

# **Management and Disposal of Waste: A State Cooperative Perspective**

**2018 EPA International Decontamination  
Research and Development Conference**

**May 8-10, 2018**

**Research Triangle Park, North Carolina**

**Gary A. Flory**

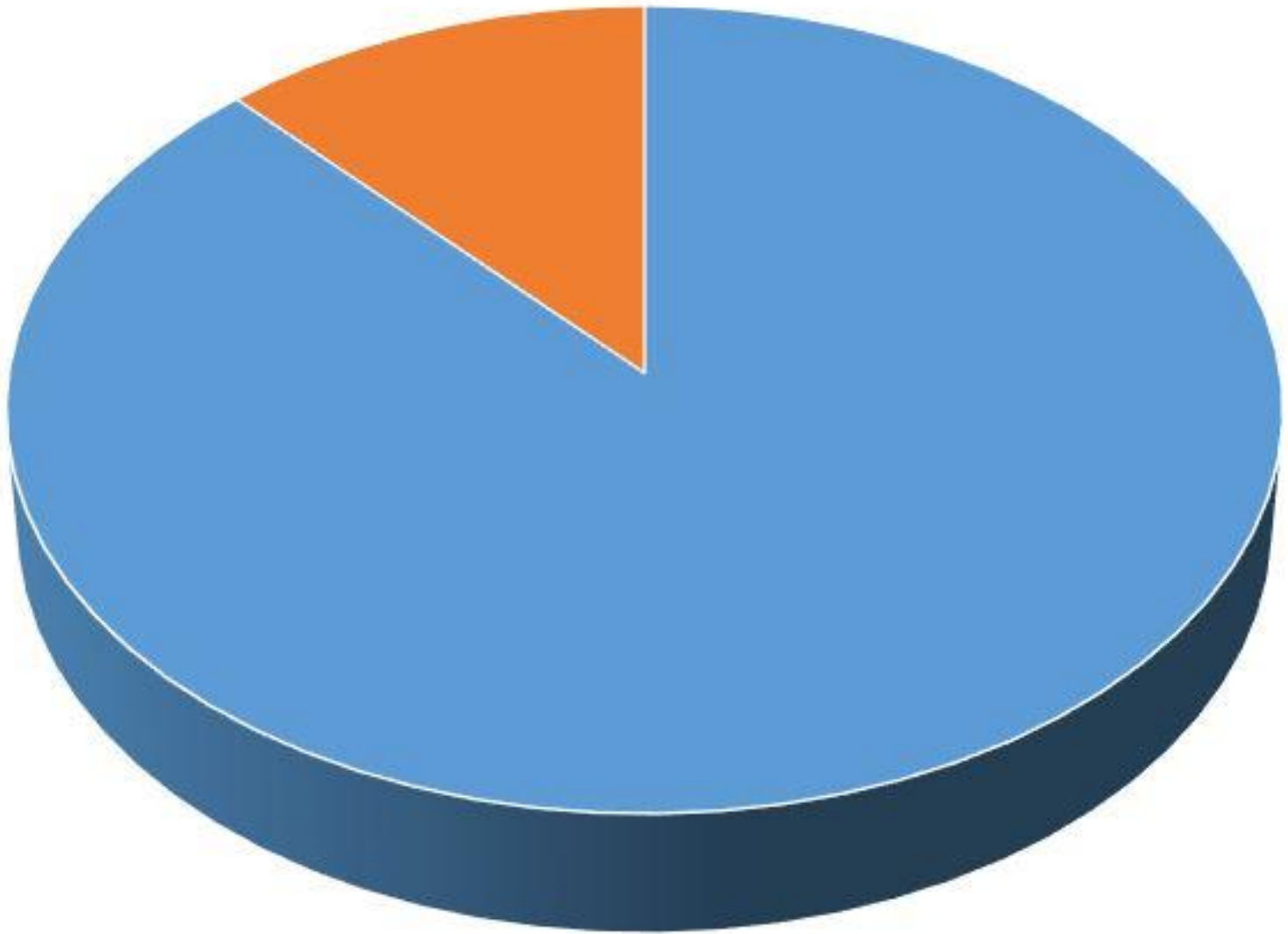
# Virginia's Experience with AI

- ▶ 1984 – 69 flocks, H5N2
- ▶ 1999 – 1 flock, H5N2
- ▶ 2002 – 197 flocks, H7N2
- ▶ 2007 – 1 flock, H5N2
- ▶ 2007 – 1 flock, H5N1

Avian influenza  
**STRIKES**  
Virginia poultry  
farms



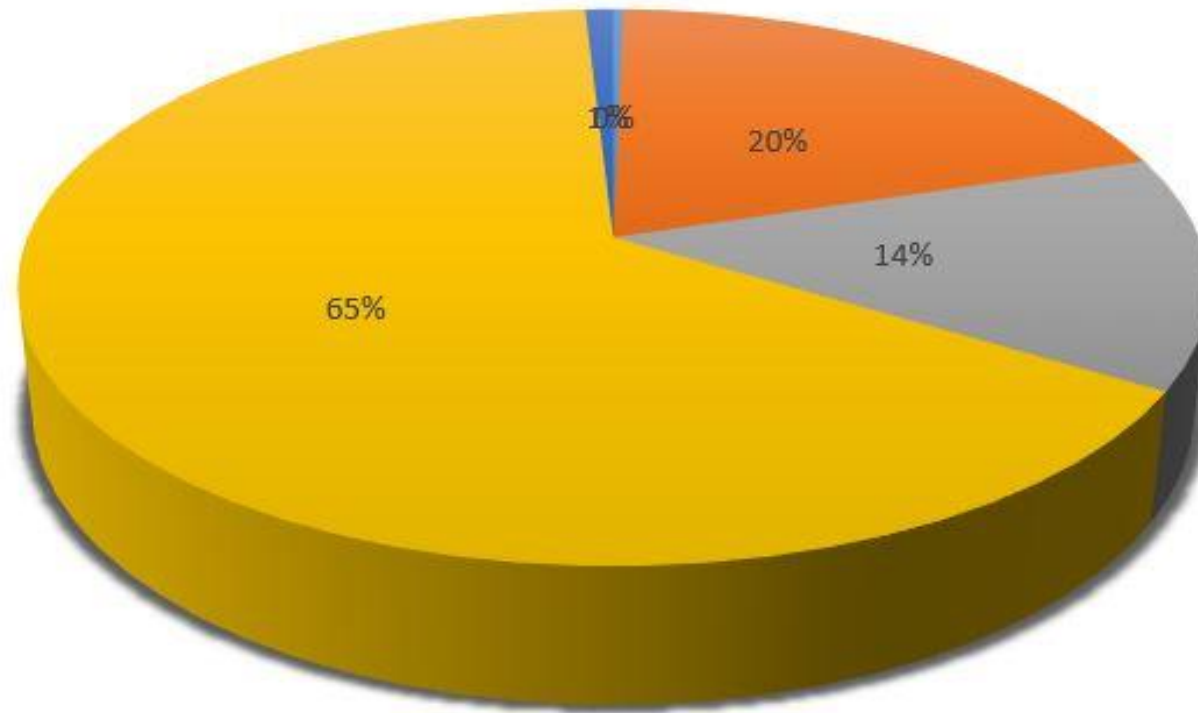
## Carcass Disposal Methods in 1984



■ On-Farm Burial ■ Landfilling

# Methods of Disposal Used in 2002

Percentage of Birds by Method



■ On-site Burial

■ Controlled slaughter

■ Incineration

■ Landfilling

■ Composting (Ag-Bag & In-house)

# The Delmarva Experience

- ▶ 2004 avian influenza outbreak
- ▶ In-house composting
- ▶ 5-pound broilers
- ▶ Confined to 3 poultry farms

# Research in Virginia 2004

Successful in-house composting of large turkeys



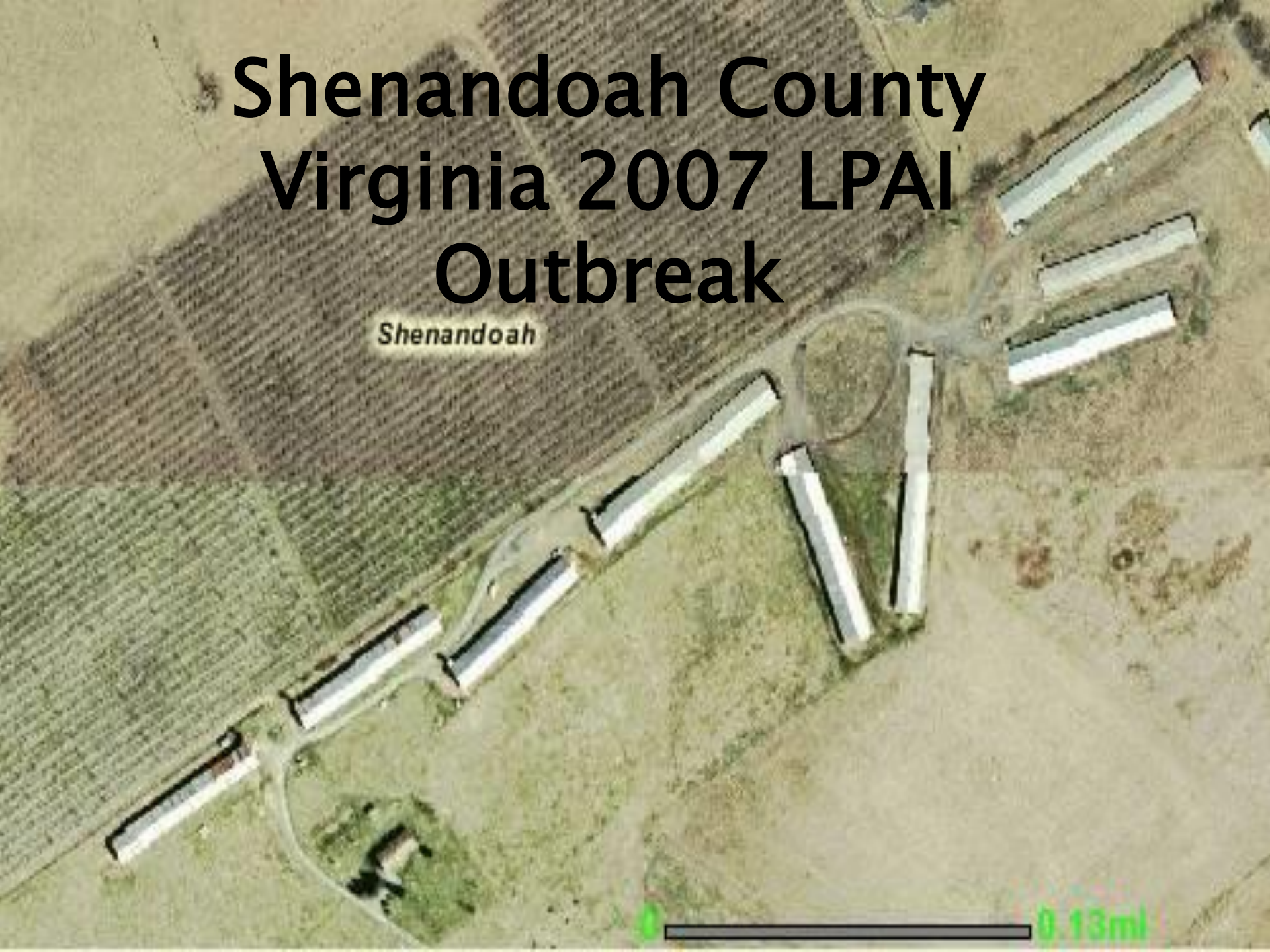
# First Successful Use of Composting for Turkeys During a Disease Outbreak

Sugar Grove, West Virginia 2007



# Shenandoah County Virginia 2007 LPAI Outbreak

*Shenandoah*



0.13mi





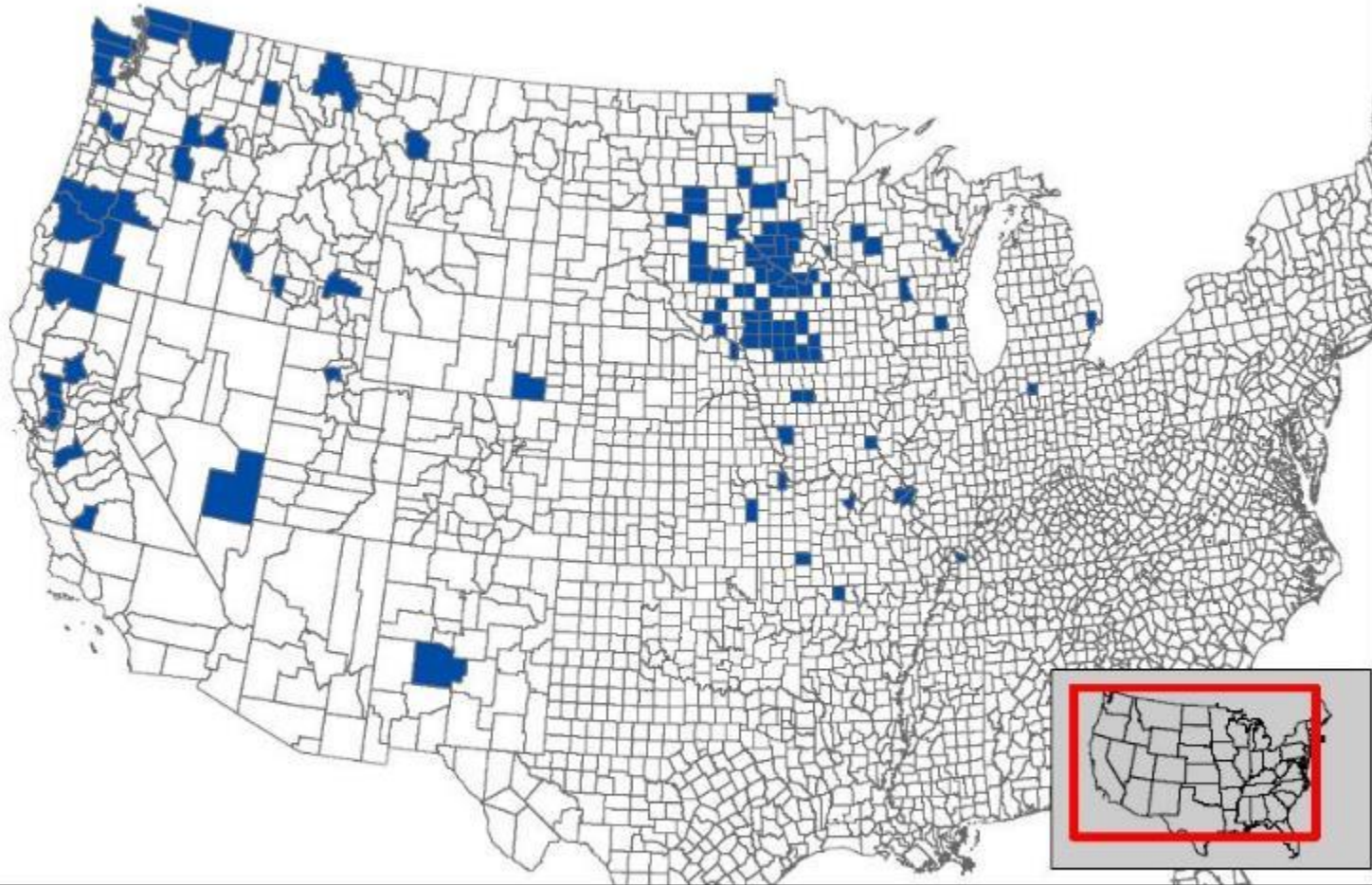




# HPAI 2015



Figure 1. All HPAI Detections as of 8/27/2015  
(as reported on [www.aphis.usda.gov](http://www.aphis.usda.gov)) \* one or more detections may have occurred in county



USDA, APHIS, VS  
Center for Epidemiology and Animal Health  
2160 Centre Ave.  
Fort Collins, CO 80526

Data Source:  
Provided by Requestor



0 130 260 390 520 Miles

Date Created: August 27, 2015

Time Created: 12:40:26 PM MST

Coordinate System: North America Albers Equal Area Conic

These data, and all the information contained therein, have been collected by the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS), or by its cooperation on APHIS' behalf, for regulated government customers only and is the sole property of APHIS. Data may be disseminated on a read-to-view basis only and must be used for their intended government purposes. All information contained within these data are subject to limited Federal safeguards and shall only be shared and/or used consistent with the Trade Secrets Act (18 U.S.C. 1905), the Privacy Act of 1974, as amended (5 U.S.C. 552a), the Freedom of Information Act (5 U.S.C. 552), the confidentiality provisions of the Food Security Act of 1985 (7 U.S.C. 2202), Section 1619a of the Food, Conservation, and Energy Act of 2008 (7 U.S.C. 6791), and other applicable Federal laws and implementing regulations, as well as with the confidentiality or non-disclosure provisions of any other agreement entered into between APHIS and a recipient.



# Disposal Methods

**85% Composting**

**8% Burial**


**7% Incineration or  
Landfilling**

# Carcass Disposal Oversight

The background image shows two individuals in full white protective suits, including hoods and gloves, working on a large, dark brown pile of compost or mulch. One person is bent over, using a shovel, while the other stands nearby. The scene is outdoors under a bright blue sky with scattered white clouds. The overall context is related to agricultural waste management and biosecurity.

- ▶ Managed by USDA
- ▶ Subject Matter Experts
- ▶ Composting Technical Committee
- ▶ HPAI Composting SOP

# Standard Operating Procedures



## Guidelines for In-House Composting Poultry Mortality as a Rapid Response to Avian Influenza

Version August 13, 2015

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- Summary of Method
- Advantages of In-House Composting
- Key Elements for Successful Composting
- Labor, Equipment and Supplies
- Protocols
  - Prior to Windrow Construction
  - Windrow Base Construction
  - Constructing the Core
  - Capping the Windrow
- Temperature Monitoring
- Temperature Log
- Troubleshooting
- List of References
- Contact Information

### SUMMARY OF THE METHOD

Composting is a biological heating process that results in the natural degradation of organic resources (such as poultry carcasses) by the microorganisms. Composting has been successfully used throughout the United States for nearly 2 decades to control outbreaks of avian influenza. Composting can be effective with most bird types and poultry house designs.

Microbial activity within a well-constructed compost pile can generate and maintain temperatures sufficient to inactivate the avian influenza virus. The effectiveness of this virus inactivation process can be assessed by evaluating compost temperatures, the shape of the time and temperature curve, visual observation of carcass decomposition and the homogeneity of the compost mix.

### ADVANTAGES OF IN-HOUSE COMPOSTING

- Contains the disease and limits off-farm disease transmission
- Limits the risks of groundwater and air pollution
- Inactivates pathogens in carcasses and litter
- Limits public concerns over disease exposure
- Composting equipment and supplies are readily available
- Minimizes delays, environmental impacts and process disruptions due to severe weather (precipitation, temperature fluctuation, etc.)

### KEY ELEMENTS FOR SUCCESSFUL COMPOSTING

- Windrows (6 to 8 feet high and 12 to 15 feet wide) are constructed on an adequate and uniform base layer (10 to 15 inches thick) of sufficiently porous carbon material;
- The base layer and windrow are not compacted with equipment;
- Ensure good carcass to carbon contact, by creating a core with a minimum 1:1 mix by volume of carcasses, carbon and other infected material (manure, egg shells, feed, etc.) **THERE IS NO NEED TO GRIND/CRUSH/MASCERATE THE CARCASSES DURING CONSTRUCTION!**
- Windrows should be constructed to ensure adequate distribution of moisture throughout; and
- The windrows are capped with carbon material (8 to 12 inches thick) to ensure that no carcasses are exposed and to minimize odor.

**"Research indicates that Avian Influenza Virus (AIV) can be inactivated in 10 minutes at 140°F (60°C) or 90 minutes at 133°F (56°C) (Lu et al., 2003)."**



## FY2016 HPAI Response Mortality Composting Protocol for Avian Influenza Infected Flocks

February 5, 2016

Please note: These procedures may be revised as the situation develops.

### EXECUTIVE SUMMARY OF THE METHOD

Composting is a biological heating process that results in the natural degradation of organic resources (such as poultry carcasses) by microorganisms. Composting has been successfully used throughout the United States for nearly two decades to control outbreaks of low pathogenicity avian influenza (LPAI) and highly pathogenic avian influenza (HPAI). Composting can be effective with most bird types and poultry house designs.

Microbial activity within a well-constructed compost pile can generate and maintain temperatures sufficient to inactivate the avian influenza virus. The effectiveness of this virus inactivation process can be assessed by evaluating compost temperatures and the shape of the time and temperature curve, visual observation of carcass decomposition, and the homogeneity of the compost mix.

Successful mortality composting requires the following:

1. A qualified composting expert to guide windrow construction.
2. Trained equipment operators.
3. Sufficient carbon, water, and space.

**If any of these components is lacking, composting is NOT recommended.**

Prepared by members of the USDA Composting Technical Committee: Lon D. Miller, Gary A. Flory, Robert W. Peierl, Eric S. Bendfeldt, Mark E. Hutchinson, Mark A. King, B.W. Sankins, George W. Malone, Joshua B. Payne, Jerry Floren, Edward Malek, Mary Schwarz, and Jean Bonhotal



Completed windrow (photo by Gary Flory)

1

**So**

**what?**





# Method and Model

# Adapting Protocol for International Use

- ▶ 68 countries\*
- ▶ 6,946 outbreaks\*
- ▶ 12 subtypes\*

\*2013-18



# Livestock SOP

*Please note: These procedures may be revised as circumstances change.*

## EXECUTIVE SUMMARY OF THE METHOD

Composting is a biological heating process that results in the natural degradation of organic resources (such as animal carcasses) by microorganisms. Composting mortalities, including sheep, goats, deer, pigs, cattle and horses, has been successfully used throughout the United States for nearly two decades to control animal disease outbreaks and to respond to natural disasters.

Microbial activity within a well-constructed compost pile can generate and maintain temperatures sufficient to inactivate most livestock pathogens. The effectiveness of this pathogen inactivation process can be assessed by evaluating compost temperatures, i.e., the shape of the time and temperature curve, visually observing carcass decomposition, and evaluating the homogeneity of the compost mix.

**Successful mortality composting requires the following:**

1. A qualified composting expert to guide windrow construction.
2. Trained equipment operators.
3. Sufficient carbon, water, and space.

**If any of these components are lacking, composting is NOT recommended.**

*Prepared by members of the USDA Composting Technical Committee: Lori P. Miller, Amy Buckendahl, Gary A. Flory, Robert W. Peer, Mark L. Hutchinson, Mark A. King, Josh B. Payne, Edward Malek, Jean Bonhotat, Ken Powell, Dean Ross and Thao Le.*



*Compost Pile Monitoring (photo by Gary Flory)*

# Hurricane Matthew 2016



## *North Carolina Animal Agriculture Impacts NCDA&CS Response and Recovery*

Mike Mayes / Joe  
Hudyncia  
N.C. Department of  
Agriculture &  
Consumer Services

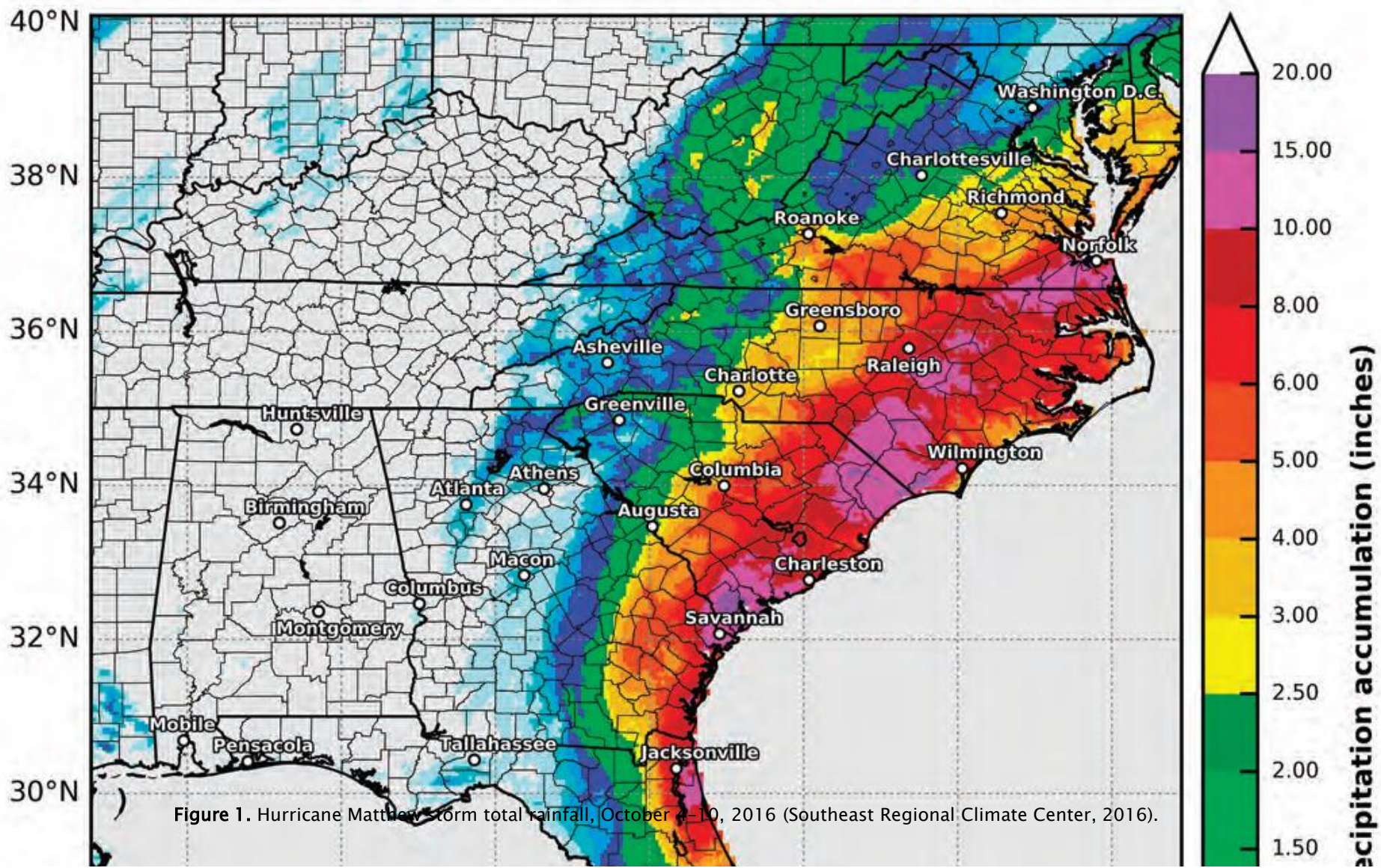


Figure 1. Hurricane Matthew storm total rainfall, October 4-10, 2016 (Southeast Regional Climate Center, 2016).

# Agriculture Impacts

- 1,809,124 commercial poultry
- 49 farms with >180 total poultry houses
- 2,800 commercial nursery swine (1 farm)
- Major field crops ~\$400 million
- Landscape and nursery crops >\$20 million

# Collaboration with FEMA to procure carbon material



# Aerial View of On-Farm Compost Windrows!







By –  
Associated  
Press

0

comments

Share ...

# Federal government to pay for all debris removal from Virgin Islands in wake of Hurricane Maria



# Method and Model



**6<sup>th</sup> International Symposium on Animal Mortality Management**

June 3-7, 2016, Amarillo, Texas

[animalmortmgmt.org](http://animalmortmgmt.org)



# QUESTIONS?

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