api&utm_source=article&utm_medium=summary&utm_campaign=What%20To%20Read%20Next. Accessed September 23, 2024.

[119] Draft EIS at 62.

[120] Tiensin, T., Nielen, M., Vernooij, H., et al. (2007). Transmission of the Highly Pathogenic Avian Influenza Virus H5N1 within Flocks during the 2004 Epidemic in Thailand. *The Journal of Infectious Diseases*, *196*(11), 1679–1684. https://doi.org/10.1086/522007, at 1683.

[121] Savill, N. J., St. Rose, S. G., Keeling, M. J., & Woolhouse, M. E. J. (2006). Silent spread of H5N1 in vaccinated poultry. *Nature*, *442*(7104), 757–757. https://doi.org/10.1038/442757a

the U.S. that have the infrastructure to enable a robust HPAI surveillance program.[122,123] While the "classic" signal of HPAI infection (rapid, mass morality) is unlikely to be seen in flocks vaccinated against HPAI that subsequently become infected with the virus, there are numerous other means of HPAI surveillance, including RT-PCR tests that detect active virus shedding and serological tests.[124] Historically, there was a problem known as "Differentiating Infected from Vaccinated Animals" (DIVA), in that standard serologic tests used for HPAI surveillance couldn't differentiate antibodies produced by vaccination from those produced in response to natural HPAI infection.[125] However, there are now numerous different strategies that can be used for successfully overcoming the DIVA problem, reviews of which are available in the scientific literature.[126,127,128]

The draft EIS describes some logistical challenges to HPAI vaccination. However, the description provided fails to take into account recent technological advances related to vaccine administration and duration of immunity. For example, the EIS states, "Poultry would have to be caught and vaccines injected into each individual bird, as HPAI vaccination cannot currently be administered through feed or water."[129] However, there is an HPAI vaccination (Vaxigen NewH5) that can be administered as a spray, and there is considerable research going on in the U.S. and elsewhere on HPAI vaccinations that could be administered via water or spray.[130] In addition, there are multiple HPAI vaccinations that can be administered either *in ovo* (and therefore do not require any live bird handling) or to newly hatched chicks,[131] who frequently receive other vaccinations at the hatchery.[132] While *in ovo* vaccination has historically only been used in broiler chickens, new technology that permits *in ovo* sexing means that this vaccination route is now an option for some layer flocks.[133]

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[122] *High Pathogenicity Avian Influenza in Layers: Considerations and Essential Components for Vaccination and Surveillance*, International Egg Commission Avian Influenza Global Expert Group (2023), https://www.internationalegg.com/resource/considerations-and-essential-components-for-hpai-vaccination-and-surveillance/.

[123] Swayne, D.E. & Sims, L. (2023). Vaccine Usage to Control Highly Pathogenic Avian Influenza in Poultry and Other Domestic Birds: Setting the Scene, available at: https://rr-americas.woah.org/app/uploads/2023/05/0206-eng-swayne-hpai-vax-setting-stage.pdf.; EFSA Panel on Animal Health and Animal Welfare (AHAW), European Union Reference Laboratory for Avian Influenza, Nielsen, S. S., Alvarez, J., Bicout, D. J., et al. (2024). Vaccination of poultry against highly pathogenic avian influenza - Part 2. Surveillance and mitigation measures. *EFSA journal. European Food Safety Authority*, *22*(4), e8755. https://doi.org/10.2903/j.efsa.2024.8755

[124] Hasan, N. H., et al. (2016); Mirzaei, S. G., Shoushtari, A., & Noori, A. (2020). Development and evaluation of real-time reverse transcription polymerase chain reaction test for quantitative and qualitative recognition of H5 subtype of avian influenza viruses. Archives of Razi Institute, 75(1), 17- 22. https://doi.org/10.22092/ari.2019.120821.1201.

[125] Hasan, N. H., et al. (2016).

[126] *Id.*

[127] Suarez, D. L. (2012). DIVA Vaccination Strategies for Avian Influenza Virus. *Avian Diseases*, *56*(4s1), 836–844. https://doi.org/10.1637/10207-041512-review.1

[128] Lee, J., et al. (2024).

[129] Draft EIS at 62.

[130] Personal communication, Erica Spackman, September 9, 2024.

[131] EFSA Panel on Animal Health and Animal Welfare (AHAW), European Union Reference Laboratory for Avian Influenza. (2023), at 32-33.

[132] Gardin, Y. (2009). Vaccination in the Hatchery. *The Poultry Site*. Available at: https://www.thepoultrysite.com/articles/vaccination-in-the-hatchery, Accessed September 19, 2024.

[133] Innovate Animal Ag. (n.d.). In-Ovo Sexing. Available at: https://www.innovateanimalag.org/egg-sexing. Accessed September 19, 2024.

The draft EIS also incorrectly states that "HPAI vaccines would likely require a minimum of two injections in certain species and offer protection for less than six months."[134] While some HPAI vaccinations do require a "boost" for long-lived birds such as layer hens,[135] this need not create a significant logistical issue, as the first dose could be given *in ovo* or at the hatchery while the second dose could be coordinated with moving the flock between housing systems.[136] For broiler chickens, who are typically slaughtered at six weeks of age, research confirms that there are numerous vaccine options with sufficient duration of immunity that may be achieved by a single injection at or before the day of hatch.[137]

The EIS states that, "[w]hile vaccine research is ongoing, it is far from being at the point of implementation due to the complexities surrounding the science."[138] While it is certainly the case that further research must be done on HPAI vaccines and vaccination strategies, the current state of research, along with the overwhelmingly positive experience of France in vaccinating duck flocks,[139] provides numerous reasons for seriously considering the incorporation of HPAI vaccination as a mean of controlling the on-going HPAI outbreak.

ii. Experts on human and avian health recommend incorporating HPAI vaccination into the HPAI response strategies.

Globally, and increasingly in the U.S., experts on HPAI, public health, conservation, and the poultry industry are calling for incorporation of vaccination into HPAI response strategies. These recommendations arise largely from fundamental shifts in HPAI over the past few years in terms of its patterns of spread, disease ecology, and zoonotic potential. For example, in its policy brief released in December 2023, WOAH states:

> The rapidly evolving nature of avian influenza and changes in its patterns of spread require a review of existing prevention and control strategies. To effectively contain the disease, protect the economic sustainability of the poultry sector and reduce potential pandemic risks, all available tools must be reconsidered – including vaccination. [140]

The policy brief cites an infographic produced by WOAH that illustrates the differences

[134] Draft EIS, at 62.
[135] EFSA Panel on Animal Health and Animal Welfare (AHAW), European Union Reference Laboratory for Avian Influenza. (2023) at 34.
[136] *Foreign Animal Disease Preparedness and Response Plan (FAD PReP)/National Animal Health Emergency Management System (NAHEMS) Guidelines*, U.S. DEP'T OF AGRIC., ANIMAL AND PLANT HEALTH INSPECTION SERV, https://www.aphis.usda.gov/sites/default/files/poultry_ind_manual.pdf at 103.
[137] Lee, J., et al. (2024); Germeraad, E.A., et al. (2024); Palya, V., et al. (2018); Germeraad, E.A., Bouwman, K.M., Jansen, C.A., et al. (2024). Progress report: Transmission study testing HVT-based H5 vaccine against highly pathogenic avian influenza (HPAI) H5N1 virus (clade 2.3.4.4b) First report, 8-weeks post vaccination with Vectorimmune ® AI. First Report, Project No. BO-43-111-083, Wageningen Bioveterinary Research. Available at https://edepot.wur.nl/656515.
[138] Draft EIS at 21.
[139] Gruber, P. (2024).
[140] *Avian influenza vaccination: why it should not be a barrier to safe trade*, WORLD ORGANISATION FOR ANIMAL HEALTH, (December 28, 2023), https://www.woah.org/en/avian-influenza-vaccination-why-it-should-not-be-a-barrier-to-safe-trade/.

between HPAI's "historical scenario," in which wild birds carried only LPAI, to the "new scenario," in which wild birds carry both LPAI and HPAI and are able to spread HPAI to farmed poultry as well as a range of mammals.[141]

In the 2023 OHHLEP report referenced above ("The Panzootic Spread of Highly Pathogenic Avian Influenza H5N1 Sublineage 2.3.4.4b: A Critical Appraisal of One Health Preparedness and Prevention"), the panel recognizes the "recent unprecedented shift in the ecology of highly pathogenic avian influenza (HPAI)," and more specifically (1) its spread to wild birds in previously uninfected geographic areas, (2) infection of a range of wild aquatic and terrestrial mammals, as well as farmed mink and pet cats, and (3) new scenarios that increase human risk.[142] Among OHHLEP's recommendations for reducing the risk of an HPAI pandemic among humans is making changes in poultry production, including "implementation of vaccination programs coupled with AI vaccine stewardship."[143]

In contrast to what is asserted in the draft EIS ("[w]hile HPAI is extremely infectious and fatal in poultry, the risks of HPAI infections in humans is low"[144]), changes to HPAI ecology and epidemiology indicate that human risk is increasing under the U.S.' current approach to HPAI response, especially for farm workers who are now recommended by the CDC to wear proper PPE.[145]

There is increased concern about HPAI's risk to public health at the global level. For example, in December 2023, the FAO released a statement entitled "Ongoing avian influenza outbreaks in animals pose risk to humans" which notes:[146]

> Avian influenza viruses normally spread among birds, but the increasing number of H5N1 avian influenza detections among mammals—which are biologically closer to humans than birds are—raises concern that the virus might adapt to infect humans more easily. In addition, some mammals may act as mixing vessels for influenza viruses, leading to the emergence of new viruses that could be more harmful to animals and humans.

Incorporation of HPAI vaccination into current disease control approaches is also recommended by global experts on conservation. Recently, the CMS passed two resolutions (described above in Section III.B.i.) that stress the importance of vaccination to protect migratory species from devastating disease.[147] Its Avian Influenza resolution recommends "considering vaccination of poultry against HPAI as a complement to other

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[141] *Avian influenza: understanding new dynamics to better combat the disease*, WORLD ORGANISATION FOR ANIMAL HEALTH, (2023), https://www.woah.org/app/uploads/2023/06/avian-influenza-understanding-new-dynamics-to-better-combat-the-disease.pdf.
[142] *A Critical Appraisal of One Health Preparedness and Prevention*, at 1-2.
[143] *Id.* at 9.
[144] Draft EIS at i.
[145] *Protect Yourself From H5N1 When Working With Farm* Animals, CENTERS FOR DISEASE CONTROL AND PREVENTION ONTROL, (May 2024), https://www.cdc.gov/flu/pdf/avianflu/protect-yourself-h5n1.pdf.
[146] Ongoing avian influenza outbreaks in animals pose risk to humans, FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, (December 7, 2023), https://www.fao.org/animal-health/news-events/news/detail/ongoing-avian-influenza-outbreaks-in-animals-pose-risk-to-humans/en.
[147] CMS Resolution 14.18; CMS Resolution 12.6.

control measures,"[148] while the resolution on Wildlife Health and Migratory Species urges CMS Parties to "take robust measures at livestock-wildlife interfaces," including vaccination, to "minimize the risk of infectious diseases to wildlife and pathogen spillover." As mentioned above, the U.S. is not a party to CMS, however, it provides input on draft resolutions via the AFWA. AFWA reviewed these resolutions when they were in draft form and recommended no changes to the language supporting HPAI vaccination of poultry.[149]

During the 90th Annual General Session of the World Assembly of Delegates of WOAH, a resolution was passed that addressed strategic challenges in the global control of HPAI and recommended parties (which includes the U.S.) to "consider the implementation of [HPAI] vaccination as a complementary disease control tool that is based on sound surveillance and takes into account local factors such as circulating virus strains, risk assessment and vaccination implementation conditions."[150]

Finally, key sectors of animal agriculture, both in the U.S. and internationally, have recently begun advocating for incorporation of HPAI vaccination strategies into U.S. control activities. For example, in 2023, the Avian Influenza Global Expert Group, commissioned by the trade group International Egg Commission, published a report on recommending incorporation of well managed HPAI vaccination programs for poultry.[151] Most recently, in August 2024, The International Dairy Foods Association, National Milk Producers Federation, United Egg Producers, and National Turkey Federation sent a coalition letter to USDA Secretary Thomas Vilsack requesting "urgent development of H5Nx vaccines for dairy cows, turkeys and egg-laying hens." In the letter, they note that HPAI is "a widespread and circulating animal disease with no end in sight" and that "it is clear that a new approach is needed. This includes the availability of animal vaccines effective against current and future strains of H5Nx that are necessary for a sustainable food supply as well as human and animal health."[152]

iii. An alternative incorporating vaccination could drastically reduce negative environmental impacts of HPAI outbreak response activities

The weight of the scientific evidence indicates that adopting an appropriate HPAI vaccination strategy would dramatically reduce the environmental impact of HPAI response, primarily by decreasing the number of HPAI infected farms and birds and decreasing the amount of virus shed by infected birds. France is one of the few developed countries with a large poultry export market to widely deploy HPAI vaccination, and their experience may be instructive. Within less than a year of starting vaccination, France went from logging hundreds of infected farms per year to only 10 farms testing positive in a six-month period; the HPAI affected farms either were not

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[148] CMS Resolution 14.18, at 1.

[149] *International Relations Committee Briefing Paper*, at 4.

[150] Resolution No. 28, WORLD ORGANISATION FOR ANIMAL HEALTH, (90th General Session, May 25, 2024), https://www.woah.org/app/uploads/2023/06/a-resos-2023-all.pdf at 49.

[151] International Egg Commission Avian Influenza Global Expert Group (2023).

[152] Letter from Michael Dykes, President, International Dairy Foods Association, Gregg Doud, President, National Milk Producers Federation, Chad Greg, President, United Egg Producers, and Leslee Oden President, National Turkey Federation to Thomas J. Vilsack, Secretary, USDA (August 16, 2024), https://idfa.org/wordpress/wp-content/uploads/2024/08/H5N1-Vaccines_Letter-to-Secretary-Vilsack_8.16.24_Final.pdf.

vaccinated (8 farms) or had factors that explained the breakthrough infections.[153] It is difficult to estimate the precise impact of incorporating vaccination on parameters considered by the EIS, as results would vary depending on the vaccine and vaccination strategy used, but some estimations are possible.

Were a preventive or even emergency protective vaccination strategy utilized, it is likely that millions of birds each year would avoid death by HPAI or inhumane depopulation methods. Fewer farms would become infected, especially via lateral spread, a factor implicated in 39% of HPAI cases in commercial table egg operations according to the USDA.[154] Were vaccination employed, it is possible that detecting HPAI in a single poultry house might not require depopulation of all the other houses on an infected premises, given that vaccinated birds shed less virus and may need to be exposed to a greater amount of virus in order to become infected. With widespread use of HPAI vaccination in large commercial operations, the dramatically reduced production of virus would significantly decrease contamination of the environment in and around the farm, potentially decreasing infection of wildlife and other animals, and thus helping to contain or even eradicate HPAI.

Vaccination for HPAI would also drastically reduce the negative impacts on animal welfare of the on-going outbreak and the response to it. Even factoring in the potential for increased human handling during vaccine administration, which has the potential to result in injuries if not properly done, the benefit of vaccination in terms of animal welfare stands to be enormous, given how severe and prolonged suffering is during death caused by HPAI or the commonly used depopulation method of VSD+. HPAI vaccination would not remove the need for depopulation or mass euthanasia entirely, as vaccinated flocks might still rarely become infected and not all flocks would be vaccinated; however, it is likely that the percentage of birds depopulated via low welfare methods such as VSD+ would be reduced. This is both because there would be fewer shortages of the resources needed for use of higher welfare depopulation methods and because the goal of completing depopulation of an entire premises within 24-48 hours might not be necessary when infected flocks are shedding much less virus and surrounding farms are less susceptible to HPAI infections.

The benefit of decreased viral shedding and reduced reliance on depopulation would carry over to people, benefitting public health, depopulation workers, and farmers as well. Less virus production by infected birds would mean fewer opportunities for the virus to gain mutations that enable it to easily infect and spread between humans, reducing pandemic potential. Less virus shedding would mean workers charged with carrying out depopulation and disposal would have a lower chance of getting infected.

As noted in the EIS, "minority and low-income farmers face additional barriers in accessing resources and support to help them prepare for, respond to, and recover from an HPAI outbreak" and "may be disproportionately financially impacted by an HPAI outbreak," given that they are likely to "lose more revenue and market share" than larger, more established farms.[155] A

[153] Gruber, P. (2024).
[154] *Summary of Depopulation Methods* at 33.
[155] Draft EIS at 102.

vaccination strategy that ensures such farmers have access to HPAI vaccination would help mitigate the disproportionate harm the current HPAI outbreak is inflicting on them.

By dramatically reducing the number of birds that need to be depopulated and disposed of, an alternative that incorporates HPAI vaccination would have far fewer negative impacts on the physical/natural environment, including of the parameters analyzed in the draft EIS: soil quality, air quality, water quality, vegetation health, and climate impact. One environmental issue that is under-analyzed in the EIS is water use. Water-based foaming, the depopulation method most commonly used for turkeys, broilers, and ducks,[156] uses enormous amounts of water. In a 2023 presentation on the topic, a state veterinarian noted that water-based foam requires "in excess of 35,000 gallons per day."[157]

Finally, as briefly discussed above, HPAI is impacting wild birds and mammals in a way never before seen with avian influenza. There are numerous wildlife species for which HPAI may ultimately hasten extinction.[158,159,160,161] In March 2024, the Centers for Disease Control and Prevention published a synopsis indicating that the risk to biodiversity is greater for the current HPAI than for any other in history, affecting "4 near-threatened, 4 endangered, 3 vulnerable, and 1 critically endangered species."[162] Many conservation scientists fear the "true effect of this enormous panzoontic on wild birds and their ecosystems may not be recognized for years to come."[163] As described above, international bodies and expert panels, as well as domestic agencies recognize that the risk HPAI poses to wildlife can be mitigated by use of HPAI vaccination.[164,165] Therefore, it is essential that the final EIS analyze the impact that an alternative that includes HPAI vaccination would have on federally listed threatened and endangered species by virtue of reducing environmental contamination with HPAI virus. For example, APHIS currently allows transport of infected birds carcasses in uncovered trucks if they are being disposed of on-premises, even when premises are expansive; this potentially contaminates the environment and may play a role in perpetuating HPAI in wildlife. This risk would be mitigated via vaccination because fewer infected bird carcasses would need to be disposed of and vaccinated bird who nonetheless became

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[156] *Summary of Depopulation Methods*, at 4.
[157] Leibsle, S. (2023). A State Vet's Perspective on Management of Food Animal Disease Outbreaks. ABVP Conference 2023.
[158] Ramos, N. & Har, N. (2024). Chile scientists warn of Humboldt penguin extinction risk. Business Day, https://www.businesslive.co.za/bd/world/americas/2024-06-11-chile-scientists-warn-of-humboldt-penguin-extinction-risk/.
[159] Campagna, C., Uhart, M., Falabella, V., et al. (2024). Catastrophic mortality of southern elephant seals caused by H5N1 avian influenza. *Marine Mammal Science*, *40*(1), 322–325. https://doi.org/10.1111/mms.13101
[160] Gamarra-Toledo, V., Plaza, P. I., Gutiérrez, R., et al. (2023). Mass Mortality of Sea Lions Caused by Highly Pathogenic Avian Influenza A(H5N1) Virus. *Emerging infectious diseases*, *29*(12), 2553–2556. https://doi.org/10.3201/eid2912.230192
[161] Continued expansion of high pathogenicity avian influenza H5 in wildlife in South America and incursion into the Antarctic region, OFFLU AD-HOC GROUP ON HPAI H5 IN WILDLIFE OF SOUTH AMERICA AND ANTARCTICA, (December 21, 2023), https://www.offlu.org/wp-content/uploads/2023/12/OFFLU-wildlife-statement-no.-II.pdf.
[162] Plaza, P. I., Gamarra-Toledo, V., Euguí, J., & Lambertucci, S. A. (2024). Recent Changes in Patterns of Mammal Infection with Highly Pathogenic Avian Influenza A(H5N1) Virus Worldwide. *Emerging Infectious Diseases*, *30*(3), 444-452. https://doi.org/10.3201/eid3003.231098.
[163] Klaassen, M., & Wille, M. (2023). The plight and role of wild birds in the current bird flu panzootic. *Nature ecology & evolution*, *7*(10), 1541–1542.
[164] CMS Resolution 14.18.
[165] *International Relations Committee Briefing Paper*.

infected with HPAI would excrete far less virus than unvaccinated birds.

iv. Economic concerns regarding trade disruption do not justify failure to analyze an alternative that incorporates HPAI vaccination.

The EIS raises concerns about the potential of HPAI vaccine use to "impact trade negotiations," implying that this would stem from "[l]imitations on [HPAI] detection ability [that] could lead to trading partners restricting their imports of U.S. poultry and poultry products, even when the United States is not experiencing an observable outbreak."[166] As discussed above, modern technologies and vaccines allow HPAI to be detected in vaccinated flocks and detailed information is available on specific surveillance strategies that reliably demonstrate freedom from disease.[167,168,169,170] In its 2023 policy on the issue, the World Organisation for Animal Health states unequivocally, "Vaccination is compatible with the pursuit of safe trade in poultry and poultry products . . . the inclusion of vaccination as a control tool has been endorsed by international standards adopted by the World Assembly of WOAH national Delegates."[171]

The current trade challenges associated with HPAI vaccination provide a reason for beginning the process of renegotiating agreements with trade partners, but they do not provide a reason for failing to analyze the environmental impact of an alternative that includes HPAI vaccination as a component of disease control efforts.

III. 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 of mass killing of animals, particularly by methods that cause severe and/or prolonged suffering, on affected animals and human psychological health, both that of depopulation workers and the public.

A. The EIS should consider the impacts of different depopulation methods on animal welfare.

As discussed above, NEPA requires APHIS to consider impacts to the "human environment." 40 C.F.R. § 1508.1(m). 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:

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[166] Draft EIS at 62.
[167] Hasan, N. H., et al. (2016).
[168] Suarez, D. L. (2012).
[169] Lee, J., et al. (2024).
[170] EFSA Panel on Animal Health and Animal Welfare (AHAW), European Union Reference Laboratory for Avian Influenza. (2024).
[171] WORLD ORGANISATION FOR ANIMAL HEALTH (2023), at 3.

> 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 berecognized as such under NEPA.[68]

Animal welfare is impacted differently by different depopulation methods, based on factors such as how long animals experience negative affective states, such as pain, fear, respiratory distress, and fatigue prior to losing consciousness. In evaluating the environmental impact of different alternatives, the EIS should consider impact on animal welfare as a parameter alongside others it evaluates, such as human health and soil quality.

Disappointingly, however, the EIS fails to analyze or even acknowledge higher-welfare nitrogen-based depopulation methods, such as high-expansion nitrogen gas-filled foam[172] (expansion ratio equal to 300:1 or higher) and nitrogen whole house gassing. Because of their action mechanism and how rapidly they produce loss of consciousness, these methods have the potential to significantly improve welfare, especially compared with VSD+, and they can be used across a wide range of poultry housing systems.[173,174,175] Instead, APHIS VS chose only to analyze the impacts of depopulation methods discussed explicitly in AVMA's 2019 *Guidelines for the Depopulation of Animals.* These guidelines have been heavily criticized by the U.S. and international veterinary communities, in part due to their failure to include both research and a categorization for nitrogen-based methods.[176] In 2023, the AVMA reconvened its Panel on Depopulation, tasked with reviewing and updating the *Guidelines for the Depopulation of Animals*, and an updated draft is expected to be released in the near future. To the extent practicable, APHIS VS should reference and assess relevant provisions in the updated AVMA guidelines in its final EIS. As it pertains to high expansion nitrogen foam, sufficient research exists[177] in order for APHIS VS to include this method as part of its analysis and EIS prior to

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[172] Note that the draft EIS erroneously describes water-based foaming as being done with "medium- or high-expansion foam" on page 38. Water-based foam is done with low- or medium-expansion foam and causes death via air occlusion and/or drowning. *See*, EFSA Panel on Animal Health and Welfare (AHAW), Nielsen, S. S., Alvarez, J., Bicout, D. J., et al. (2024). The use of high expansion foam for stunning and killing pigs and poultry. *EFSA journal. European Food Safety Authority*, *22*(7), e8855. https://doi.org/10.2903/j.efsa.2024.8855, at 8.

[173] *Id.*

[174] *Opinion on the use of High Expansion Nitrogen Foam Delivery Systems for depopulation of poultry flocks affected by notifiable disease in the UK*, DEPARTMENT FOR ENVIRONMENT FOOD AND RURAL AFFAIRS, ANIMAL WELFARE COMMITTEE, (2024), https://www.gov.uk/government/publications/awc-opinion-on-high-expansion-nitrogen-foam-for-culling-poultry/awc-opinion-on-the-use-of-high-expansion-nitrogen-foam-for-culling-poultry (hereinafter *Opinion on the use of High Expansion Nitrogen Foam).*

[175] Hill, J. (2024), Evaluation of Nitrogen Whole House Gassing for the Mass Depopulation of Poultry. Presentation for Poultry Innovation Partnership, https://poultryinnovationpartnership.ca/presentation/evaluation-for-adopting-nitrogen-in-whole-barn-gassing-during-the-mass-depopulation-of-poultry/.

[176] Kipperman B. (2023). 'The veterinary profession should not condone killing animals by heatstroke'. *The Veterinary record*, *192*(3), 132. https://doi.org/10.1002/vetr.2714; Loeb J. (2023). Seeking the best means to an end. *The Veterinary record*, *192*(4), 141. https://doi.org/10.1002/vetr.2734; Loeb J. (2023). Depopulating poultry and pig farms: can it be done humanely?. *The Veterinary record*, *192*(4), 155–158. https://doi.org/10.1002/vetr.2753

[177] *Opinion on the use of High Expansion Nitrogen Foam*; EFSA Panel on Animal Health and Welfare (AHAW),

finalization of AVMA's updated guidelines. Nitrogen whole house gassing and high expansion nitrogen foam have environmental benefits over other commonly used depopulation methods, which should also be considered.[178] Other, more comprehensive references on depopulation methods for poultry are available and can be referenced in determining the welfare impact of various methods.[179]

B. The EIS should meaningfully consider the impacts of different depopulation methods on human psychological health.

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."[180] *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); *Grunewald v. Jarvis*, 776 F.3d 893, 906 (D.C. Cir. 2015) (identifying witnessing the killing of deer, encountering deer carcasses, and hearing gunshots as potential effects on the human environment); *cf. also 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);

In 2023, 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.[181] Numerous studies have detailed negative psychological impacts experienced by those charged with euthanizing or depopulating animals, including secondary trauma/compassion fatigue, moral distress, perpetration-induced traumatic

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Nielsen, S. S., Alvarez, J., Bicout, D. J., Calistri, P., Canali, E., ... & Michel, V. (2024). The use of high expansion foam for stunning and killing pigs and poultry. *EFSA Journal*, *22*(7), e8855; *See also, More Humane Farmed Animal Depopulation Methods: Information and Sources,* Animal Welfare Ins. (June 2023), https://awionline.org/sites/default/files/uploads/documents/More-Humane-Farmed-Animal-Depopulation-Methods.pdf.

[178] For example, high expansion nitrogen foam utilizes far less water than does water-based foam, and whole house gassing with nitrogen does not release large volumes of greenhouse gasses into the atmosphere as does whole house gassing with carbon dioxide.

[179] EFSA Panel on Animal Health and Welfare (AHAW), Nielsen, S. S., Alvarez, J., Bicout, D. J.,et al. (2019). Killing for purposes other than slaughter: poultry. *EFSA journal. European Food Safety Authority*, *17*(11), e05850. https://doi.org/10.2903/j.efsa.2019.5850; - McKeegan, D. (2018). Mass depopulation. In *Advances in Poultry Welfare*; Elsevier: Duxford, UK, 2018; pp. 351–372. ISBN 978-0-08-100915-4.

[180] Cassuto, N. and DiBenedetto, T. (2020). Suffering Matters: NEPA, Animals, and the Duty to Disclose. *Pace Law Faculty Publications*, 64.

[181] Kollias, N. S., Strand, E. B., Kogan, L. R., et al. (2023). Psychological implications of humane endings on the veterinary profession. *Journal of the American Veterinary Medical Association*, *261*(2), 185-192. https://doi.org/10.2460/javma.22.06.0234.

stress, burnout, and emotional detachment.[182]

The draft EIS briefly discusses the psychological impact on workers of participating or witnessing depopulation, decontamination, transportation, and disposal of HPAI-affected poultry and on poultry owners or the public of losing animals and/or seeing images of depopulation.[183] However, the discussion is superficial and does not analyze the different types of psychological impacts and the extent to which they may be associated with factors such as the number of animals involved or the method of killing. It is important that APHIS analyze the impact on human psychological well-being in greater detail.

Psychological impacts on people may be worsened when animals experience prolonged periods of poor welfare prior to death, including as a result of the depopulation method utilized.[184,185] Moral distress, in particular, arises when "individuals are aware of the right action but are hindered by institutional constraints;"[186] thus moral distress would be expected to arise in veterinarians and other responders who are aware that depopulation methods that minimize animal suffering can be rapidly deployed with sufficient advanced planning and preparation, but are charged with executing mass depopulations with low welfare methods due to others' decisions not to prioritize such planning efforts. Indeed, testimony from veterinarians involved in depopulation efforts confirm that VSD+ is "hard on people performing the method," particularly when a relatively large percentage of animals survives the depopulation attempt.[187] A requirement for better planning and preparedness, such that higher welfare methods can be rapidly deployed and implemented, is thus likely to mitigate negative psychological impacts on responders.

IV. 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. It should also

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[182] Baysinger, A., & Kogan, L. R. (2022). Mental Health Impact of Mass Depopulation of Swine on Veterinarians During COVID-19 Infrastructure Breakdown. *Frontiers in veterinary science*, *9*, 842585. https://doi.org/10.3389/fvets.2022.842585.; Bussolari, C., Packman, W., Currin-McCulloch, J., Strand, E., & Kogan, L. (2022). Mass depopulation of swine during COVID-19: An exploration of swine veterinarians' perspectives. *Veterinary Sciences*, *9*(10), 563. https://doi.org/10.3390/vetsci9100563; Whiting, T. L., & Marion, C. R. (2011). Perpetration-induced traumatic stress—A risk for veterinarians involved in the destruction of healthy animals. *The Canadian Veterinary Journal*, *52*(7), 794; Olff, M., Koeter, M. W., Van Haaften, E. H., Kersten, P. H., & Gersons, B. P. (2005). Impact of a foot and mouth disease crisis on post-traumatic stress symptoms in farmers. *The British Journal of Psychiatry*, *186*(2), 165-166. https://doi.org/10.1192/bjp.186.2.165.

[183] Draft EIS at 90-91.

[184] Whiting, T. L., & Marion, C. R. (2011). Perpetration-induced traumatic stress - A risk for veterinarians involved in the destruction of healthy animals. *The Canadian veterinary journal = La revue veterinaire canadienne*, *52*(7), 794–796.

[185] Baysinger, A., & Kogan, L. R. (2022).

[186] Baysal, Y., Goy, N., Hartnack, S., & Guseva Canu, I. (2024). Moral distress measurement in animal care workers: a systematic review. BMJ open, 14(4), e082235. https://doi.org/10.1136/bmjopen-2023-082235.

[187] Baldwin, M. (2022). Ventilation Shutdown and VSD+. Presentation to US Animal Health Association Committee on Animal Welfare, Oct. 11, 2022, available at: https://usaha.org/upload/Committee/2022Reports/2022_Animal_Welfare.docx.

consider an alternative in which APHIS incorporates vaccines into its HPAI response activities. 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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