

# WOAH Collaborative Centre Reports Activities 2025

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## CENTRE INFORMATION

<b>*Title of WOA Collaborating Centre</b>	Animal Disease Surveillance Systems, Risk Analysis and Epidemiological Modeling
<b>*Address of WOA Collaborating Centre</b>	Centers for Epidemiology and Animal Health, Fort Collins, Colorado (USA)
<b>*Tel:</b>	+13017343497
<b>*E-mail address:</b>	alan.r.huddleston@usda.gov
<b>Website:</b>	<a href="https://www.aphis.usda.gov/livestock-poultry-disease/epidemiology">https://www.aphis.usda.gov/livestock-poultry-disease/epidemiology</a>
<b>*Name Director of Institute (Responsible Official):</b>	Alan Huddleston
<b>*Name (including Title and Position) of Head of the Collaborating Centre (WOAH Contact Point):</b>	Alan Huddleston, Director
<b>*Name of the writer:</b>	Sarah Blasko

## TOR 1 AND 2: SERVICES PROVIDED

1. Activities as a centre of research, expertise, standardisation and dissemination of techniques within the remit of the mandate given by WOA

Category	Title of activity	Scope
Epidemiology, surveillance, risk assessment, (true)	Provided Geospatial and Mapping Support for the HPAI Poultry Outbreak in the United States (2022–2025)	CEAH Geographic Information Systems (GIS) staff provided daily maps for all positive highly pathogenic avian influenza (HPAI) detections (premises) within the United States. Interactive map tools were managed to facilitate safe routing and movement of poultry products to Canada. Other HPAI Zone Location tools continued to be used to verify that poultry products were not coming out of restricted control areas/zones, minimizing impacts to trade. Map products were used to communicate with trade partners regarding status (open/closed) of restricted geographic areas. Maps were also developed for daily situation reports to show all stages of tasks, including detection, depopulation, cleaning, repopulating premises, and closing quarantine zones.
Training, capacity building (true)	HPAI Biosecurity Auditor Training	CEAH provided subject matter expertise on biosecurity audit data mining as part of an effort to develop training materials for auditors tasked with conducting HPAI biosecurity audits.
		CEAH collaborated with the U.S. Geological Survey and the University of Maryland on a model of spillover risk from wild waterfowl to

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Wildlife (true)	HPAI Risk Interface Model: Wild Birds to Domestic Poultry	domestic poultry across the continental United States for the full annual cycle. Published in One Health in 2025. <a href="https://doi.org/10.1016/j.onehlt.2025.101172">https://doi.org/10.1016/j.onehlt.2025.101172</a> .
Aquatic animal diseases (true)	Declarations of National Disease Freedom for Six Aquatic Pathogens	CEAH experts supported agency activities that resulted in the United States publishing country-wide claims of disease freedom for epizootic hematopoietic necrosis virus (EHNV), salmonid alphavirus (SAV), Gyrodactylus salaris, Martellioides chungmuensis, Martelia refringens, and Perkinsus olsenii.
Epidemiology, surveillance, risk assessment (true)	Bovine TB Test and Remove Modeling	CEAH modeled optimal test and remove strategies to clear infected animals from three herds: a 25,000-head dairy in Texas (June 2025), a 22,000-head dairy in New Mexico (Sept 2025), and a 52-head beef herd in Michigan (March 2025).
Epidemiology, surveillance, risk assessment (true)	HPAI H5N1 Economic Biosecurity Analysis of Commercial Turkey Operations	Published manuscript entitled "Biosecurity investment impacts on highly pathogenic avian influenza control in United States commercial turkey operations." <a href="https://www.sciencedirect.com/science/article/pii/S0167587725002090">https://www.sciencedirect.com/science/article/pii/S0167587725002090</a> Work was in collaboration with the University of Arkansas. Produced an information sheet describing challenges in implementing biosecurity practices for commercial turkey and table egg producers using results from the HPAI turkey and table egg producers case control studies.
Epidemiology, surveillance, risk assessment (true)	Improving Indemnity Accuracy, Processes, and Procedures	CEAH continued work on a project to revise the "APHIS Guidelines for Private Appraisals" standard operating procedure. The purpose of this document is to provide specific guidelines on what makes an acceptable livestock appraisal report to USDA's Animal and Plant Health Inspection Service (APHIS). Appraisals are used when there is no readily available data on animal values for indemnity. Our organization is also working with the USDA Office of the General Council to determine if incorporation of overhead, depreciation, and loss of future income can be included in determining indemnity values. An industry group requested the inclusion. Working on indemnity values for the following: – Elk – Table egg laying hens – Captive deer in West Virginia – Doves
Epidemiology, surveillance, risk assessment (true)	Supporting the Cattle Fever Tick Eradication Program	CEAH staff are providing support to the Cattle Fever Tick Eradication Program (CFTEP) to complete a series of disease control tasks assigned to CEAH in the fiscal years 2021–2025 CFTEP Strategic and Workforce Plan.
Epidemiology, surveillance, risk assessment (true)	Supporting the National Feral Swine Damage Management Program	CEAH staff are providing quantitative ecological support to the National Feral Swine Damage Management Program with the ultimate goal of controlling disease among feral swine.
Epidemiology, surveillance, risk assessment (true)	North American Elk Breeders Association Request to Update Elk Categories in the VS Indemnity Table	An update to the 2025 Indemnity Table was made for common cow, superior cow, and bull indemnity categories, based on a dataset provided by the Association.
Epidemiology, surveillance, risk assessment (true)	Evaluated United Egg Producers Request to Change Indemnity Values Based on Iowa State University Egg Industry Center Data	A mid-cycle update for layer categories was executed in February 2025. An adjustment to cage-free layer categories was also added to maintain consistency.
Epidemiology, surveillance, risk assessment (true)	New World Screwworm Strategy Action Group	CEAH staff are participating in the Domestic New World Screwworm Strategy Action Group. The purpose of the group is to work on an education/outreach plan, meet training needs, and increase

		communication/inspections with U.S. Customs and Border Protection.
Epidemiology, Surveillance, Risk Assessment (true)	Swine influenza A Interagency Working Group	CEAH staff contributed significantly to the World Organisation for Animal Health (WOAH) and Food and Agriculture Organization of the United Nations (FAO) Network of Expertise on Animal Influenza (OFFLU) swine influenza A working group, via the World Health Organization (WHO) bi-annual Vaccine Composition Meeting (VCM), where genetic and antigenic characteristics of zoonotic influenza A viruses and development of candidate vaccine viruses for pandemic preparedness are discussed.
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	HPAI-affected Livestock Herds	CEAH produced an analysis and report describing epidemiology of initial months of detections of HPAI in domestic livestock. <a href="https://www.aphis.usda.gov/sites/default/files/status-report-livestock-edition-508.pdf">https://www.aphis.usda.gov/sites/default/files/status-report-livestock-edition-508.pdf</a> CEAH led analysis and reporting of avian influenza spillover events in Nevada and Arizona. <a href="https://www.aphis.usda.gov/sites/default/files/20250611-epi-brief-nevada-arizona-h5n1-dairy.pdf">https://www.aphis.usda.gov/sites/default/files/20250611-epi-brief-nevada-arizona-h5n1-dairy.pdf</a>
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	Influenza A Virus in Swine Surveillance Fiscal Year 2025 Quarterly Reports	CEAH produces quarterly and annual reports to provide a brief update on the status of the national surveillance for influenza A virus (IAV) in swine for producers, swine practitioners, diagnosticians, and the public. <a href="https://www.aphis.usda.gov/livestock-poultry-disease/swine/influenza-a-virus">https://www.aphis.usda.gov/livestock-poultry-disease/swine/influenza-a-virus</a>
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	National HPAI Disease Spread and Control Model for Poultry	CEAH staff refined national models and generated outbreak scenarios to assess the impact of hypothetical HPAI vaccination strategies on outbreak size and duration. Model outputs were shared with the Kansas State University Collaborating Center for the Economics of Animal Health for estimation of the economic impact of HPAI vaccination. In addition, CEAH provided subject matter expertise on HPAI modeling to academic collaborators.
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	National Foot-and-Mouth Disease Spread and Control Model	CEAH staff generated disease spread and control modeling scenarios characterizing potential for foot-and-mouth disease (FMD) introduction and spread for multiple geographic regions in the United States. Model outputs were used to support tabletop exercises. In collaboration with the USDA's Agricultural Research Service, CEAH published a manuscript titled, "Epidemiologic Consequences of preclinical transmission of foot-and-mouth disease virus in cattle." This publication identifies the potential impact of preclinical transmission on outbreak size and duration. <a href="https://doi.org/10.3389/fvets.2025.1651091">https://doi.org/10.3389/fvets.2025.1651091</a> In addition, CEAH provided subject matter expertise on FMD modeling to academic collaborators.
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	National African Swine Fever Disease Spread and Control Model	CEAH staff developed and utilized national disease spread and control models to examine African swine fever (ASF) spread scenarios, support risk assessments, inform policy decisions, and contribute to preparedness and response planning efforts. In addition, CEAH provided subject matter expertise on ASF modelling to academic collaborators.
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	Epidemiologic and Other Analyses of HPAI-affected Poultry Flocks	CEAH coordinated analysis and reporting of outbreak, phylogenetic analysis and diagnostics (National Veterinary Services Laboratory), case series epidemiologic studies and AIV surveillance in wild birds (Wildlife Services). Expected publication in 2026.
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	CEAH Modeling to Inform H5N1 in Cattle	CEAH is modeling H5N1 in cattle to help in targeting surveillance efforts, determine likely origins of the outbreak, and predict future spread of the disease. CEAH co-authored a manuscript with Colorado State University titled "Estimating the Within-herd Transmission Rate of Highly Pathogenic Avian Influenza H5N1 Virus in a Dairy Herd using an Approximate Bayesian Computation Approach." This

		manuscript used morbidity data from an HPAI-infected dairy herd to estimate parameters of disease spread. This manuscript is currently in the peer-review process.
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	2025 U.S. National Animal Health Reporting System (NAHRS) Reportable Diseases, Infections, and Infestations List	CEAH published the updated United States list of reportable animal diseases for 2025 to inform stakeholders of current reportable diseases.
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	National Surveillance Strategy for HPAI (Dairy Cattle)	CEAH provided subject matter expertise to expand and refine national surveillance strategies for HPAI (dairy cattle) resulting in current plans described here: <a href="https://www.aphis.usda.gov/livestock-poultry-disease/avian/avian-influenza/hpai-detections/livestock/nmts">https://www.aphis.usda.gov/livestock-poultry-disease/avian/avian-influenza/hpai-detections/livestock/nmts</a>
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	Equine Arbovirus Dashboard	CEAH developed and maintained a public dashboard showing historical and current equine cases of arboviral disease (eastern equine encephalitis, western equine encephalitis, and West Nile virus) that occurred in the United States through 2025. <a href="https://www.aphis.usda.gov/livestock-poultry-disease/equine/arbovirus-dashboard">https://www.aphis.usda.gov/livestock-poultry-disease/equine/arbovirus-dashboard</a>
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	Equine Infectious Anemia Epidemiologic Report	CEAH analysed data and published a report describing cases of Equine Infectious Anemia that occurred in the United States in 2024. <a href="https://www.aphis.usda.gov/sites/default/files/2024-eia-report.pdf">https://www.aphis.usda.gov/sites/default/files/2024-eia-report.pdf</a>
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	Outbreak Surveillance Optimization Using Within-Herd Spread Models	CEAH collaborated with the University of Minnesota to develop a within-herd ASF spread model, which is used to evaluate surveillance scenarios to optimize outbreak response planning. New modeling scenarios have been used to evaluate surveillance strategies proposed as part of the U.S. Swine Health Improvement Plan, as well as control zone surveillance for USDA ASF response plans.
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	U.S. Swine Hemorrhagic Fevers Integrated Surveillance Plan Dashboard	CEAH published quarterly reports quantifying the U.S. African swine fever (ASF) and classical swine fever (CSF) surveillance efforts in domestic and feral swine. <a href="https://www.aphis.usda.gov/aphis/dashboards/tableau/asf-csf-exec-summary-dashboard">https://www.aphis.usda.gov/aphis/dashboards/tableau/asf-csf-exec-summary-dashboard</a>
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	Updated information Related to Certificate of Veterinary Inspections and Improve Data Availability	CEAH is working to update information related to Certificate of Veterinary Inspections and improve data availability. States are being contacted to learn more about where/how States are storing certificate data. Animal movement modeling data for individual States (shipments in and out) will be offered to States as an incentive for participating in the project.
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	Predicting HPAI H5N1 Bulk Tank Milk rRT-PCR CT Values from Non-clinical Dairy Herds	CEAH analysis was used to inform the development surveillance schemes for multiple response objectives and proposed schemes for disease eradication and estimation of national HPAI prevalence. CEAH produced a technical report describing statistical approaches to estimate the probability of detecting HPAI in bulk tank milk samples. <a href="https://www.aphis.usda.gov/sites/default/files/tech-brief-hpai-btm-surveillance.pdf">https://www.aphis.usda.gov/sites/default/files/tech-brief-hpai-btm-surveillance.pdf</a>
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	Within-flock HPAI Vaccine Model	CEAH developed a within-flock model for HPAI spread in vaccinated flocks. The model was needed to generate inputs for national-level HPAI models used to evaluate vaccination strategies. A manuscript outlining model development and evaluation of surveillance strategies was submitted for consideration to the WOAHP Technical Review on Vaccination.
		CEAH is modeling the entry of ASF via the Air Passenger Baggage Pathway and Predicting the Quantity of Swine-Origin Quarantine Material Entering the U.S. Undetected through Air Passenger Baggage

Epidemiology, Surveillance, Risk Assessment, Modeling (true)	Modeling the Entry of ASF via the Air Passenger Baggage Pathway	from Countries Affected by African Swine Fever project. We are using a Bayesian model that will model the movement of at-risk product via passengers, mail, and cargo from countries with foreign animal diseases (FADs) of interest (for example, ASF). The predicted movements of at-risk product will be used to predict the likelihood of FAD introduction.
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	North American Foot-and-Mouth Disease Vaccine Bank	CEAH has been providing expertise to the North American Foot-and-Mouth Disease Vaccine Bank (NAFMDVB) related to what testing numbers may look like in an FMD outbreak (initial number and the new number with expanded testing). Modeling is being used to estimate numbers.
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	African Swine Fever and Classical Swine Fever Surveillance in Puerto Rico and U.S. Virgin Islands	CEAH performed a comprehensive evaluation of surveillance systems for ASF and CSF in Puerto Rico and the U.S. Virgin Islands as part of the U.S. Protection Zone. The outcomes of that evaluation are informing plans to sustain USDA's detection capabilities, enhance outbreak preparedness for ASF and CSF, and support claims of disease freedom from ASF and CSF. <a href="https://www.aphis.usda.gov/sites/default/files/eval-swine-hemorrhagic-fevers-survel-plan.pdf">https://www.aphis.usda.gov/sites/default/files/eval-swine-hemorrhagic-fevers-survel-plan.pdf</a>
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	Bovine Tuberculosis (bTB) Transmission Risk Among Livestock and Wildlife and Evaluation of Control Measures on Moloka'i Island	CEAH is leading the determination of bovine tuberculosis transmission risk among livestock and wildlife and evaluation of control measures on Moloka'i island project. The project objectives include estimation of population densities of feral swine and axis deer, estimation of contact rates among livestock and wildlife, and estimation of bTB prevalence in feral swine, axis deer, and mongoose.
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	Cattle Fever Tick Data Project	CEAH provided subject matter expertise on a cattle fever tick data project trouble shooting challenges with obtaining premises info (name, identification, latitude/longitude) for Texas surveys.
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	Information on TB Test Results from Slaughter Catchment Areas	CEAH staff are leading a project looking at using information on TB test results from slaughter catchment areas (slaughterhouses) to improve disease surveillance sampling efficiency.
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	Collaboration with the United Kingdom and Sweden on Modeling of HPAI in Livestock	CEAH staff are collaborating with the United Kingdom and Sweden on modeling of HPAI in livestock. Funding is from the National Science Foundation's Ecology and Evolution of Infectious Diseases Program and the United Kingdom's Biotechnology and Biological Sciences Research Council.
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	Evaluating Wildlife Surveillance for Avian Influenza 2.3.4.4b Virus	CEAH is leading a project evaluating wildlife surveillance for avian influenza 2.3.4.4b virus around affected dairy herds. The evaluation is ongoing as new premises are detected.
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	Longhorned Tick Hotspot Project	CEAH staff are participating in a longhorned tick hotspot project conducted by the University of Massachusetts – Amherst. Once hotspots are identified, they are investigated for key attributes (livestock markets, migratory bird flyways, major highways) that could influence dispersal of the tick and associated disease.
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	ASF Entry Risk for Guam and Other U.S. Territories	CEAH staff are participating in a project modeling ASF entry risk for Guam and other U.S. Territories. The information will be used to target ASF surveillance areas at higher risk for ASF entry.
		CEAH collaborated with the National Agricultural Statistics Service (NASS) to complete a national study of U.S. small enterprise table egg

Epidemiology, Surveillance, Risk Assessment, Modeling (true)	National Animal Health Monitoring System (NAHMS) Poultry 2025 Small Enterprise Study	layer, broiler, and turkey operations. The study focuses on management and biosecurity practices to understand producer preparedness for animal health emergencies, such as HPAI.
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	Asian Longhorned Tick (ALHT) Story Maps	ALHT story map was updated in 2025 to include updates on the transmission of <i>T. orientalis</i> Ikeda by this tick species and tick control options. CEAH continues to update the ALHT collection map monthly.
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	NAHMS Sheep 2024 Study	CEAH collaborated with the National Agricultural Statistics Service (NASS) to complete a national study of U.S. sheep health, productivity management, and biosecurity. This is the fourth national study of U.S. sheep and provides data to examine trends in the sheep industry from 1996 to 2024. Samples were collected to estimate the prevalence of gastrointestinal parasites, anthelmintic resistance, bacteria causing foot rot, fecal Salmonella, Campylobacter, generic <i>E. coli</i> , and Clostridium, and antimicrobial resistance to these enteric microbes. Samples were also collected to estimate genetic resistance to scrapie in the U.S. flock and to provide sera for future research in the prevalence of other economically important sheep pathogens.
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	NAHMS Backyard Animal Keeping 2024 Study	CEAH completed a study to estimate backyard ownership, biosecurity, and management of poultry, pigs, goats, and rabbits nationally, and to examine changes in backyard poultry ownership in two metropolitan areas. Data were cleaned and analysed in 2025, and reports are expected in 2026.
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	NAHMS Bison 2022 Study Reporting	CEAH published a report on health and management practices on U.S. bison operations describing biosecurity, use of health management practices, disease occurrence and testing practices, and other factors related to bison health and management.
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	NAHMS Swine 2021 Study Reporting	CEAH published two information briefs on characteristics of small-enterprise (< 1,000 pigs) and large enterprise (1,000 or more pigs) swine operations in the United States.
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	Human and Animal Movements Around HPAI Dairy Facilities	CEAH staff are participating in a project with the California Department of Food and Agriculture team for a network analysis looking at human and animal movements around HPAI dairy facilities with the goals of identifying commonalities and using the information to improve biosecurity.
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	Evaluation of the New World Screwworm Protocol	CEAH completed an assessment to determine the likelihood of importing New World screwworm-infested cattle into the United States from Mexico, given the importation protocols put in place to mitigate risks.
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	Literature Review and Meta-Analysis for African Swine Fever Transmission Parameters	CEAH completed work on model revisions and wrote and submitted a manuscript describing the systematic literature review and data extraction, outlining model fits describing the most important factors determining latent period, infectious period, clinical signs period, factors affecting mortality, and within herd transmission. Individual animal level distributions for these parameters were also fit accounting for the important factors identified by model fitting and distributions were reported.
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	New World Screwworm Geospatial Analysis	This activity consisted of a rapid turn-around geospatial analysis to determine areas in the United States where NWS could become established, if introduced, based on published NWS optimal survival temperature; domestic cattle and swine movement; estimated wild pig, domestic swine, cattle, sheep, and goat densities; number of

		wildlife hosts present; and historical NWS occurrence.
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	Analysis of Nonclinical signs cases of HPAI in Commercial Poultry Operations	CEAH staff worked with the poultry health team on an analysis comparing premises breaking with HPAI both with and without clinical signs. The project involved developing Emergency Management Response System (EMRS) searches to assemble a variety of data. Code was then written to merge data across all of datasets.
Epidemiology, Surveillance, Risk Assessment, Modeling (true)	R. microplus Tick Habitat Suitability Modeling	CEAH incorporated a more recent climate dataset and a new model calibration to significantly improve model performance. The new climate dataset allowed projection of habitat suitability models onto future climate scenarios.
Training, Capacity Building (true)	ASF Technical Working Group	CEAH staff provided subject matter expertise in ASF epidemiology, surveillance, and response planning as part of an APHIS technical working group that included 24 experts from APHIS and State, Federal, and industry partners. The working group assessed U.S. ASF preparedness plans and policies and continues working collaboratively to develop strategies and advance research to strengthen current surveillance, response, depopulation, and disposal plans.
Training, Capacity Building (true)	Training and Exercise Plan Outbreak Surveillance Training Workgroup	CEAH collaborated on developing and delivering new training on surveillance to support foreign animal disease outbreak response in 2025. Sessions were attended by U.S. regulatory veterinarians and animal health professionals and recordings were made available to the public.
Training, Capacity Building (true)	Foot-and-Mouth Disease (FMD) National Disease Spread Model Used for National Functional FMD Exercise	Emergency preparedness and response functional exercises require planning and the inclusion of plausible options to sustain participation and maintain an element of realism for the exercise. CEAH modeling outcomes provide an element of realism for the exercise, which also sustains participation and engagement.
Training, Capacity Building (true)	Geospatial Premise Validation Pilot Project	The Premise Identification Numbers (PIN) Validation Project utilized deep learning models applied to high-resolution aerial imagery to automatically detect and delineate the footprints of commercial swine facilities across five counties in Iowa and one county in Minnesota. These detected structures were then spatially matched to existing PINs to validate the accuracy of farm location data for veterinary emergency response planning. Following a manual review by subject matter experts, this automated deep learning achieved a positive predictive value of over 95%, though the specificity was lower at 41%. These results indicate that the model can be a great tool for rapidly identifying facilities and validating the locations of previously collected facilities.
Training, Capacity Building (true)	Using Artificial Intelligence for Camera Traps to Optimize Animal Production	CEAH is working on the Decision Animal Husbandry: Using Artificial Intelligence for Camera Traps to Optimize Animal Production and Management Decision Support Systems project. The project explores whether artificial intelligence has the potential to save producers and researchers money and time by deploying camera trap arrays for animal monitoring.
Training, Capacity Building (true)	Building Vector Knowledge in Field Operations (FiOps)	CEAH staff are participating in the Building Vector Knowledge in Field Operations project. The project is focused on building vector knowledge among USDA field staff.
Training, Capacity Building (true)	National Training and Exercise Program Working Group	preparedness training. Training focuses on roles and expectations for a Situation Unit Lead, Disease Reporting Officer, and Planning Epidemiologist during an outbreak event. Training focuses on the importance of conducting and keeping records of surveillance and epidemiological interviews and traces in the Emergency Management

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		Response System (EMRS), communication, setting up zones around an infected premises, movement restrictions, and other incident response tasks in these roles. Training expected to be delivered in a webinar style for continuing education credit in spring 2026.
Training, Capacity Building (true)	Vector and Vector-borne Diseases Strategic Planning	CEAH staff are leading a discussion on vector and vector-borne diseases strategic planning as part of an inter-agency vector working group meeting. The following topics will be included in the strategic plan: Evaluate and Monitor Vector Distributions and Vector-borne Diseases, Epidemiological Investigations, Laboratory Diagnostics and Networks, Information Management and Analyses, Vector Control/Mitigations, and Communication and Outreach Activities.
Training, Capacity Building (true)	Good Aquaculture Practices	CEAH staff supported development of a train the trainer program for Good Aquaculture Practices by Joint Institute for Food Safety and Applied Nutrition (JIFSAN)
Wildlife (true)	Risk of Introduction and Spread of Novel Avian Influenza Viruses from Eurasia into North America	CEAH staff are participating in a project looking at the risk of introduction and spread of novel avian influenza viruses from Eurasia into North America. Host mobility, viral prevalence, and transmission on a large spatial scale are being looked at.
Other (true)	Disease Case Definitions Updated	CEAH drafted reportable disease case definitions using a cross-agency subject matter expert panel. These will advance initiatives to promote and expand comprehensive and integrated surveillance for animal diseases in the United States. Case definitions provide the basis for consistent reporting with uniform case findings and reporting criteria. <a href="https://www.aphis.usda.gov/livestock-poultry-disease/surveillance/reportable-diseases">https://www.aphis.usda.gov/livestock-poultry-disease/surveillance/reportable-diseases</a>
Other (true)	Veterinary Services Trade Systems Modernization	CEAH staff are contributing to the Veterinary Services Trade Systems Modernization (VSTSM). This is a multi-year project with an end goal of building a trade-focused IT solution designed to meet VS program and stakeholders' needs to streamline the business processes related to import and export. CEAH staff will serve as subject matter experts for Veterinary Accreditation (NVAP) and interstate certificates of veterinary inspection (CVIs).
Other (true)	Oropouche and Dengue Virus in Cuba	CEAH provided subject matter expertise for a weekly interagency meeting the Centers for Disease Control facilitates on Oropouche and Dengue virus in Cuba.
Other (true)	Biosecurity Audit Evaluation	CEAH is providing analytical support for the evaluation of HPAI-related biosecurity audits. Findings will be shared with stakeholders to identify common remediations needed to improve biosecurity and to mitigate the risk of HPAI introduction.

## TOR 3: HARMONISATION OF STANDARDS

2. Proposal or development of any procedure that will facilitate harmonisation of international regulations applicable to the main focus area for which you were designated

Proposal title	Scope/Content	Applicable Area
HPAI Routing Tool	CEAH staff continued to update and maintain the HPAI Routing Tool, a web-based secure map application that enables the industry to develop safe routes around restricted zones in place	Health Management

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due to the ongoing HPAI outbreak in the United States.

3. In exercising your activities, have you identified any regulatory research needs\* relevant for WOAHP?

No

4. Did your Collaborating Centre maintain a network with other WOAHP Collaborating Centres (CC), Reference Laboratories (RL), or organisations designated for the same specialty, to coordinate scientific and technical studies?

Yes

Name of WOAHP CC/RL/other organisation(s)	Location	Region of networking Centre	Purpose
Collaboration with U.S. Geological Survey	USA	América	website, "Visualizing Avian Influenza" ( <a href="https://eesc.usgs.gov/aiv/indexus.html">https://eesc.usgs.gov/aiv/indexus.html</a> ), featuring several avian influenza collaborative projects, including preliminary risk interface models that estimate the risk of avian influenza spillover from wild to domestic bird populations. These models depend on data regarding wild waterfowl distribution, influenza prevalence by waterfowl species, farm locations, and the relative risk of each farm based on size, production method, and poultry species. The modeling output is particularly useful for poultry producers who might increase biosecurity or other preparedness activities to minimize risk of HPAI introductions.
Collaboration with Canadian Government	USA	América	CEAH staff are supporting a project with Canada, focused on preparedness for neglected, emerging, and re-emerging diseases.

## TOR 4 AND 5: NETWORKING AND COLLABORATION

5. Did your Collaborating Centre maintain a network with other WOAHP Collaborating Centres, Reference laboratories, or organisations in other disciplines, to coordinate scientific and technical studies?

Yes

Name of WOAHP CC/RL/other organisation(s)	Location	Region of networking Centre	Purpose
HPAI Vaccination Economic Impacts Project – WOAHP Collaborating Centre for the Economics of Animal Health- Americas Region	Virtual	Americas	Evaluate the economic impacts of different HPAI vaccination strategies while balancing the epidemiological impacts.

## TOR 6: EXPERT CONSULTANTS

6. Did your Collaborating Centre place expert consultants at the disposal of WOAHP?

Yes

Name of expert	Kind of consultancy	Subject
Laura Miles, Jim Lee	Subject matter expert in consultation with WOA World Animal Health Information System (WAHIS) staff	CEAH participated in a feedback session with Canadian representatives and WOA WAHIS staff and their contractors to discuss the new WAHIS reporting system and its implementation. CEAH also provided subject matter expertise on the system's functionality and proposed enhancements to improve the system. We reached out to WOA WAHIS support on a case-by-case basis when help was needed to ensure accurate reports were submitted through WAHIS.
Lori Gustafson	Subject matter expert	WOAH ad hoc groups (mollusc) member on species susceptibility and American Fisheries Society Blue Book Inspection Standards Advisory Panel member.

## TOR 7: SCIENTIFIC AND TECHNICAL TRAINING

7. Did your Collaborating Centre provide advice/services to requests from Members in your main focus area?

Yes

CEAH collaborates with partners from Canadian Food Inspection Agency to discuss HPAI surveillance and response activities to align best practices and strategies for emergency response to HPAI.

8. Did your Collaborating Centre provide scientific and technical training, within the remit of the mandate given by WOA, to personnel from WOA Members?

Yes

a) Technical visit : 0

b) Seminars : 1

c) Hands-on training courses: 0

d) Internships (>1 month) : 0

Type of technical training provided (a, b, c or d)	Content	Country of origin of the expert(s) provided with training	No. participants from the corresponding country
B	Drs Ann Carpenter, Catherine Lorenz, Kathleen O'Hara, Marta Remmenga, and Lynn Wachtman presented the Overview of African Swine Fever and Surveillance Initiatives as a VS Technical Training Webinar in March 2025.	USA	100

## TOR 8: SCIENTIFIC MEETINGS

9. Did your Collaborating Centre organise or participate in the organisation of scientific meetings related to your main focus area on behalf of WOA?

Yes

National/International	Title of event	Co-organiser	Date	Location	No. Participants
Internationally	GeoZone Final Workshop and Seminar	IZS Ve Geozone Team	2025-05-01	Virtual / Padua, Italy	60

## TOR 9: DATA AND INFORMATION DISSEMINATION

10. Publication and dissemination of any information within the remit of the mandate given by WOA that may be useful to Members of WOA

a) Articles published in peer-reviewed journals:

Kayleigh Chalkowski; Kim M. Pepin; Michael J. Lavelle; Ryan S. Miller; Justin W. Fischer; Vienna R. Brown; Michael P. Glow; Benjamin Smith; Seth M. Cook; Keely J. Kohen; Sarah Sherburne; Hatton Smith; Bruce R. Leland; Kurt C. VerCauteren; Nathan P. Snow *Operational lessons learned from simulating an elimination response to a transboundary animal disease in wild animals* *Preventive Veterinary Medicine*

Peter Kessinger; Angela M. James; Kelly Patyk; Sheryl Magzamen *A Habitat Suitability Analysis for Three Culicoides Species Implicated in Bluetongue Virus Transmission in the Southeastern United States* *Medical and Veterinary Entomology*

Heather L. Walker; Ryan S. Miller; Laura W. Pomeroy; Andreia G. Arruda *Characterizing risk factors for infection of Mycobacterium bovis between wild pigs and domestic cattle from an outbreak response — California, 1961–1967* *Preventive Veterinary Medicine*

Ryan H. Avery; Natalie J. Urie; Matthew A. Branan; Alyson M. Wiedenheft; Elliott Dennis; Katherine L. Marshall; Joan M. Burke; James E. Miller *A national survey of the gastrointestinal nematode control practices used by GOAT producers in the United States* *Veterinary Parasitology*

Stephanie C. Hempstead; Catherine A. Gensler; Charles A. Haley; Alyson M. Wiedenheft; James B. Robertson; Paula J. Fedorka-Cray; Megan E. Jacob *Prevalence and characterization of Salmonella species on U.S. swine sites as part of the NAHMS 2021 swine enteric study* *Journal of Food Protection*

Catherine A. Gensler; Stephanie C. Hempstead; Shivaramu Keelara; Paula J. Fedorka-Cray; Natalie J. Urie; Alyson M. Wiedenheft; Keira Stuart; Katherine L. Marshall; Megan E. Jacob *Antimicrobial Resistance Characteristics of Fecal Escherichia coli and Enterococcus Species in U.S. Goats: 2019 National Animal Health Monitoring System Enteric Study* *Foodborne Pathogens and Disease*

Matthew Gonnerman; Jennifer M. Mullinax; Andrew Fox; Kelly A. Patyk; Victoria L. Fields; Mary-Jane McCool; Mia K. Torchetti; Kristina Lantz; Jeffery D. Sullivan; Diann J. Prosser *Avian influenza spillover into poultry: environmental influences and biosecurity protections* *One Health*

Eddie M. Wampande; Robert Opio; Simon P. Angeki; Corrie Brown; Bonto Faburay; Rose O. Ademun; Kenneth Ssekatawa; David D. South; Charles Waiswa; Peter Waiswa *Spatiotemporal Distribution and Risk Factors of African Swine Fever Outbreak Cases in Uganda for the Period 2010–2023* *Viruses*

Jada M. Thompson; Kelly Patyk; Victoria Fields; Matthew Branan; Amy Delgado; Kylie Roesler *Biosecurity investment impacts on highly pathogenic avian influenza control in United States commercial turkey operations* *Preventive Veterinary Medicine*

Joshua A. Cullen; Nicholas M. Mastro; Jeffery D. Sullivan; Cory J. Highway; Kelly A. Patyk; Mary-Jane McCool; Mia Kim Torchetti; Kristina Lantz; Rebecca L. Poulson; Deborah L. Carter; Jamie C. Feddersen; Bradley S. Cohen; Diann J. Prosser *Spatiotemporal overlap of mallards with poultry farms is associated with greater risk of avian influenza wild bird spillover events* *Ecology and Evolution*

Matthew Gonnerman; Jennifer M. Mullinax; Andrew Fox; Kelly A. Patyk; Victoria L. Fields; Mary-Jane McCool; Mia K. Torchetti; Kristina Lantz; Jeffery D. Sullivan; Diann J. Prosser *Avian influenza spillover into United States poultry farms: environmental influences, regional dynamics, and biosecurity protections* *One Health*

Sasidhar Malladi; Peter J. Bonney; Sylvia Wanzala Martin; Amos Ssematimba; Kaitlyn M. St. Charles; Kathleen C. O'Hara; Marta D. Remmenga; Michelle Leonard; Holden C. Hutchinson; Cesar A. Corzo; Marie R. Culhane *ASF Shiny app: An interactive web application for exploring premovement active surveillance scenarios for early African Swine Fever detection* *SoftwareX*

Bonto Faburay; Kathleen O'Hara; Marta Remmenga; Theophilus Odoom; Sherry Johnson; William Tasiame; Matilda Ayim-Akonor; Benita Anderson; Kingsley Kwabena; Diane Holder; Wu Ping; Michelle Zajac; Vivian O'Donnell; Lizhe Xu; Robin Hollandp; *Evaluation of Aggregate Oral Fluid Sampling for Early Detection of African Swine Fever Virus Infection* *Viruses*

Logan L. Britton; Amy D. Hagerman; Sarah R. Mielke; Columb P. Rigney; Amy H. Delgado *Alternative Foot-and-Mouth Disease Eradication Strategies in a Large Feedlot Under Resource Limitations* *Journal of Agricultural and Resource Economics*

Stormy Scharzenberger; John M. Humphreys; Columb Rigney; Alexis Freifeld; Carolina Stenfeldt; Jonathan Arzt *Epidemiologic consequences of preclinical transmission of foot-and-mouth disease virus in cattle* *Frontiers in Veterinary Science*

Molly Kroeger; Christopher James Stott; Huigang Shen; Ganwu Li; Rodger Main; Eric Bush; Margaret Parker; Dachrit Nilubo; Jean Paul Cano; Jack Creel; Pablo Piñeyro *Epidemiological and molecular retrospective analysis of porcine circovirus 3 in the US grower-finisher herd* *Infection, Genetics and Evolution*

Ryan H. Avery; Natalie J. Urie; Matthew A. Branan; Alyson M. Wiedenheft; Elliott Dennis; Katherine L. Marshall; Joan M. Burke; James E. Miller *A national survey of the gastrointestinal nematode control practices used by goat producers in the United States* *Veterinary Parasitology*

Catherine A. Gensler; Mabel K. Aworh; Nigatu Atlaw; Stephanie C. Hempstead; Charles A. Haley; Alyson M. Wiedenheft; Katherine L. Marshall; Paula J. Fedorka-Cray; Megan E. Jacob *Prevalence and Characterization of Campylobacter Species Isolated from U.S. Swine: 2021 NAHMS Enteric Study* *Journal of Food Protection*

Himel Talukder; Ryan S. Miller; Raoul K. Boughton; Kurt C. Vercauteren; George Wittemyer; Kim M. Pepin; Anni Yang *Estimating Environmental Transmission Risk From Host Movement Data* *Ecology and Evolution*

Marian Talbert; Abigail Feuka; Ryan S Miller; Kim Pepin; Lara Zipperer *Determinants of variation in epidemiological parameters for African Swine Fever virus (Available online. Not in journal form yet) Preventive Veterinary Medicine*

Kayleigh Chalkowski; Ryan S. Miller; Jeffrey C. Chandler; Alessandra Campos; Bailey Arruda; Amy L. Baker; Tavis K. Anderson; Jason Klemm; Vienna R. Brown; Kurt C. VerCauteren; Nathan P. Snow; Kim M. Pepin *Elevated Exposure to Influenza A Viruses in Wild Pigs (Sus scrofa), Texas, USA (Available online. Not in journal form yet.) The Journal of Wildlife Diseases*

Brandon J. Simony; Ryan S. Miller; Lindsay M. Beck-Johnson; Samuel M. Smith; Colleen T. Webb *Stochastic modeling of bovine tuberculosis dynamics in white-tailed deer Research in Veterinary Science*

Sophie C. McKee; Peter Koppes; Ryan S. Miller; Molly Selleck; Stephanie A. Shwiff *Wild pigs, wild costs: the economic consequences of wild pig invasions in the United States Pest Management Science*

Grete Wilson-Henjum; J. Jeffrey Root; Alex Worgo; Jeffrey Chandler; Robin Dyer; Jeff Flores; Jesse Morris; Ian Plummer; John Paul Seman; Kyle Van Why; Caleb Wellman; H. Bryant White; John Wilt; Diego Diel; Jon Heale; David L. Bergman; Josh Hewitt *Community-Scale Surveillance of SARS-CoV-2 and Influenza A Viruses in Wild Mammals, United States, 2022–2023 Emerging Infectious Diseases*

Samuel M. Smith; Clayton Hallman; Tom Lindström; Stefan Sellman; Ryan S. Miller; Katie Portacci; Colleen T. Webb; Lindsay M. Beck-Johnson *United States cattle market location and annual market sales estimate data Data in Brief*

Xiaolong Li; Yasmin Tavares; Céline M. Carneiro; Caroline Phillips; Kuttichantran Subramaniam; John Lednicky; Raoul K. Boughton; Kim M. Pepin; Ryan S. Miller; Kurt C. VerCauteren; Samantha M. Wisely *Whole genome characterization of Torque teno sus virus 1 (TTSuV1) in wild and domestic pigs: insights into genetic classification, host differentiation, and intra-host variation Frontiers in Microbiology*

Heather L. Walker; Ryan S. Miller; Laura W. Pomeroy; Andreia G. Arruda *Characterizing risk factors for infection of Mycobacterium bovis between wild pigs and domestic cattle from an outbreak response—California, 1961–1967 Preventive Veterinary Medicine*

Charles R. Taylor; Kim M. Pepin; Ryan S. Miller; John R. Foster; James C. Beasley *Comparison of removal and spatial mark-resight models for estimating wild pig density The Journal of Wildlife Management*

Kayleigh Chalkowski; Kim M. Pepin; Michael J. Lavelle; Ryan S. Miller; Justin W. Fischer; Vienna R. Brown; Michael P. Glow; Benjamin A. Smith; Seth M. Cook; Keely J. Kohen; Sarah Sherburne; Hatton Smith; Bruce R. Leland; Kurt C. VerCauteren; Nathan P. Snow *Operational lessons learned from simulating an elimination response to a transboundary animal disease in wild animals Preventive Veterinary Medicine*

b) International conferences:

1

Presentation, "What can global surveillance data tell us about the extinction of Foot-and-Mouth Disease Virus Serotype C" at the South American Commission for the fight Against Foot-and-Mouth Disease (COSALFA) conference in Santa Cruz de la Sierra, Bolivia – April 3–4, 2025.

c) National conferences:

2

Preliminary results from the NAHMS Sheep 2024 study were presented virtually in advance of the American Sheep Industry Convention – December 2025

NAHMS Backyard Animal Keeping 2024 at the American Association of Avian Pathologists virtual conference – July 29–August 15, 2025 (poster presented in person)

d) Other (Provide website address or link to appropriate information):

3

[www.aphis.usda.gov/sites/default/files/small-enter-us-swine-ops-nahms-swine2021.pdf](http://www.aphis.usda.gov/sites/default/files/small-enter-us-swine-ops-nahms-swine2021.pdf)

[www.aphis.usda.gov/sites/default/files/large-enter-us-swine-ops-nahms-swine2021.pdf](http://www.aphis.usda.gov/sites/default/files/large-enter-us-swine-ops-nahms-swine2021.pdf)

[www.aphis.usda.gov/sites/default/files/bison-2022-study.pdf](http://www.aphis.usda.gov/sites/default/files/bison-2022-study.pdf)

11. What have you done in the past year to advance your area of focus, e.g. updated technology?

No further comment to add.

12. Additional comments regarding your report:  
*No further comment to add.*