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Veterinary Services

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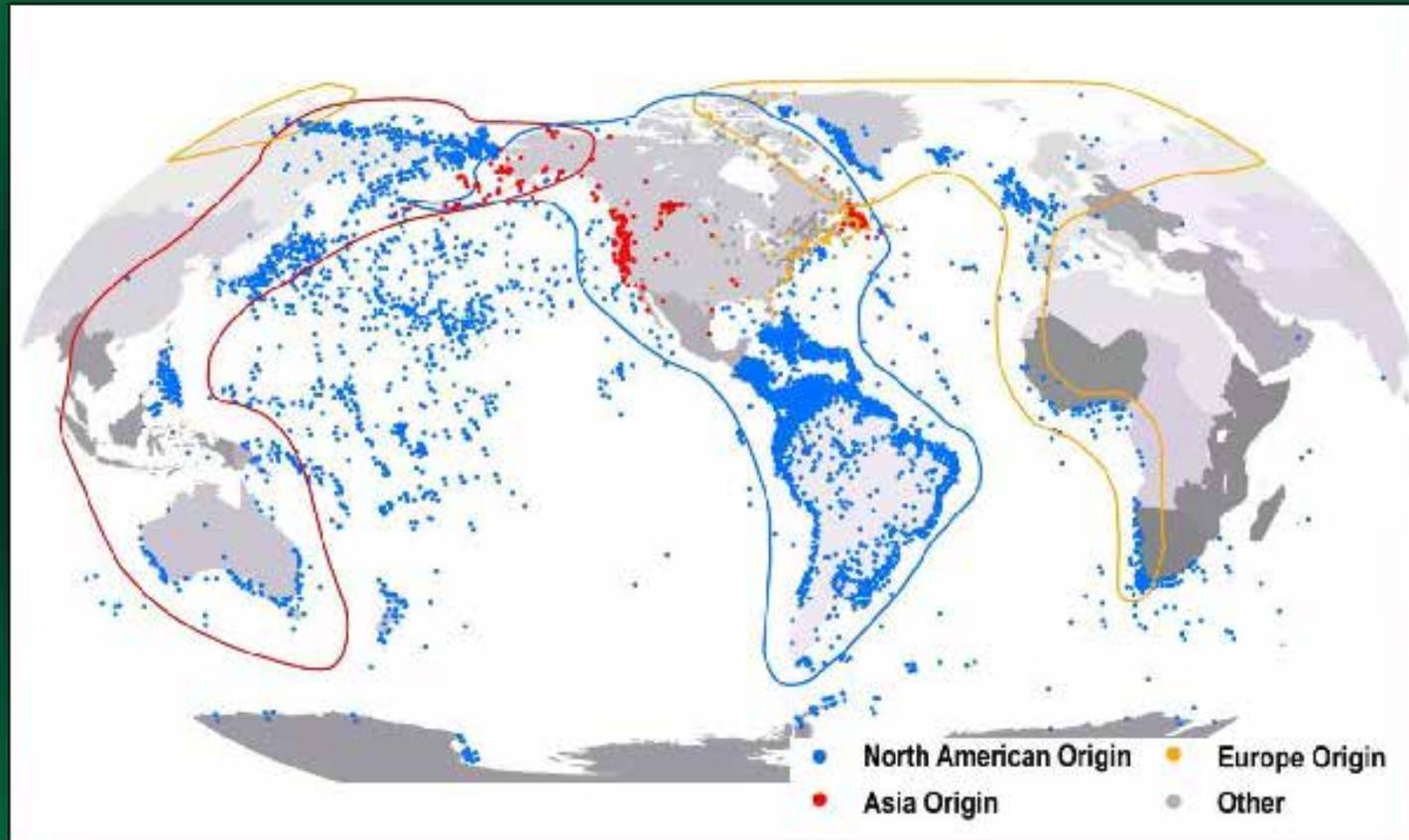
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HPAI in Review

- December 2014 – Washington State backyard (BC Canada)
- HPAI virus found in 21 states between Dec 2014 – June 2015
- More than 50 million birds have been destroyed
 - ~10% of all US layers
 - ~5% of all US turkeys
 - ~3% of all US broilers
- 211 commercial flocks, 21 backyard flocks affected
 - 160 Turkey + 49 Layer + 2 other
- \$200 million in indemnity payments
- ~\$1 billion in total control costs
- **LARGEST ANIMAL HEALTH EVENT IN US HISTORY !**

Wild Bird Migration

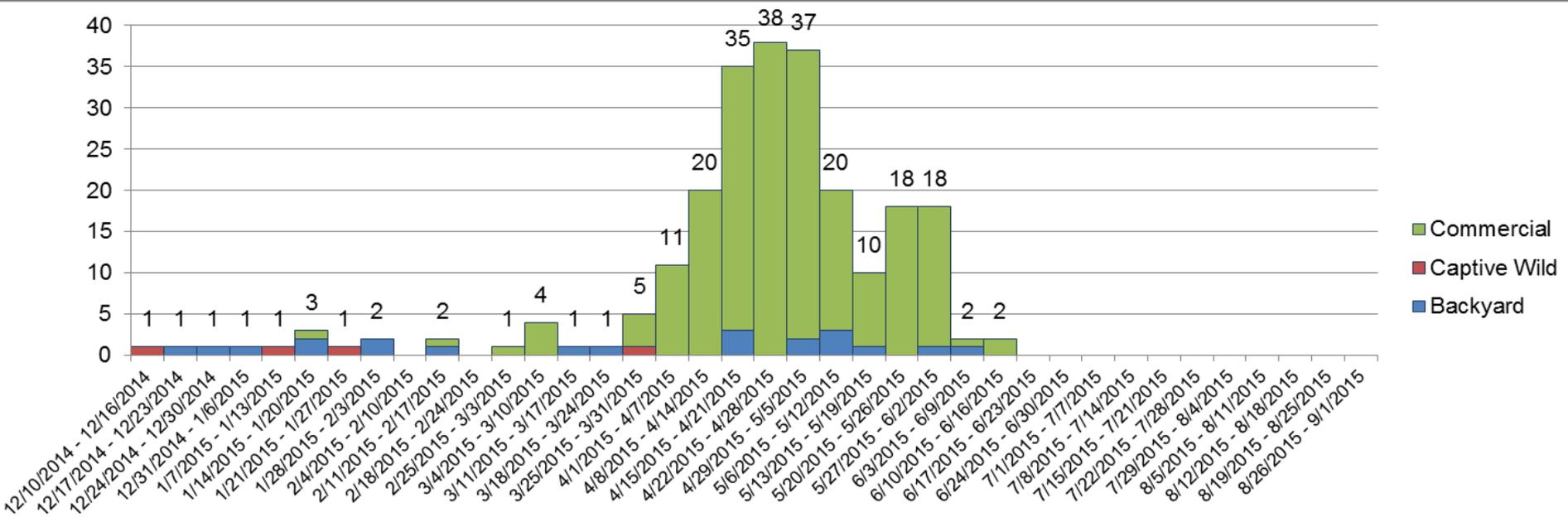


Distribution of bird bands for birds banded in North America and recovered in other continents (blue) and for birds banded in Asia (red) and Europe (orange) and recovered in North America between 1913 to present. Crude representations of the Americas flyway (blue polygon) and the East Asian/Australia flyway (red polygon) and East Atlantic (orange polygon) are included ([USGS, 2013](#)).

Wild Bird Migration

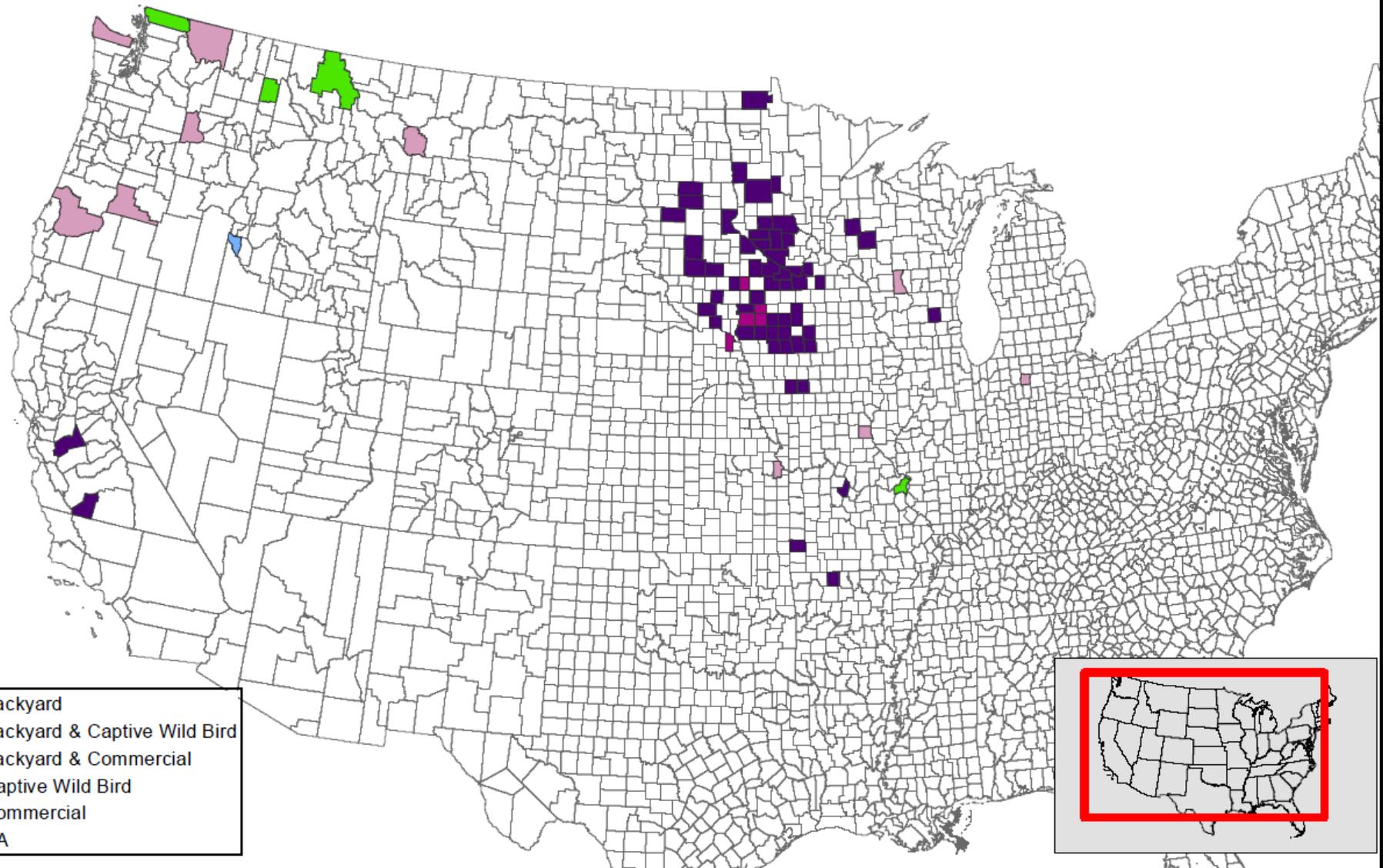


HPAI in Review



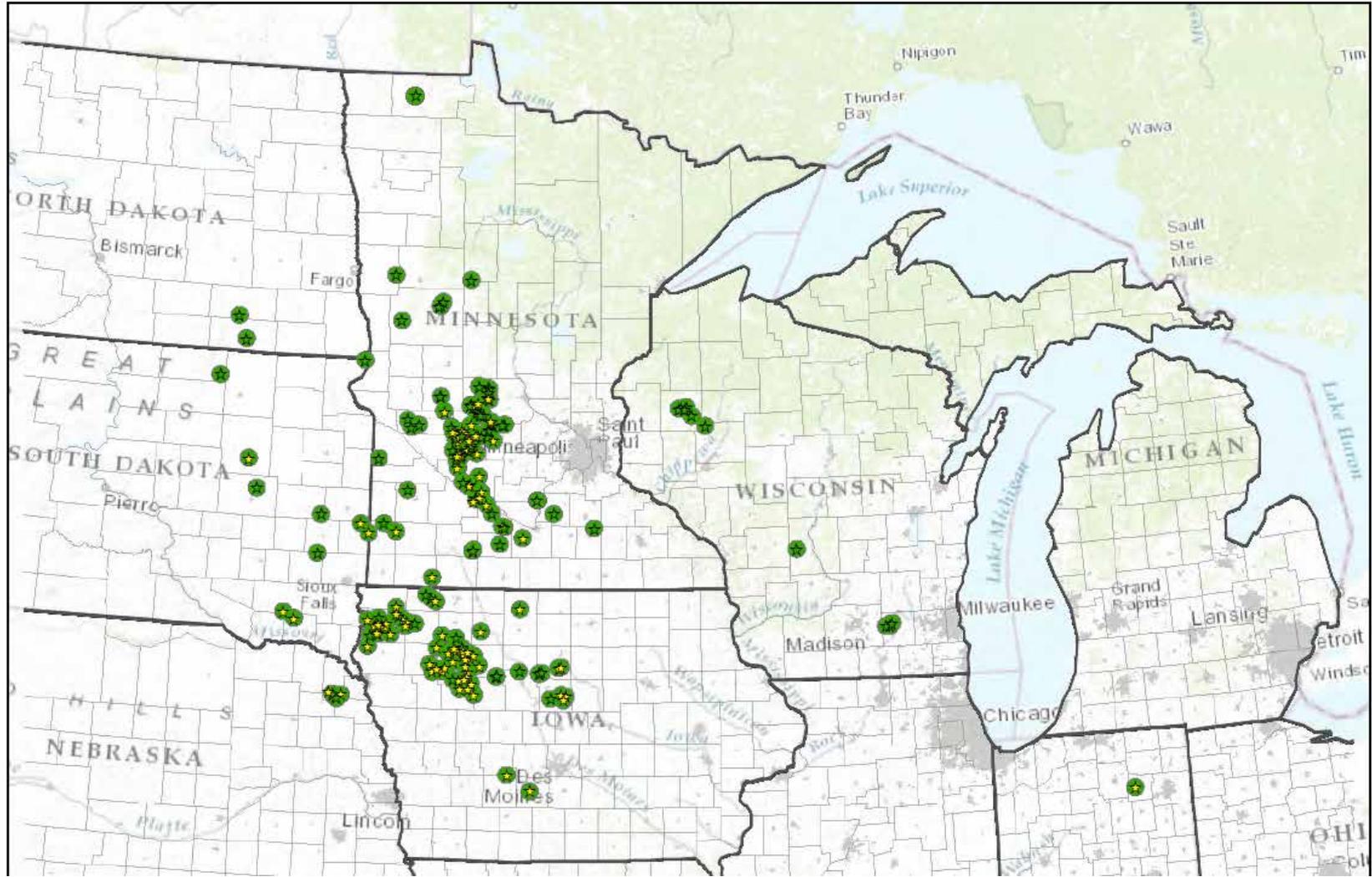
HPAI in Review

Figure 4. All HPAI Detections in Poultry and Captive Wild Birds, as of 8/27/2015 (as reported on www.aphis.usda.gov) *one or more detections may have occurred in county

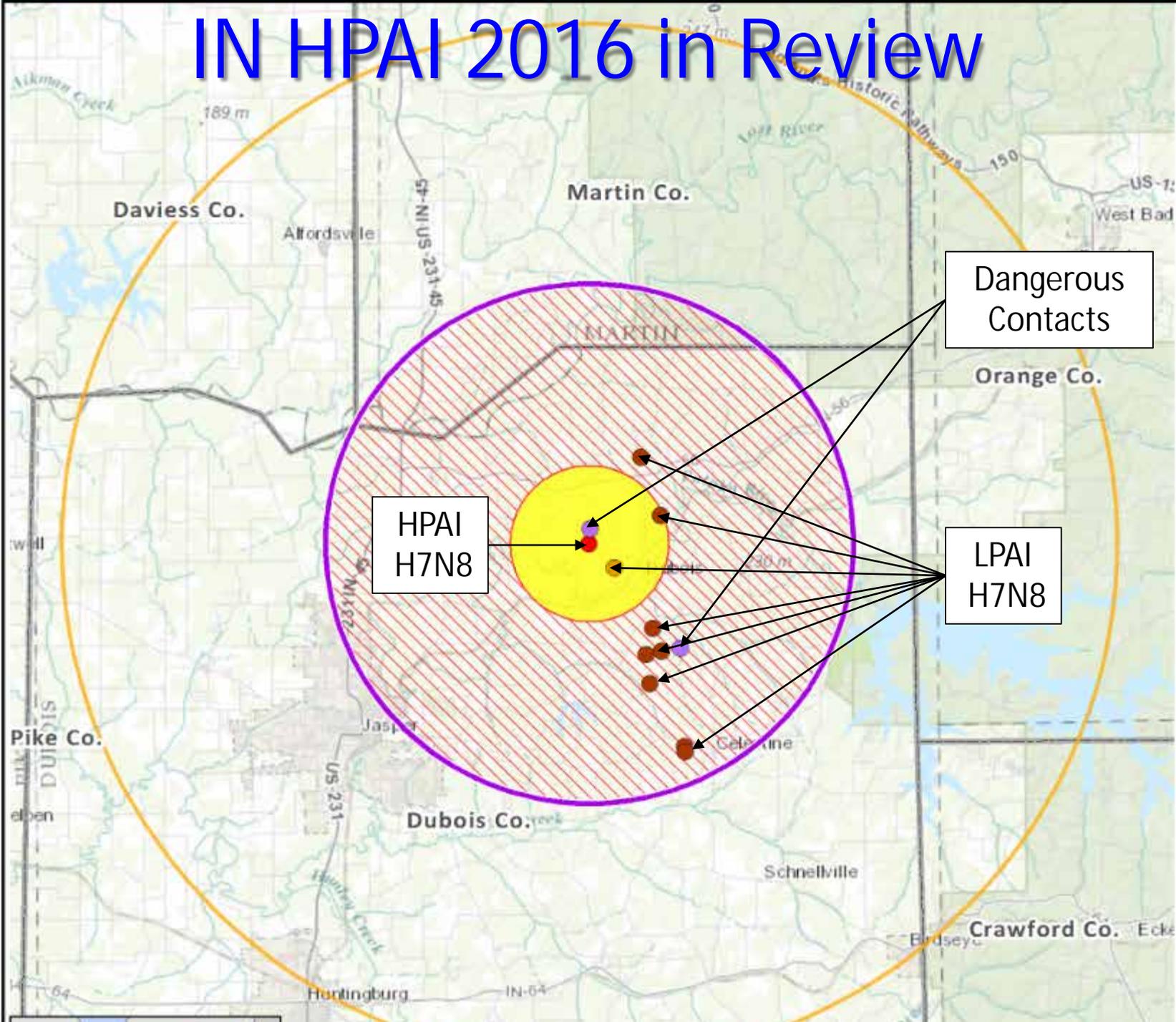


HPAI in Review

HPAI Control and Containment Status Central US as of 8/27/2015



IN HPAI 2016 in Review



ü Our Food Supply is Safe

- Food is safe because the United States has the strongest AI surveillance system in the world.
- We actively look for the disease, educate the public and producers on the most appropriate practices to ensure their health and safety, as well as provide compensation to affected producers to encourage disease reporting.
- Human infection with avian influenza viruses has not occurred from eating properly cooked poultry or poultry products.

ü The Risk to Humans is Low

- No human infections with these viruses have been detected, and the CDC considers the to people from these HPAI H5 infections in wild birds, backyard flocks, and commercial poultry to be low.
- Current EA HPAI H5 not to be confused w/ and distinctly different from the Asian H5N1

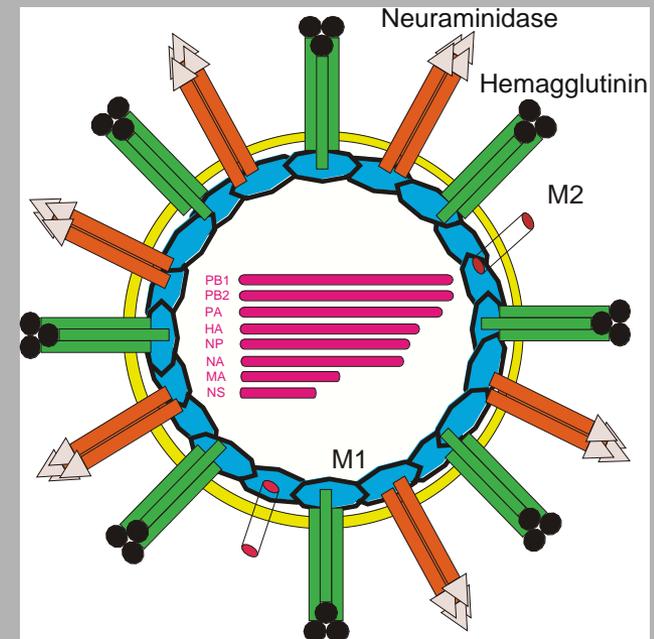
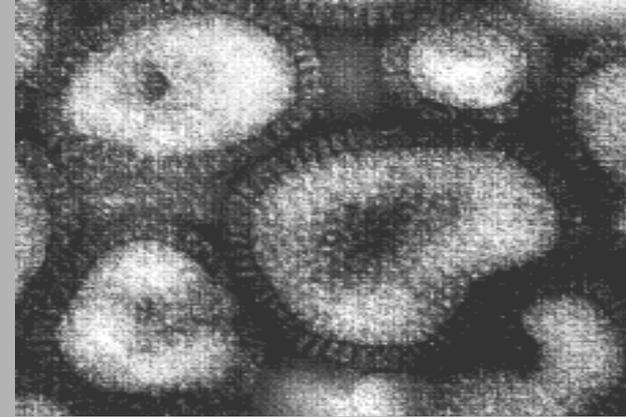
ü USDA Continues to do what it Can to Support States and Producers

- We are coordinating closely with State officials and other Federal departments on rigorous surveillance, reporting, and control efforts.
- At the same time, USDA will continue to work with Congress to ensure that we are able to provide a much-needed safety net to the poultry producers who experiencing economic hardships as a result of losses due to the disease.

Avian Influenza Virus

Orthomyxovirus

- RNA
- Major surface proteins
 - Hemagglutinin (H1-H16)
 - Neuraminidase (N1-N9)
 - 144 combinations
- Virulence is variable
 - Low Path - LPAI
 - High Path - HPAI

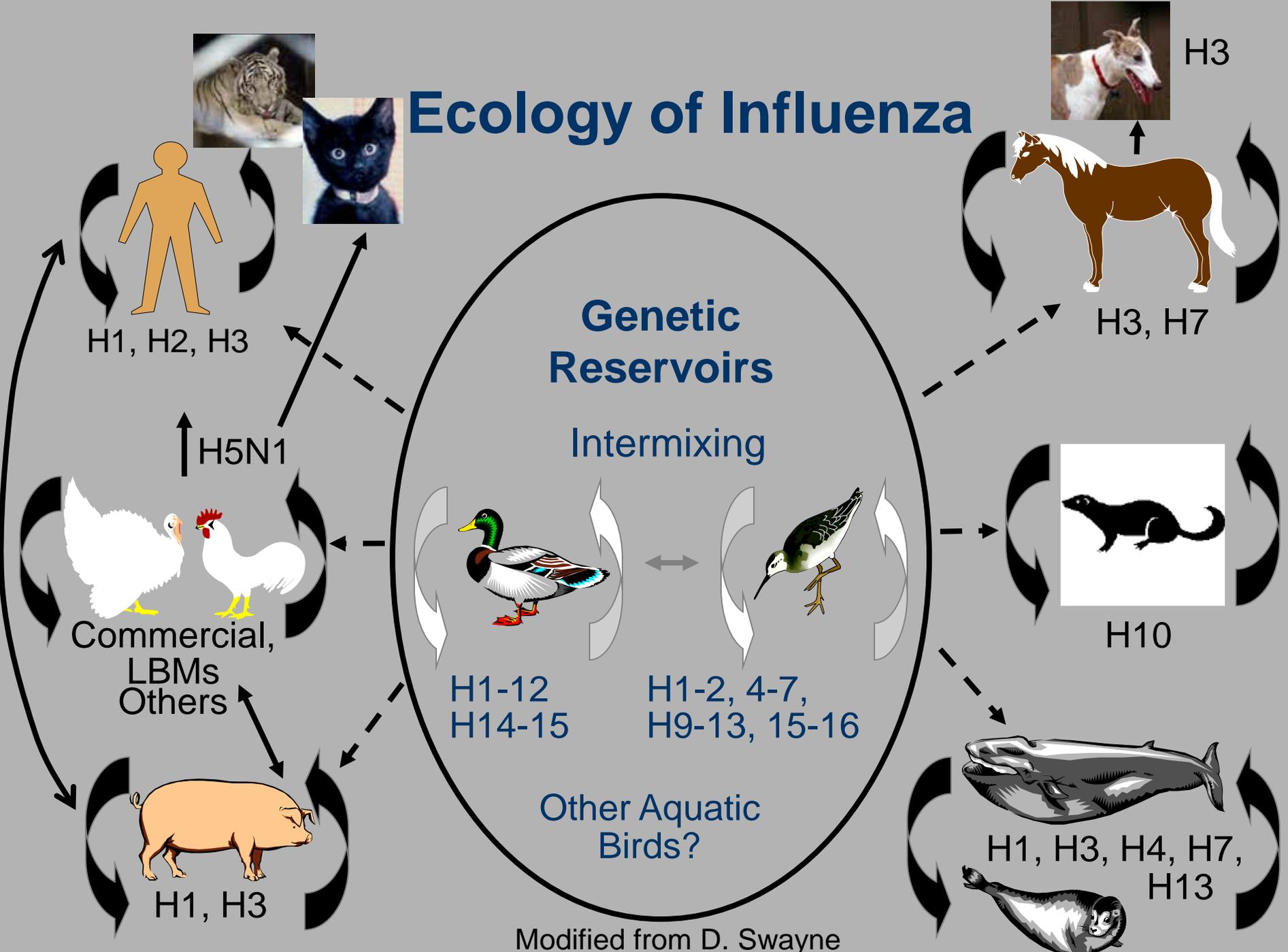


Natural Reservoirs of Influenza A Viruses

- Wild aquatic birds
- Majority are represented by two Orders
 - Anseriformes
 - ducks, geese and swans
 - Charadriiformes
 - gulls, terns and shorebirds
- No clinical disease
 - Except:
 - H5N1 infection in wild birds in Asia



Ecology of Influenza

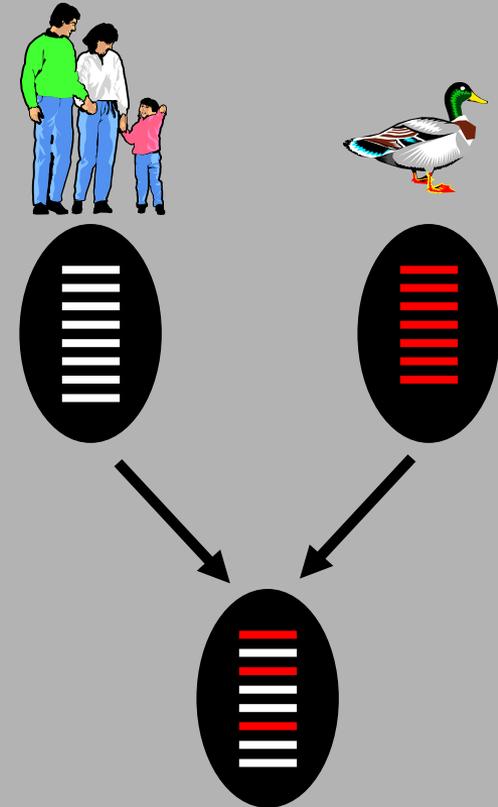


Modified from D. Swayne

Avian Influenza Viruses Change Frequently

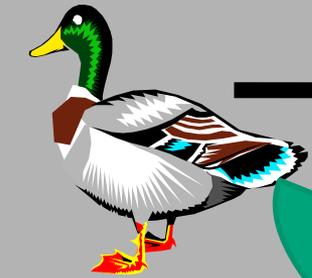
- **Antigenic Drift:**
- **Antigenic Shift:**
- **Recombination:**

- **Emergence of a new subtypes**
 - Genetic reassortment (human and animal viruses)
 - Direct animal (avian) to human transmission



254 possible combinations

Emergence of High Path AI



AIV in the natural reservoir is genetically stable and Low Path



Backyard Poultry

Rapid evolution after transfer to new hosts



Live-bird markets



HPAI



Commercial Poultry

Adapted from R. G. Webster

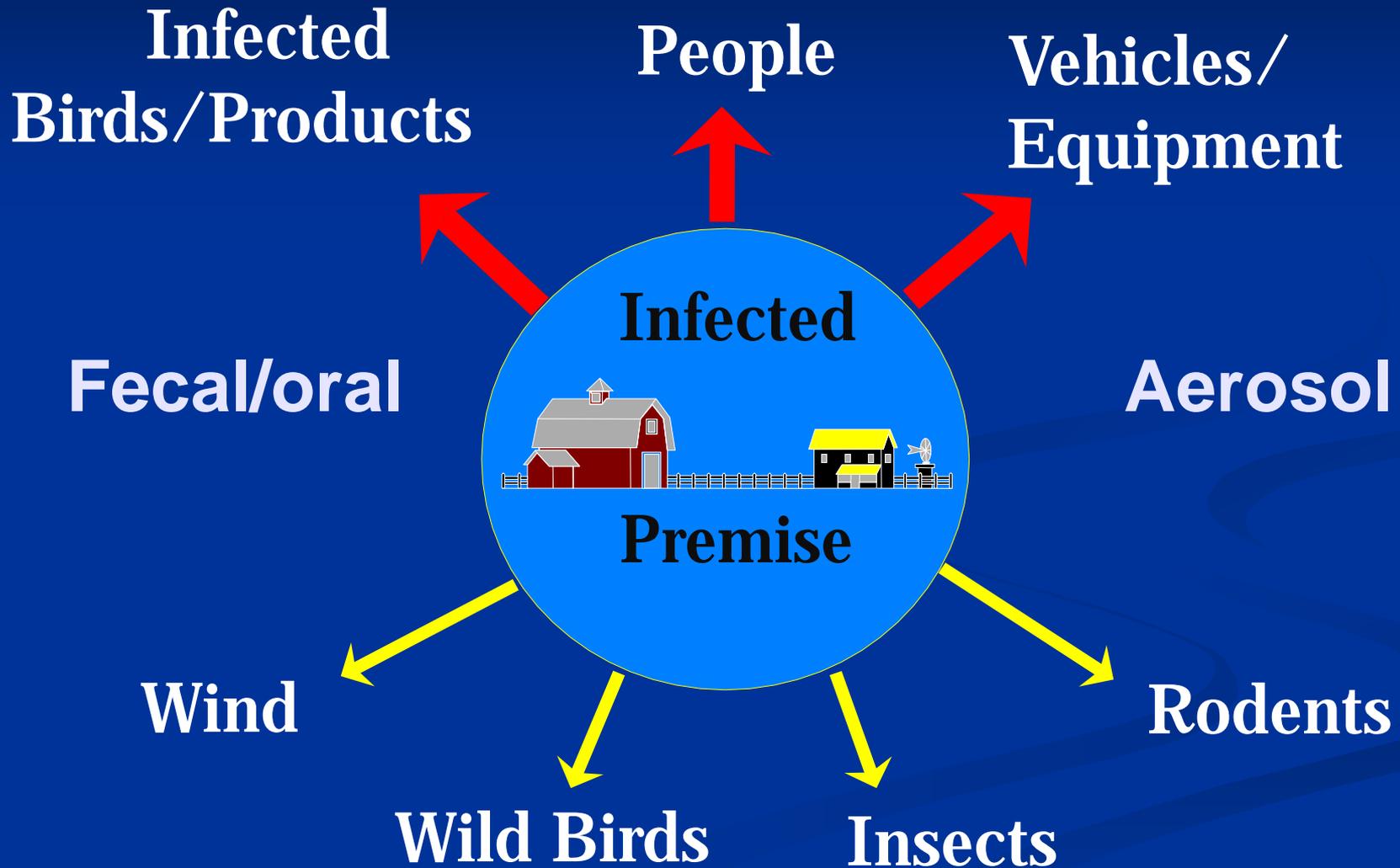
High Path Avian Influenza

Clinical Signs and Lesions:

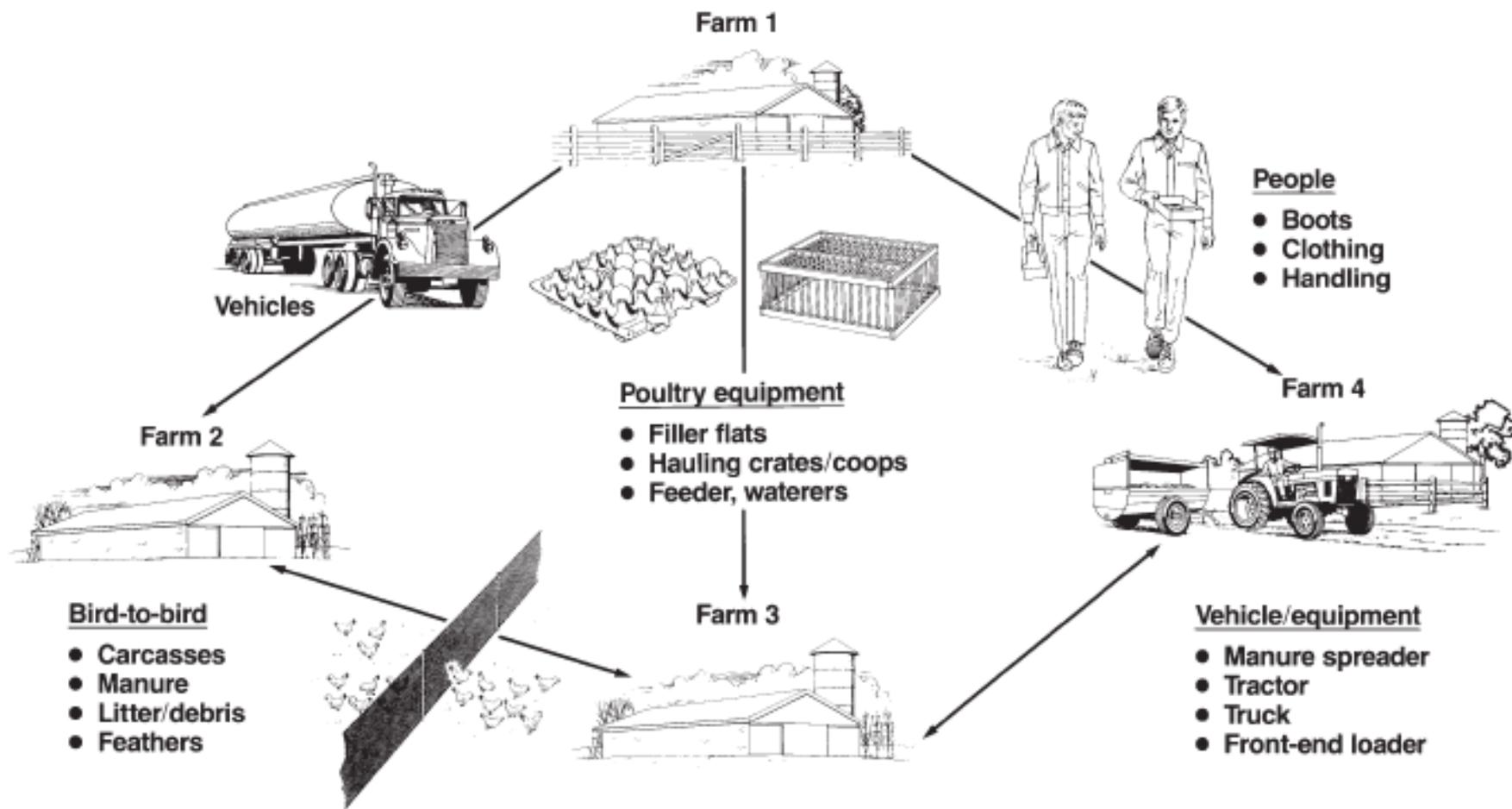
- n Sudden death
- n High mortality
- n Rapid spread
- n Decreased feed and water consumption
- n Depression, lack of energy, decreased appetite



Methods of Spread: Infected Premises



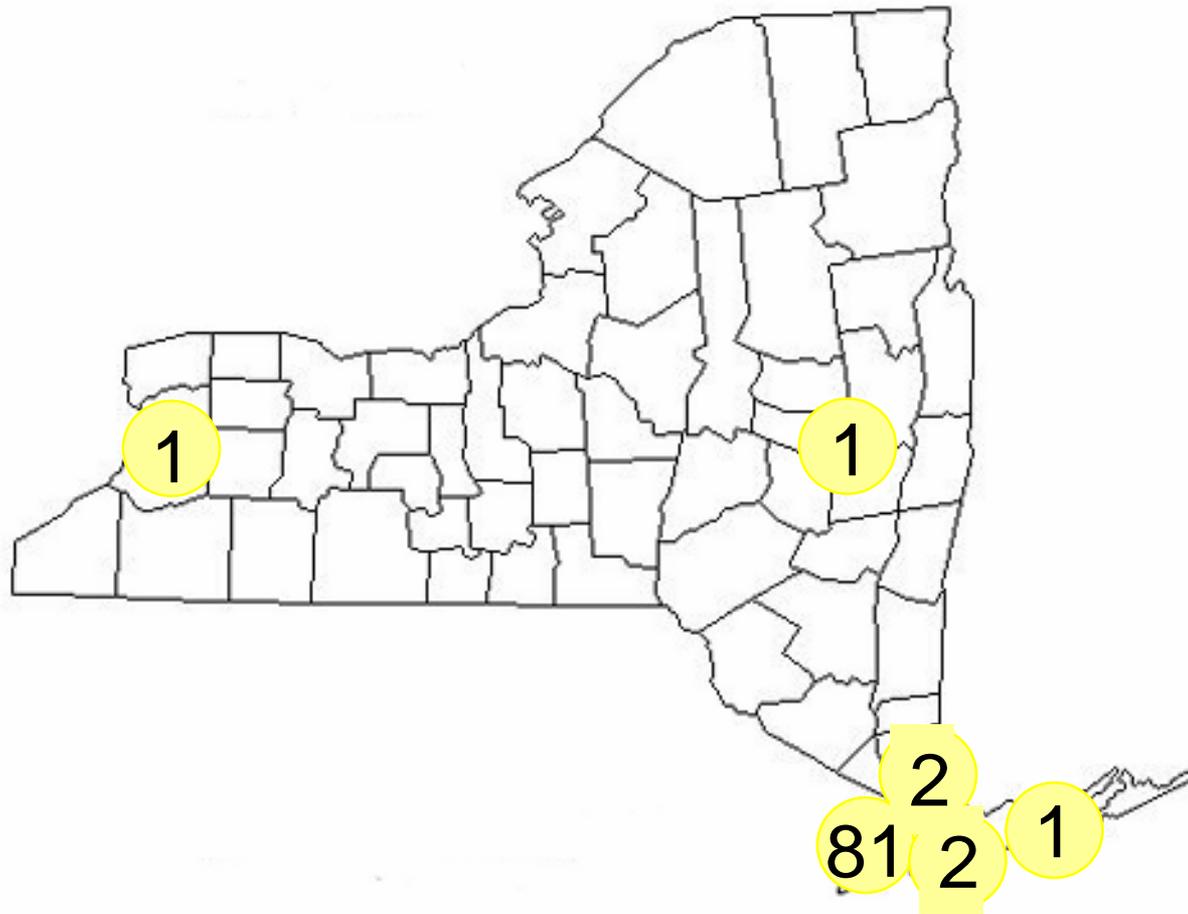
How Poultry Disease Spreads



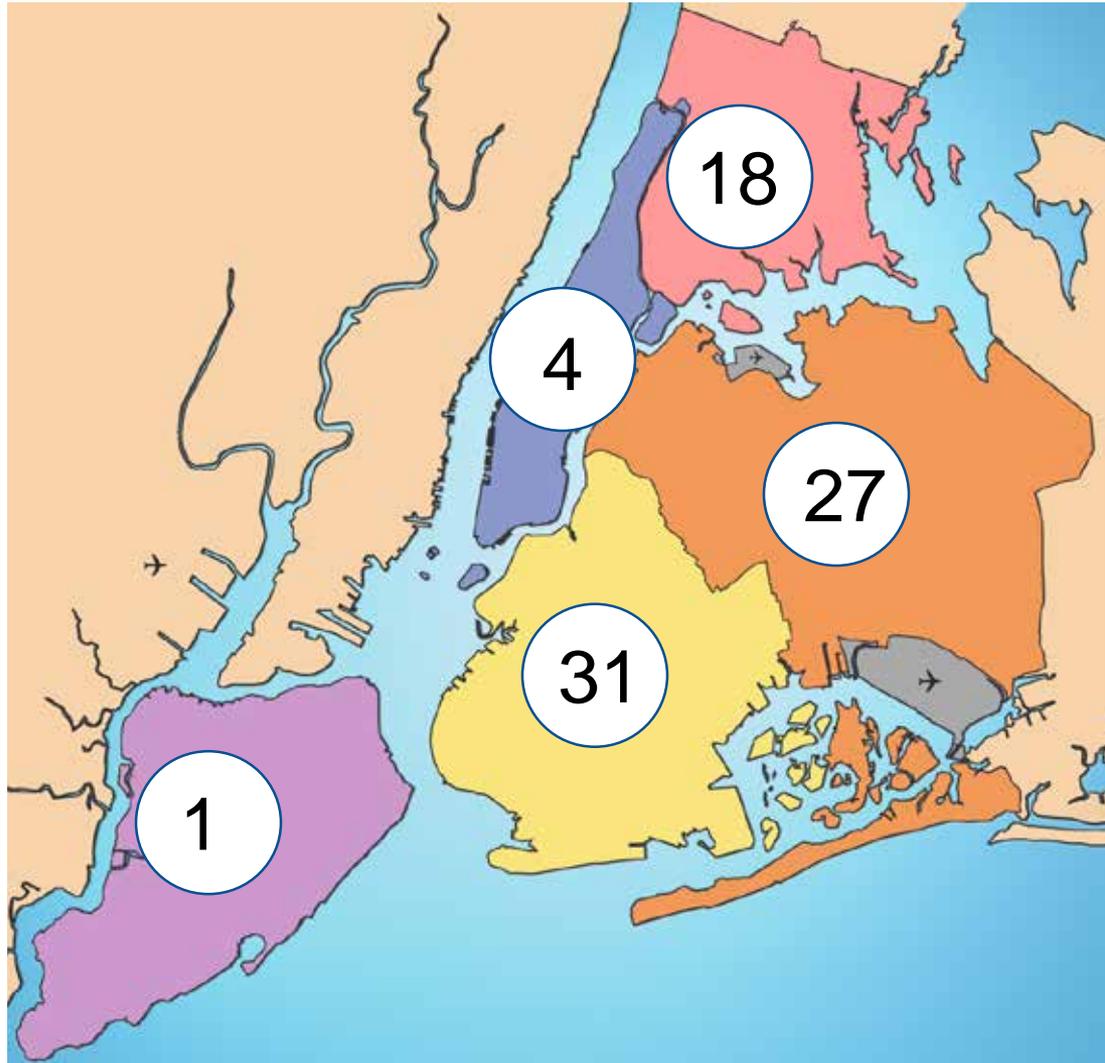


Live Bird Markets

Distribution of NY Live Bird Markets



Distribution of NYC LBMs by Borough



Components of the NY Live Bird Marketing System



Component	Number
Supply Flocks	< 5
Dealers - DAHP	17
New York	8
Pennsylvania and New Jersey	9
Live Bird Markets	88

Crate Washer



Cleaning and Disinfection



HPAI Planning and Preparedness

- Plans and Policies
- Communications
 - Incident and Information Management
 - Outreach, Awareness and Education
- Response Tools and Capabilities
 - Surveillance and Diagnostics
 - Appraisal and Compensation
 - 3D - Depopulation, Disposal and Decontamination
 - Quarantine, Permitting and Movement Controls
- Resource Development
 - Personnel
 - Supplies and Equipment
 - Training
 - Lab capacity



National Veterinary Stockpile

4 24-hour Push Package

- Contains Personal Protective Equipment and decontamination supplies
- Arrives within 24 hours of APHIS' order to deploy
- Precedes additional items necessary to continue supporting the response



National Veterinary Stockpile

13

Additional Deployable Capabilities



Kifco Avi-Foam Guard

- Antiviral medications
- AI and CSF Vaccine
- AI field test kits
- Portable vaccine shipping containers
- Vaccine ancillary supplies
- Poultry depopulation foaming units, CO2 carts
- Large animal handling equipment
- Depopulation, disposal, & decontamination (3D) commercial services

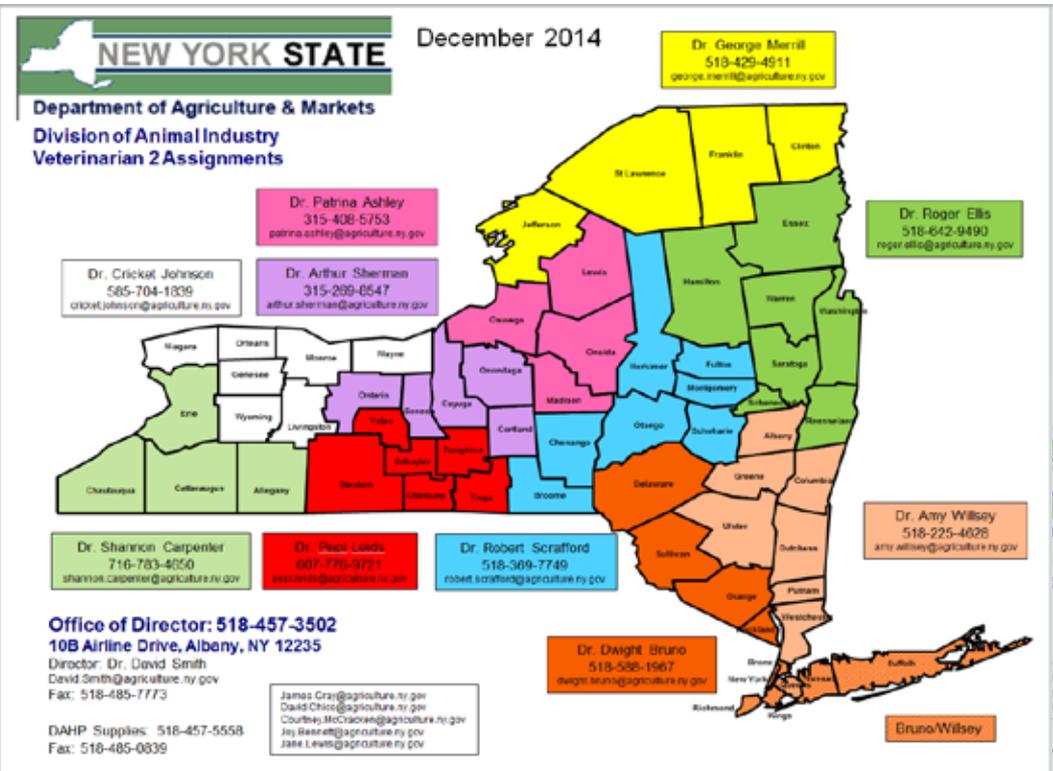


United States
Department of
Agriculture

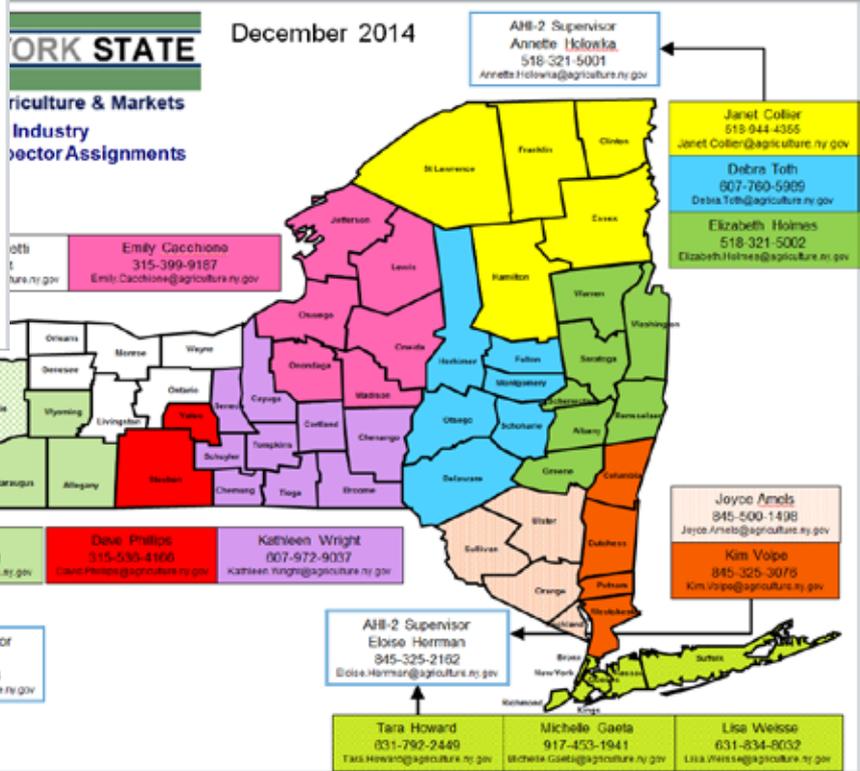
Resources: Personnel



Field Veterinarians



Animal Health Technicians



HQ:
Subject Matter Experts
Epidemiologists
Information Technology Specialists



**Keep Watch
Keep Clean
Keep Out
Keep Informed**

CLEAN RIGOROUSLY!

- Wear clean clothes, scrub your shoes with disinfectant, and wash your hands thoroughly before entering your bird area.
- Clean cages daily
- Change food and water daily.
- Clean and disinfect equipment that come in contact with your birds or their droppings including cages and tools. Remove manure before disinfecting.
- If you have been near other birds or bird owners, such as at a feed store, clean and disinfect your car and truck tires, poultry cages, and equipment before going home.

Know the Warning Signs of Infectious Bird Diseases

Early detection is important to prevent the spread of disease.



- Sudden increase in deaths in your flock
- Sneezing, gasping for air, coughing, and nasal discharge
- Watery and green diarrhea
- Lack of energy and poor appetite
- Drop in egg production, soft, thin shelled or misshapen eggs
- Swelling around the eyes, neck, and head
- Purple discoloration of the wattles, combs, and legs
- Tremors, drooping wings, circling, twisting of the head and neck, or lack of movement

POULTRY DISEASE ALERT

AVIAN INFLUENZA "BIRD FLU"

In November 2014, a dangerous new strain of Avian Influenza (AI), also known as "bird flu," has been detected in poultry and wild birds in the United States. All poultry owners need to be on the lookout for signs of illness in their poultry and use good biosecurity practices to protect their birds. This strain is deadly to birds but poses NO immediate public health concern for humans.

DOES AI COME FROM?

AI is a disease of poultry. AI can be of low pathogenicity or high pathogenicity (HPAI), causing severe disease and death loss. Especially migratory waterfowl (ducks and geese) are the most likely to carry the virus and can pass the disease along even though they are healthy.



Purple discoloration of the comb.

REPORT SICK BIRDS OR UNEXPLAINED DEATH LOSS

HPAI in chickens and turkeys resembles other mild respiratory diseases. With HPAI, the birds may become very quiet, may not eat or drink, have diarrhea and discolored combs and feet. Birds may also die suddenly without any signs of disease.



Swelling around the head and face.



BIOSECURITY PROTECTS YOUR FLOCK

HPAI is often transmitted by bird droppings. Help protect your flock by minimizing your flock's exposure to wild waterfowl. Change your footwear or use disinfectant footbaths prior to entering your bird pens, don't lend or borrow equipment from other farms, and avoid visiting other poultry farms and auctions. Change clothes and footwear before working with your own birds.



HPAI can devastate a healthy flock.



IMMEDIATELY REPORT SICK BIRDS TO:

New York State Department of Agriculture and Markets at 518-457-3502

For more information, or to report sick or dead poultry, contact:

New Jersey Department of Agriculture, Division of Animal Health
Phone: 609-671-6400 • Email: state.veterinarian@ag.state.nj.us



-OR-
USDA APHIS Veterinary Services NJ Office
Phone: 609-259-5260

For updated information on HPAI visit: www.state.nj.us/agriculture/divisions/ah/diseases/ March 2015



Biosecurity



Signage and Decon/C&D Stations



Biosecurity



Truck Cleaning and Disinfection



Safeg



Biosecurity



Equipment Cleaning and Disinfection



ding Anim



Biosecurity



- Foot traffic management – Barriers



Safeguarding Animal Health



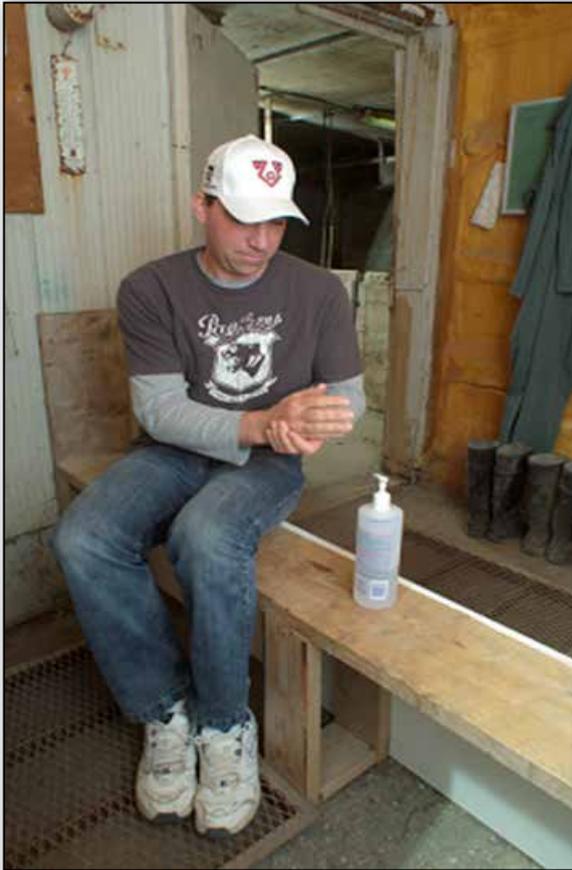


Biosecurity



Employee and Labor Management

- Poultry contacts outside the premise
- Biosecure/sanitary entrance and exit



Safeguarding Animal Health





Biosecurity

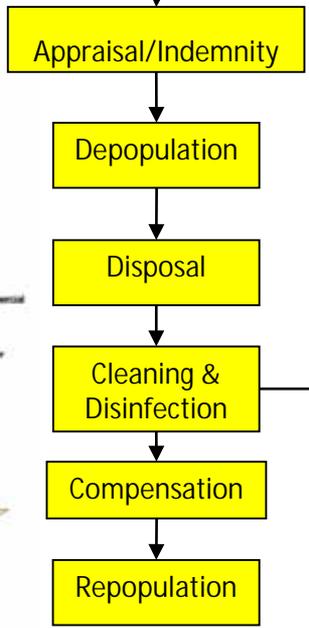
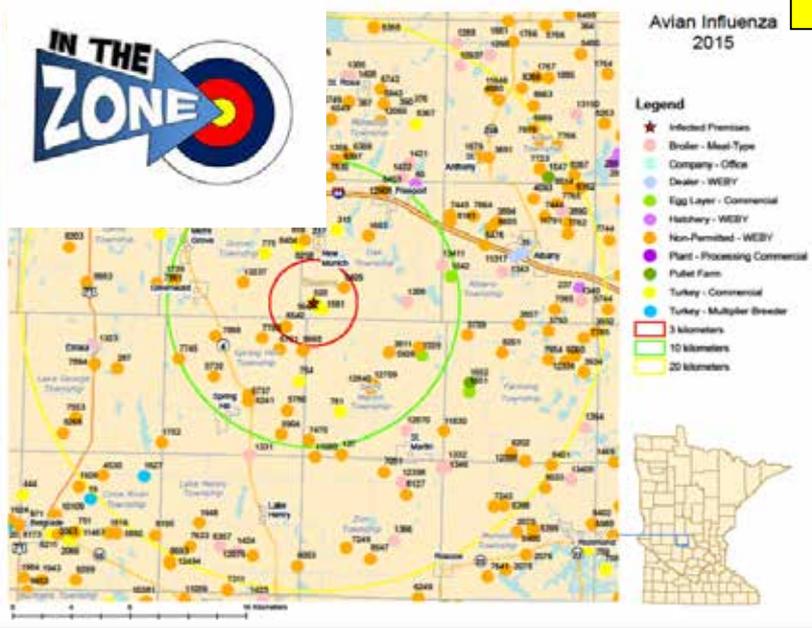
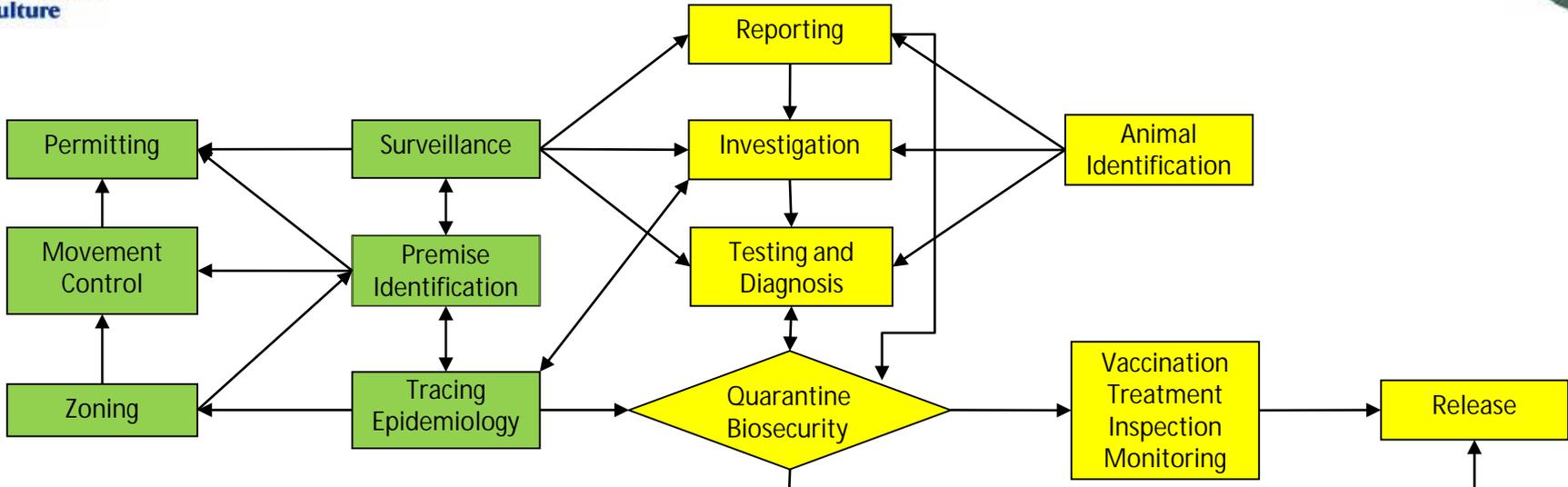


Pest Control



Safeguarding Animal Health

Animal Disease Response



Line connecting Cleaning & Disinfection to Release

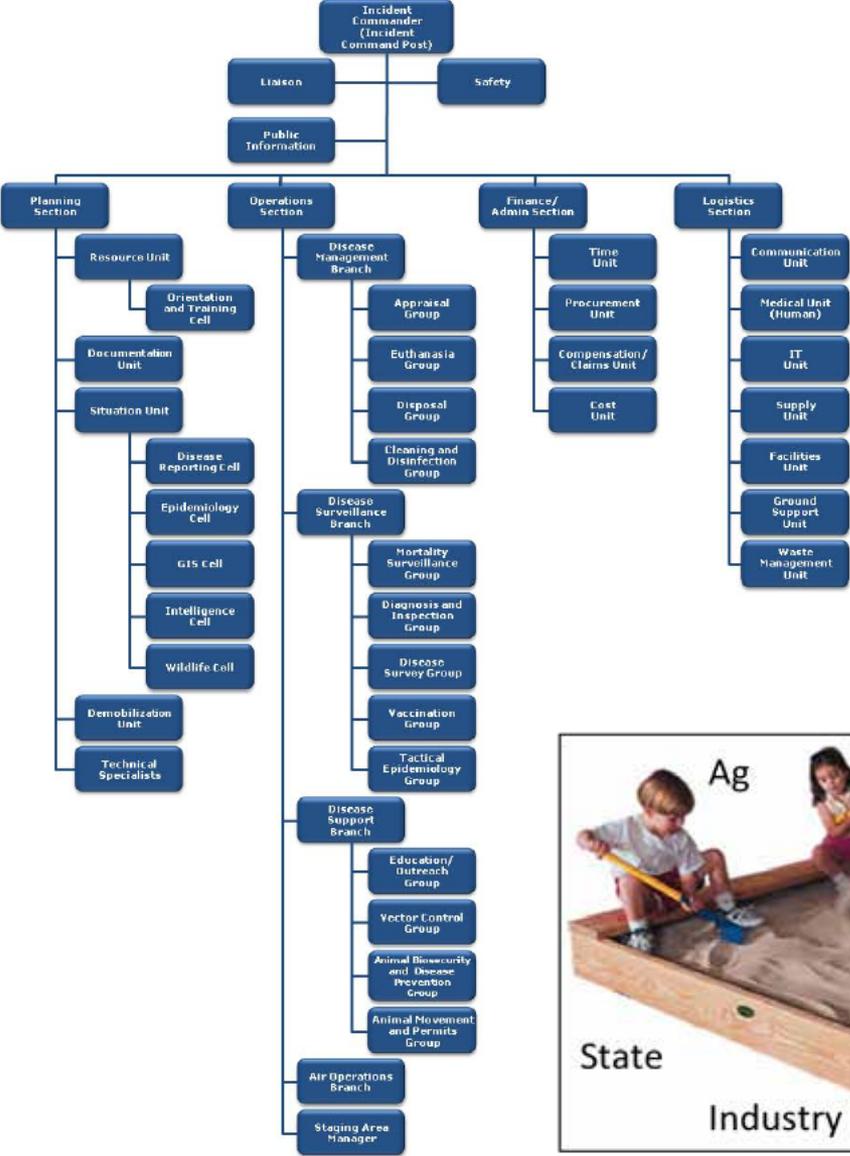
Our Partners

- NYS Dept. of Ag & Markets, DAI
- Cornell Animal Health Diagnostic Center
- Cornell Cooperative Extension
- Accredited Veterinarians
- Public Health
- Food Safety
- Wildlife
- Ag Industry
- Environmental

HPAI Planning and Preparedness

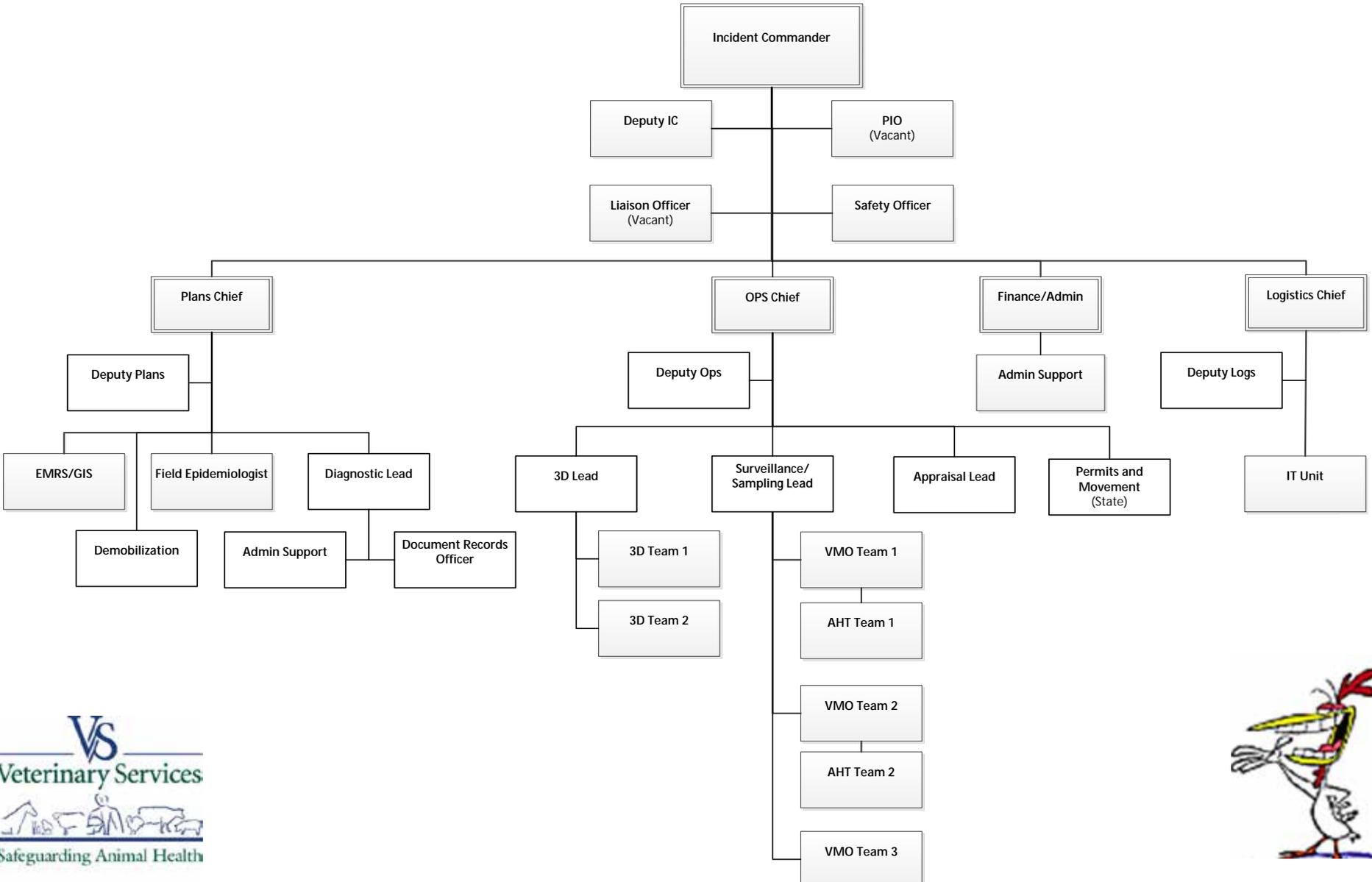
Incident Management

Figure B-7. Example APHIS VS Incident Management Team—Long Team Configuration

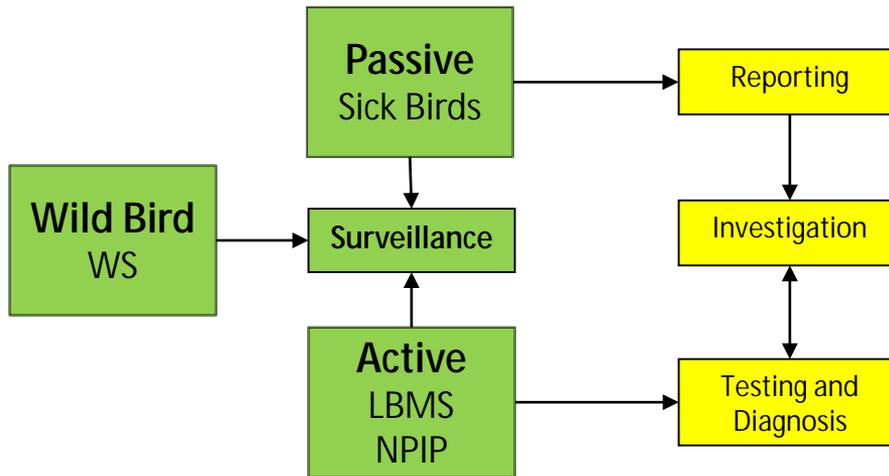


HPAI Planning and Preparedness

SPRS District 1 HPAI IMT



Animal Disease Surveillance



Diagnostic Sampling - Swabs

This composite image illustrates diagnostic sampling techniques. The top left shows a vial of 'Transport Media' at '4°C'. The top right shows two people in white protective suits and masks handling a chicken outdoors. The bottom left shows a close-up of a 'Trachea' being sampled. The bottom right shows a close-up of an 'Oropharyngeal' swab being taken from a chicken's mouth.

Diagnostic Lab Resources Communication and Coordination



FAD



NVSL
Ames, IA

Surveillance



Confirmation



Cornell University
College of Veterinary Medicine



VS
Veterinary Services
Safeguarding Animal Health

Conducting a Disease Investigation



Practicing Biosecurity

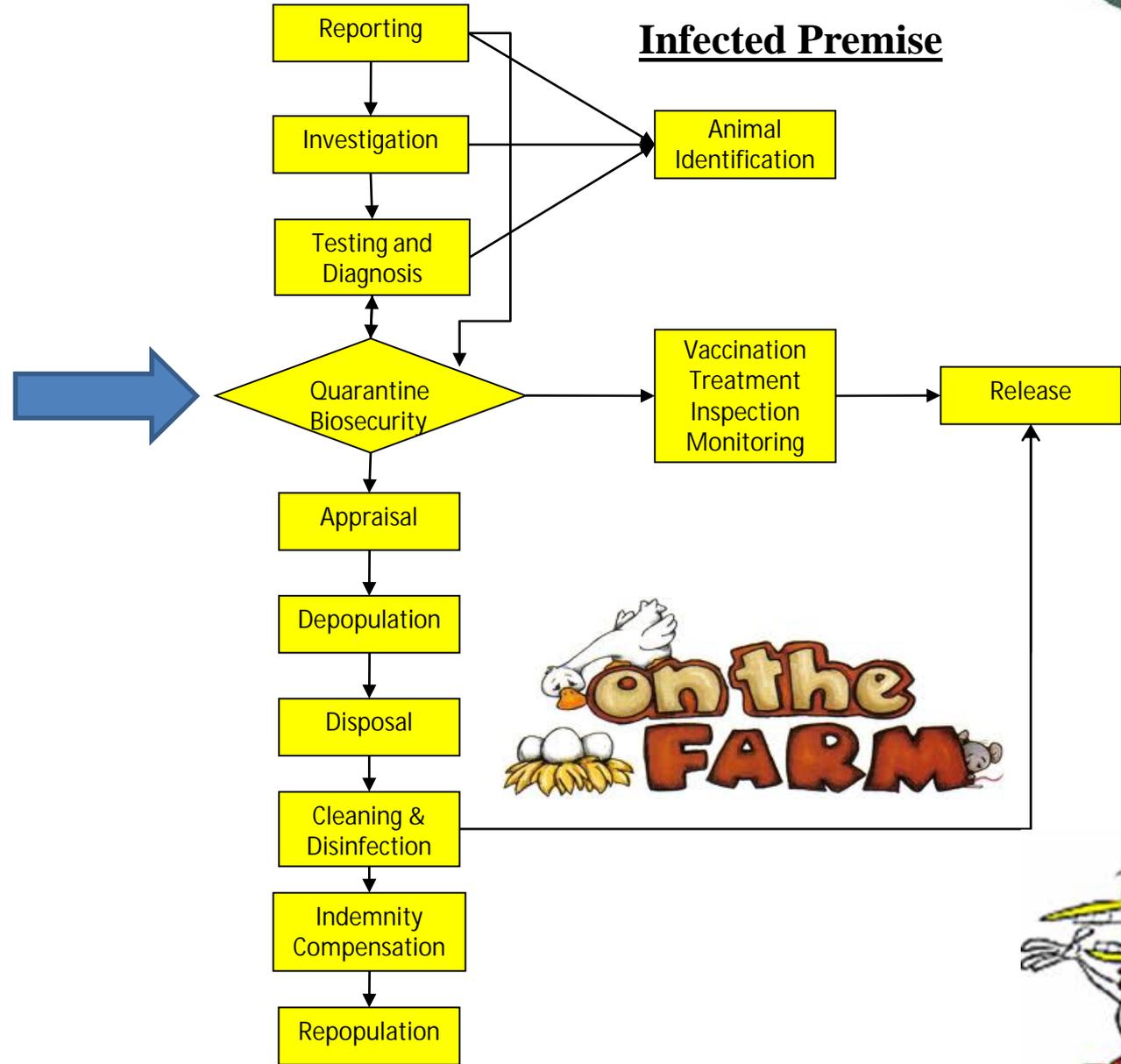


- Recent movements on and off the farm
 - Animals
 - Dealers/haulers
 - Suppliers
 - Sales
 - Shows
 - Slaughter
 - Services/Equipment
 - Veterinarians/technicians
 - Feed trucks
 - Employees/Laborers

Unified Command Established NYSDAM and USDA

- Initiate depopulation, disposal and disinfection of infected flock
- Investigation and quarantine of contact premises
- Establish movement control zones and Prem ID
- Ramp up surveillance activities and testing
- Implement industry wide biosecurity protocols
- Provide public/industry information and address consumer fears
- Permitting and movement controls

Animal Disease Response





Signage and Decon/C&D Stations



Biosecurity



Controlling movements on and off the farm





Biosecurity



Cleaning and Disinfection Station



Cleaning

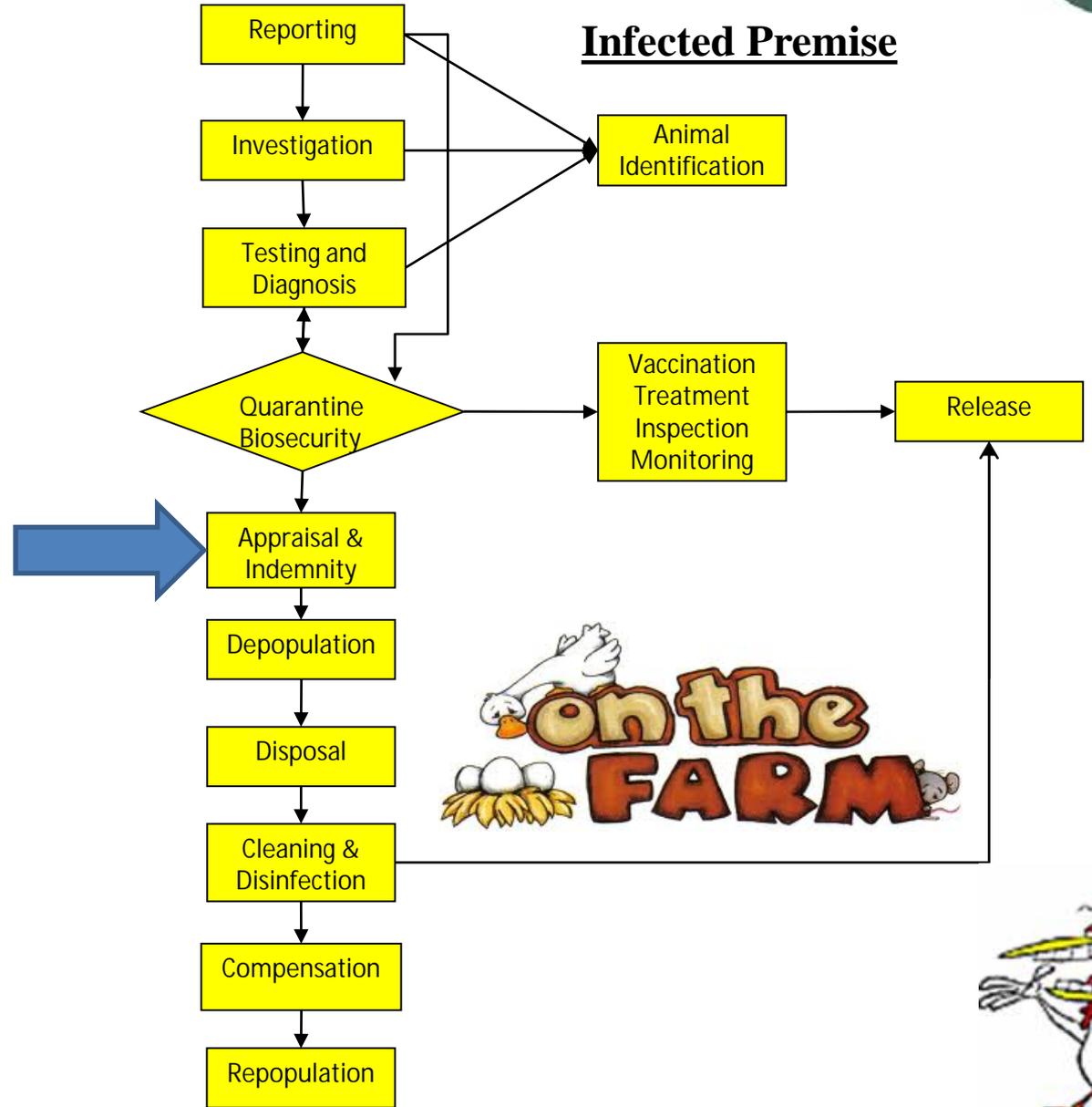


Disinfection

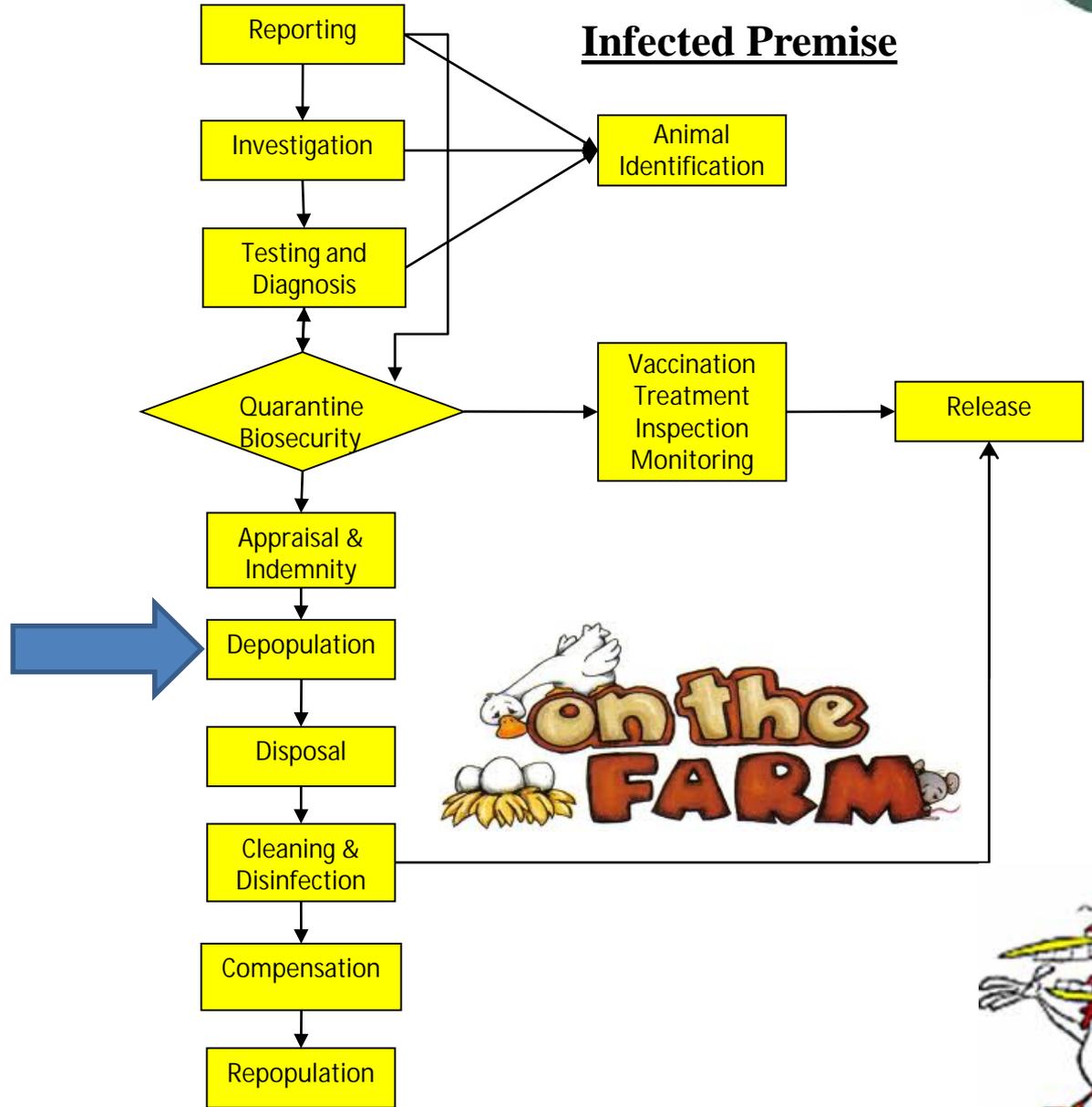
Iodophores
Phenolics
Quaternary amonia
Ethanol
Bleach
Peroxygens (Virkon-S)



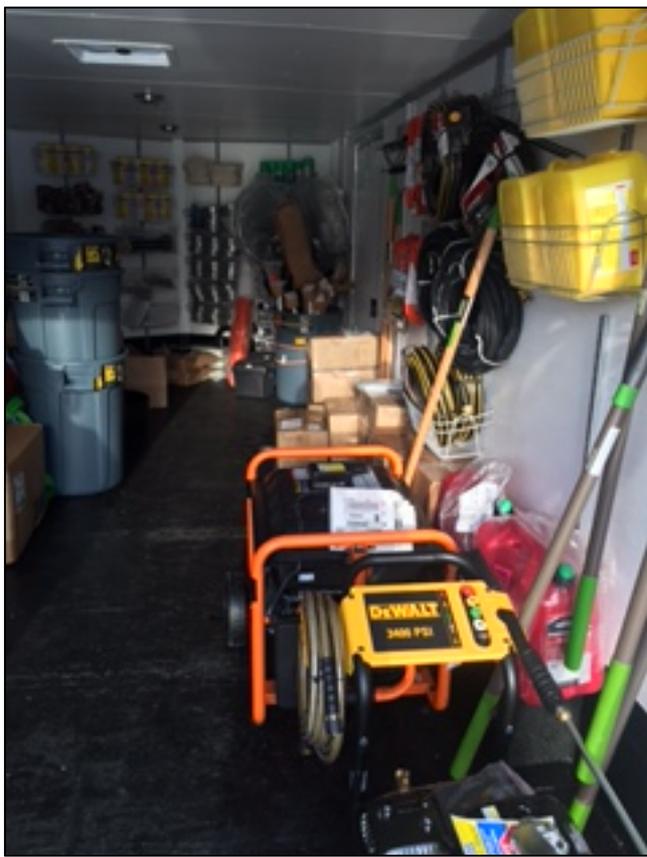
Animal Disease Response



Animal Disease Response



SPRS District 1 Resources



Quantity	Description
10	Koechner Euthanasia Device, Type T
10	Koechner Euthanasia Device, Type C
4	Pro-Pak Foam Unit Kit
4	Euthanasia Carts
2	Heavy Duty Carts
10	Garbage Can, 2 wheels
6	Long Handled Brush
2	Scoop Shovel
1	Tarp (10' x 12')
1	Garden Hose, 50 ft
1	Power Washer
20	Disposable caps
60	Disposable coveralls
60	Disposable shoe covers
20	N95 particulate respirators
10	Disposable gloves
10	Hand Sanitizer
1	8" Zip ties, box of 1000
1	15 inch Zip Ties, box of 500
48	Duct Tape, Roll
4	Hand Trucks/Dollies
1	100 ft Extension Cord

Non-penetrating Captive Bolt Poultry

TED *Turkey Euthanasia Device*

- *Welfare Compliance*
- *On-Farm Euthanasia*
- *Emergency Response*



*Also...
Chickens, Rabbits,
and Piglets!*



Captive bolt stunning device: cordless, non-penetrating

Non-penetrating Captive Bolt Poultry





KED

M&J5:15LLC

IER

U.S. PATENT NO. 8,152,605



Why Euthanize

When an animal has lost its' ability to sustain a standard of life conducive to its' own well-being and the continuation of life only leads to more suffering, euthanasia is the necessary choice.

Cervical Dislocation

- Cervical dislocation is an accepted method by the American Veterinary Medical Association (AVMA)

Carbon Dioxide - CO₂





Dump door



**USDA NVS
Minerized Gassing**



- Place ~60 layers in CO₂ charged cans.
- Cans readily available in an emergency.
- Labor intensive and slow
- CO₂ source not with can



Dare to be first.



Modified Atmosphere Kill Cans





Dare to be first.

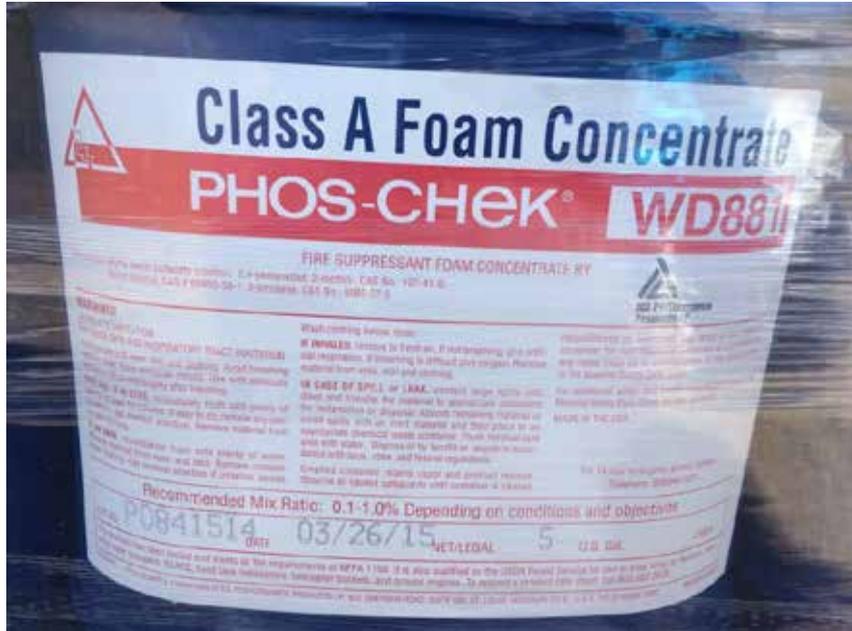


Avian Biosciences Center
UNIVERSITY OF DELAWARE

Foam



Fire fighting Foam



Need LOTS of water

Fire fighting Foam - Kifco



Fire fighting Foam - NC



After foaming

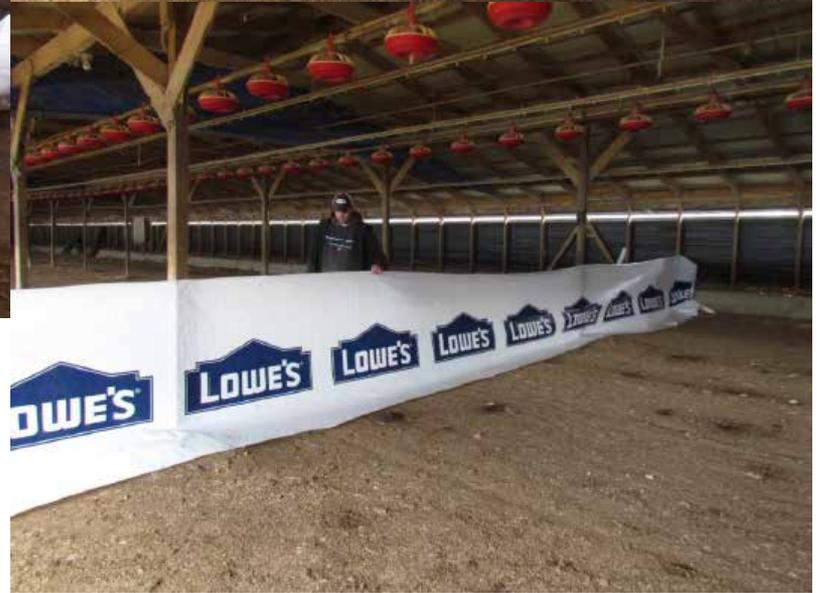


Foam has dissipated



Portable PRO/pak





Images: North Carolina Department of Agriculture

Dare to be first.



Crowding Strategies





Using fencing and wrap to produce a wall

Dare to be first.

UNIVERSITY OF
DELAWARE

Crowding Strategies

VS
Veterinary Services
Safeguarding Animal Health

- Containerized foam still requires labor to remove birds
- Utilizes existing equipment
- Facilitates out of house disposal



Higher expansion, dry foam

Lower expansion, wet foam



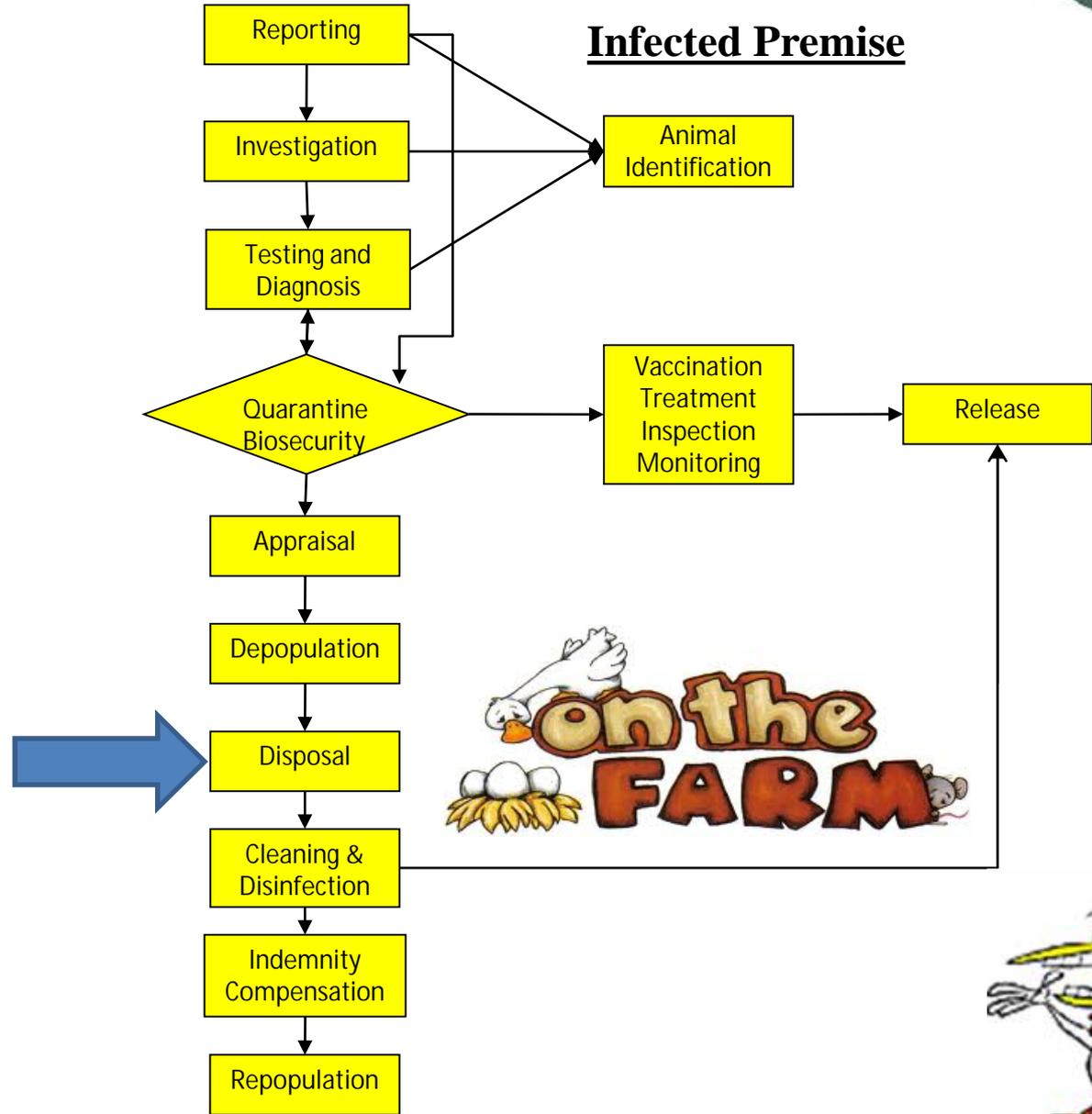
Dare to be first.

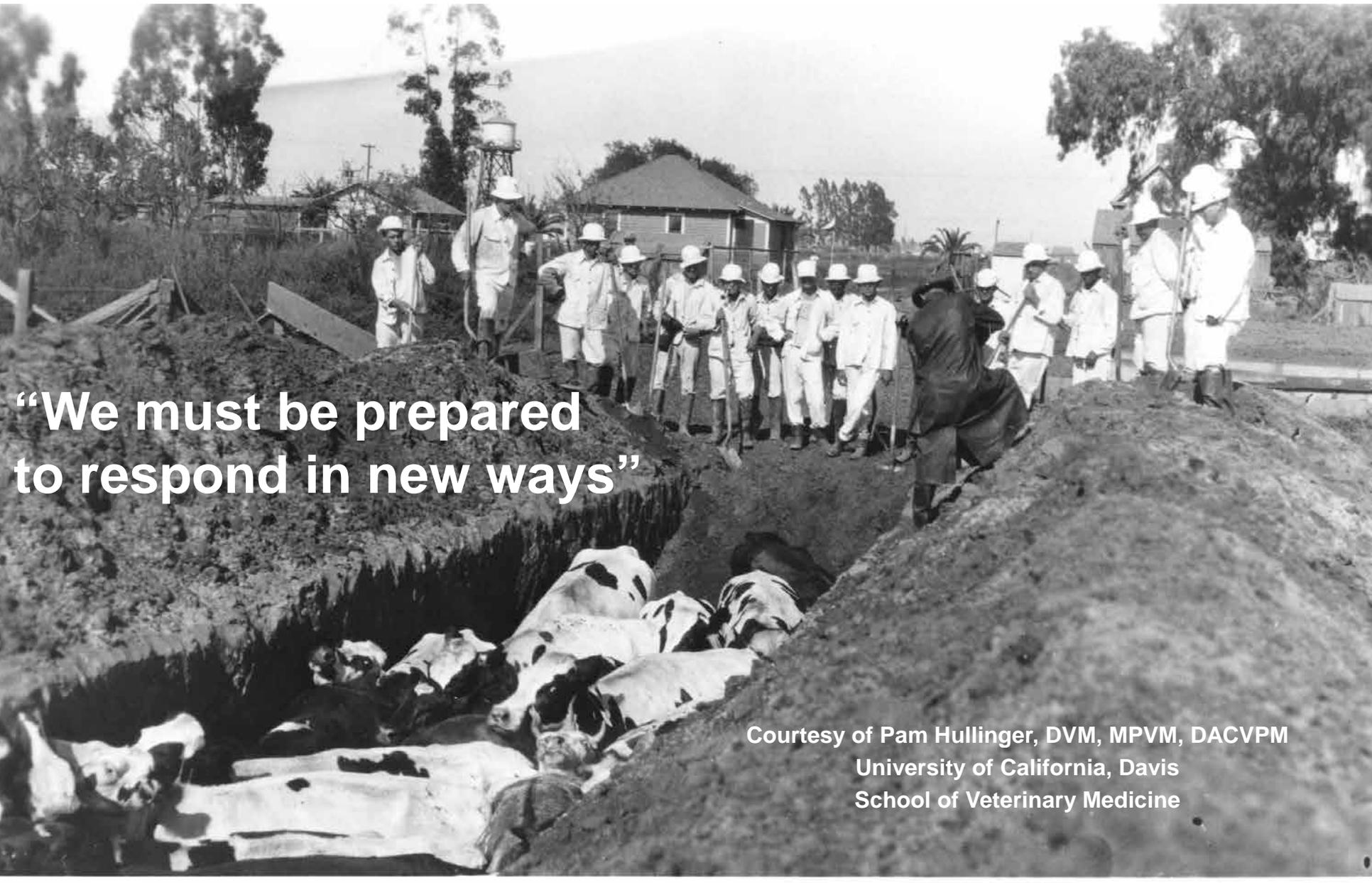


Expansion Ratio



Animal Disease Response





“We must be prepared to respond in new ways”

Courtesy of Pam Hullinger, DVM, MPVM, DACVPM
University of California, Davis
School of Veterinary Medicine

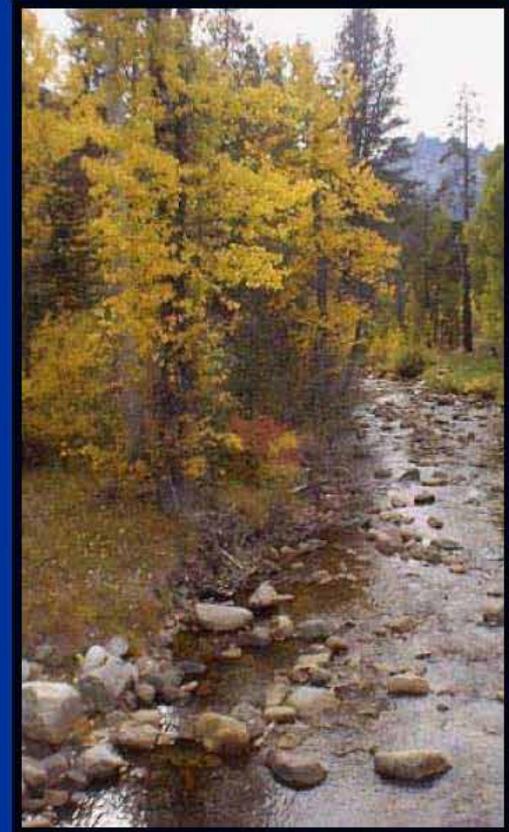
WHY IS ANIMAL CARCASS MANAGEMENT IMPORTANT?



to protect..
animal health



to protect..
human health



to protect..
the environment

Nature's way

Although it has been practiced forever, it is unacceptable for diseased domestic animals

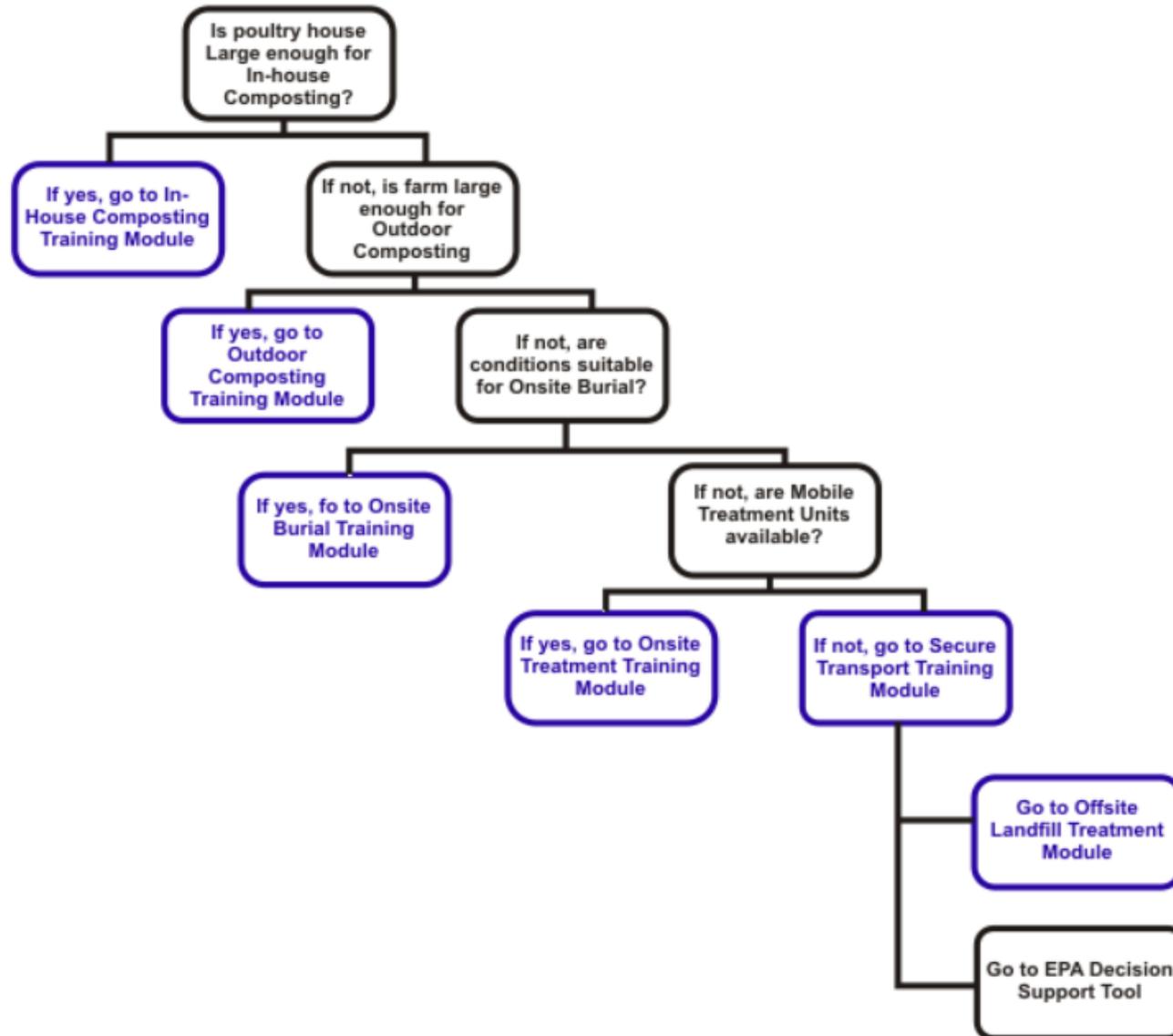


DISPOSAL OPTIONS

- Burial
- ★ ■ Composting
- Landfill
- ★ ■ Rendering
- Incineration
- Alkaline hydrolysis/"digestion"
- ★ ■ Slaughter
- New Technologies?

Emergency Management Tools - Disposal Tree

Last Modified: Sep 2, 2014



BURIAL

The placement of carcasses in unlined trenches or pits.

- Relies on the natural geology of site to contain liquids
- Has historically been used for animal disease events both large & small



picture courtesy of Patrick McKelvey

Site selection

- On farm
 - Geological suitability
 - Grade should not be greater than 5%
 - Meets environmental requirements
 - Adequate distance from **water sources**
 - Adequate distance from **property lines**
 - Adequate distance from **residences**
 - Adequate distance to **water table/bed rock**

BURIAL - ADVANTAGES

- Limits disease spread, odors and scavenging
- Often may be available on site
- Minimal movement and handling
- Scalable
- Economical



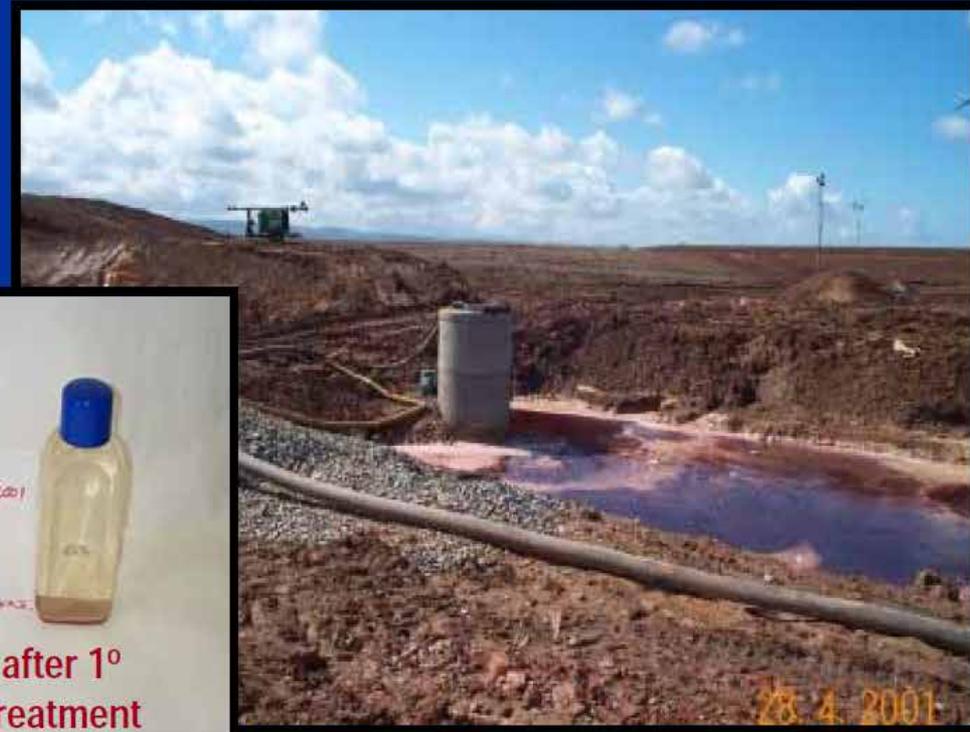
BURIAL - DISADVANTAGES

- Ground and surface water contamination
- Regulatory constraints
- Access to suitable sites
- Wet or frozen ground
- Heavy equipment may be required

**NOT
IN
MY
BACKYARD**



SEEPAGE FROM ANIMAL BURIAL SITES - UK 2001



leach·ate (lcht) *n.* A product or solution formed by leaching, especially a solution containing contaminants picked up through the leaching of soil.

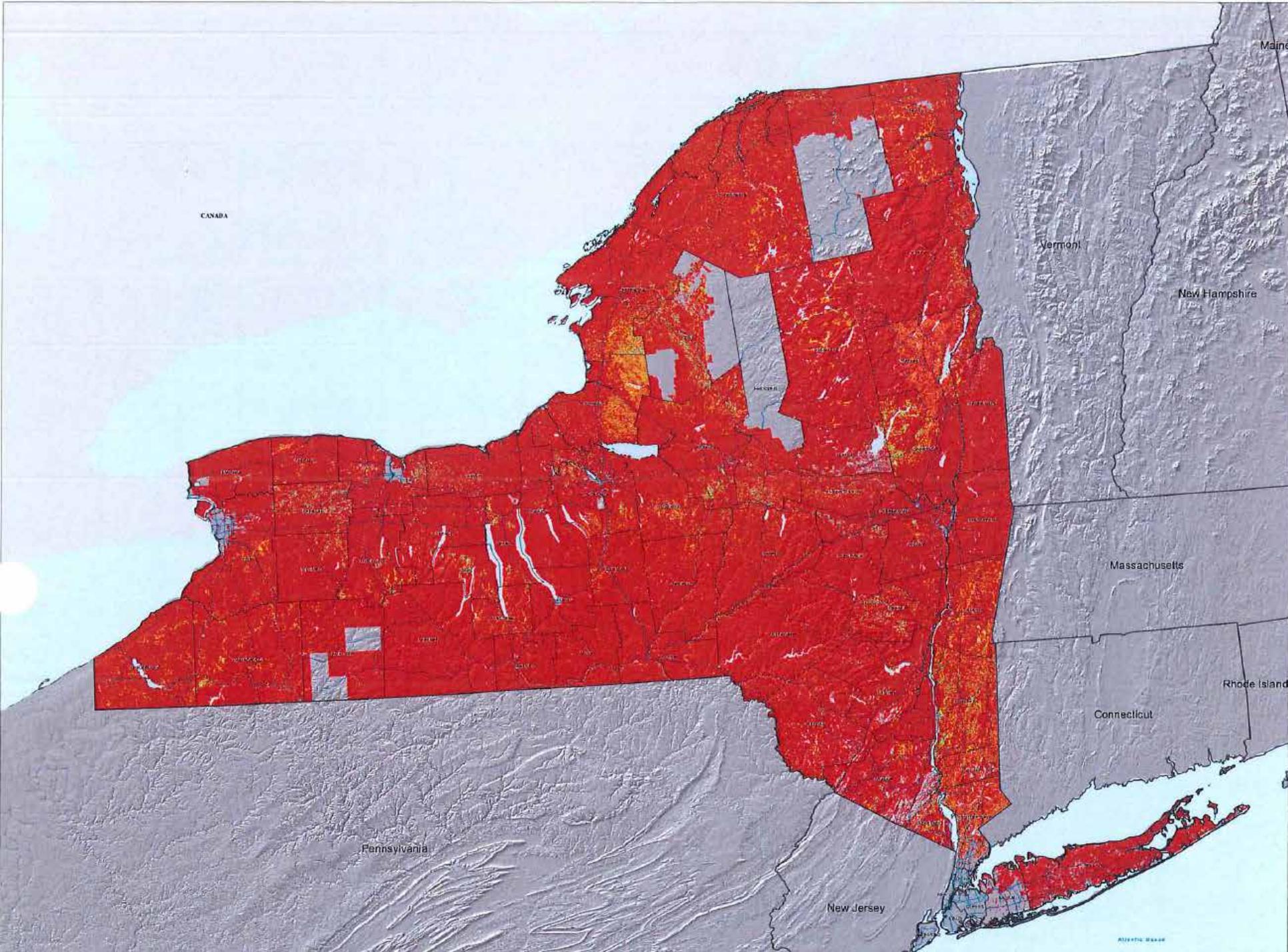
BURIAL

Best Use

- small → moderate/large numbers of carcasses
- Appropriate site
- Carcasses generated as a result of easily inactivated agent(s) or disaster
- Heavy Equipment available

Not Recommended

- Potential or known TSEs (BSE, CWD or scrapie) or contaminants
- Close to ground or surface water
- Bedrock or sands
- Sites likely to be developed



LANDFILLS

A designed, engineered site lined with a composite (clay &/or plastic) liner.



LANDFILL - GENERAL ADVANTAGES

- Excellent capacity
- Good containment of carcasses
- Leachate management
- Groundwater monitoring capability
- Can be very cost efficient
- No post-disposal remediation costs

LANDFILL – DISADVANTAGES

- Odor complaints
 - No steps to inactivate prions
 - Waste water treatment plants may be reluctant to accept leachate from landfills containing carcasses
 - Potential "**NIMBY**" response from the general public and local officials
- q Transportation of carcasses

FY 2016 HPAI Response

Cleaning and Disinfection Basics (Virus Elimination)

(Guidance updated February 19, 2016)



Roll off box CLEANING and DISINFECTION station

YELLOW ARROW IDENTIFIES EDGE OF FLUID
RETAINING POOL



RENDERING - ADVANTAGES

- Heat inactivates most agents
- Transportation network
- Fat can be burned as fuel
- Good mass reduction
- Excellent capacity
- Potential dollar value of by-products



Photo courtesy Mike Langenhorst

RENDERING - DISADVANTAGES

- Rendering plants vary in the capacity to handle different materials: some cannot handle poultry, others may require preprocessing of carcasses to achieve tissue size for cooking
 - Potential for animal feed cross-contamination with prohibited materials
 - Industry concerns about handling materials
 - Poor public understanding and awareness of industry
 - Concerns of local waste water treatment plants
- Transportation of carcasses
 - Limited availability

INCINERATION

Encompasses multiple methods of disposal by the combustion of carcasses. These range from crude to highly controlled:

- Pyres (open air burning)
- Air curtain destructors (ACDs)
- Cremation
- Medical waste incineration
- Dedicated animal incinerators
- EfW facilities

Advantages

- Pathogen destruction
- Mass reduction
- May be available on site



Disadvantages

- Regulation and permitting
- Air quality concerns
odor, unsightly and dramatic
- Can be expensive – fuel
- Transportation of carcasses



AIR CURTAIN DESTRUCTORS

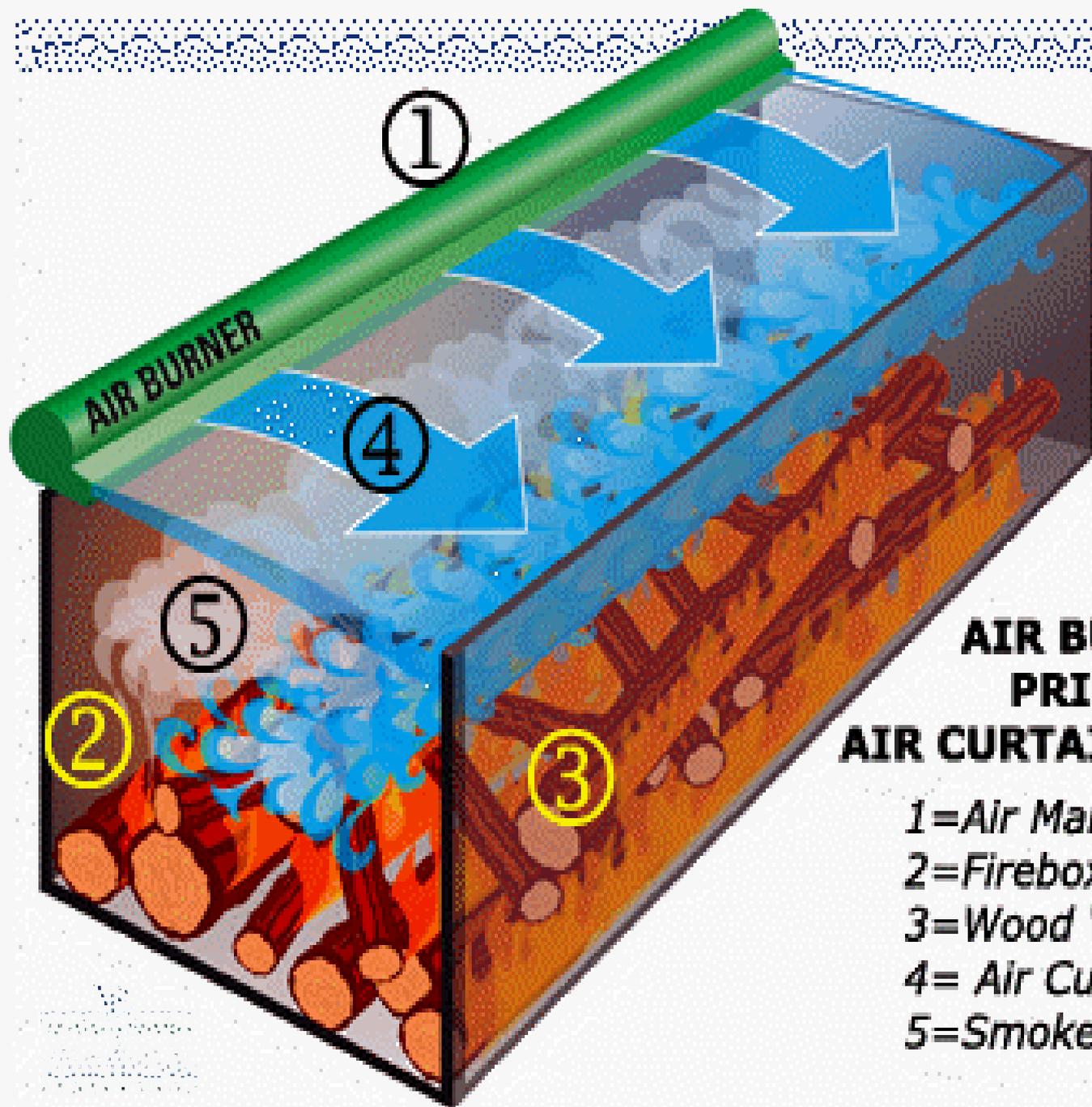


Photo courtesy of
Colorado Dept. of Agriculture



Photo courtesy of
Rob Southall USDA APHIS VS





**AIR BURNERS, LLC
PRINCIPLE OF
AIR CURTAIN INCINERATION**

- 1=Air Manifold*
- 2=Firebox Refractory Wall*
- 3=Wood Waste or Wood Fuel*
- 4= Air Curtain (left to right)*
- 5=Smoke (PM)*

Offsite Disposal Requires Biosecure Transport





10/27/2009 14:19



10/27/2009 14:19

Off-site Disposal

- Trucks must be leak proof and covered
- Do not open carcasses
- Leave adequate space for expansion
- Absorbent material in bottom of vehicle
- Decontamination of vehicle required



Composting



Its Recycling...



Naturally



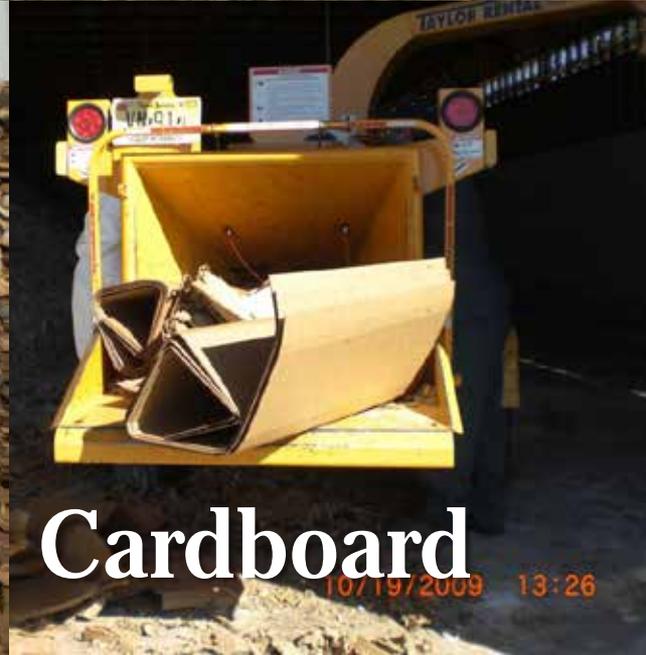
Carbon Sources



Litter



Wood chips



Cardboard



10/26/2009 15:15



10/27/2009 14:34



10/28/2009 8:31

One month later...



11/23/2009 14:42

MD LPAI Turkey Farm

Litter composting/storage

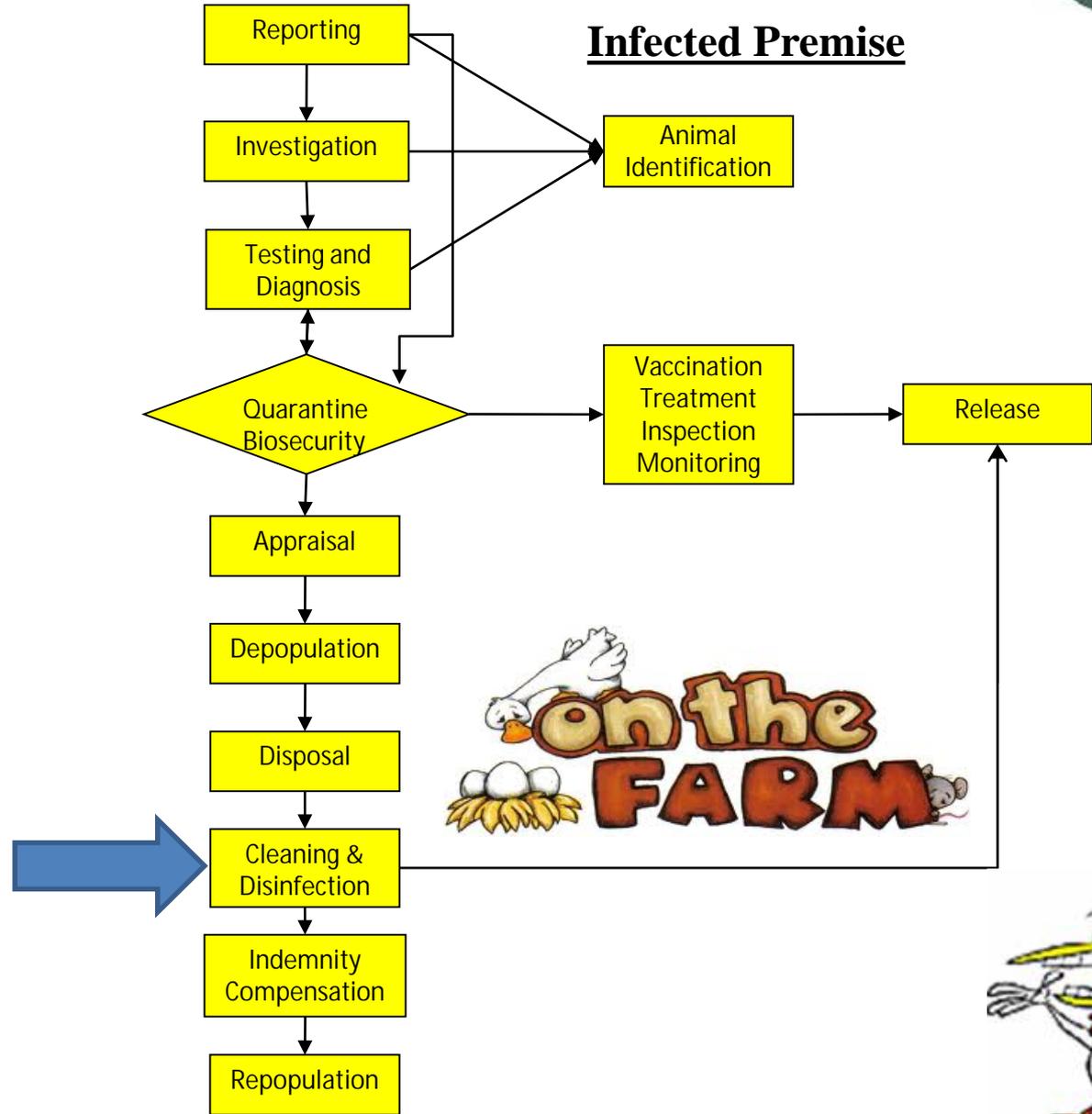


MD LPAI Turkey Farm Litter Composting/Storage

Litter that is removed is covered and composted for 30 days
and is sampled for AI after no less than 21 days



Animal Disease Response



MD LPAI Turkey Farm House Cleaning and Disinfection



House and litter heated to 90-100F for 72 hr prior to removal

Options

For premises that can be cleaned and disinfected (most premises):

Step 1

CLEANING OPTIONS

Dry Cleaning

Timing & method of dry cleaning must not aerosolize virus.

and/or

Wet Cleaning

Step 2

DISINFECTION OPTIONS

Drying & Heating (100-120 °F for 7 days total)

At least three days must be consecutive days drying and heating at specified temperature; heating to 100-120 °F must occur for seven days total.

and/or as needed

Wet Disinfection with EPA Approved Antimicrobial

and/or as needed

Fumigation with EPA Registered Sterilant for Porous and Non-Porous Surfaces or Alternative Science-Based Methods

NOTE: A premises may require a *combination* of methods, but at *least* one choice must be selected from Step 1 and Step 2. The cleaning and disinfection options selected and implemented *must* be included as part of the approved cleaning and disinfection plan and approved by State Animal Health Officials and APHIS for reimbursement.

Options

For premises that can't be cleaned and disinfected:

- Fallowing for 120 days or a period recommended by Incident Command.
- Length will vary, depending on temperature and season.
- Reserved for use on premises that need to be completely repaired or destroyed in order to be effectively cleaned and disinfected.
- Inspection may be required at the end of the fallow period.



MD LPAI Turkey Farm House Cleaning and Disinfection



MD LPAI Turkey Farm House Cleaning and Disinfection



05/07/2014

MD LPAI Turkey Farm House Cleaning and Disinfection



MD LPAI Turkey Farm

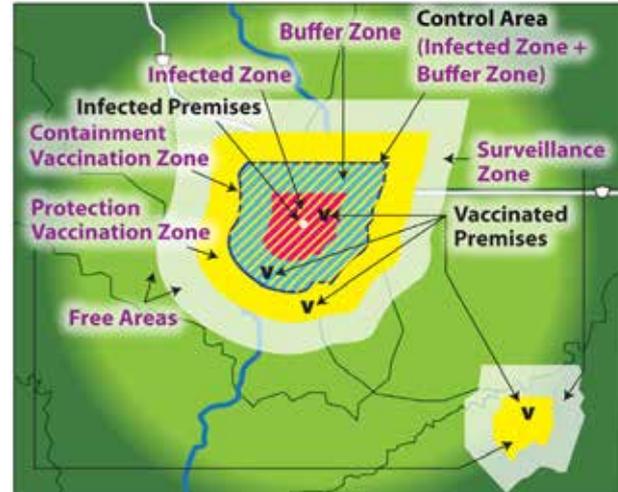
House Cleaning and Disinfection



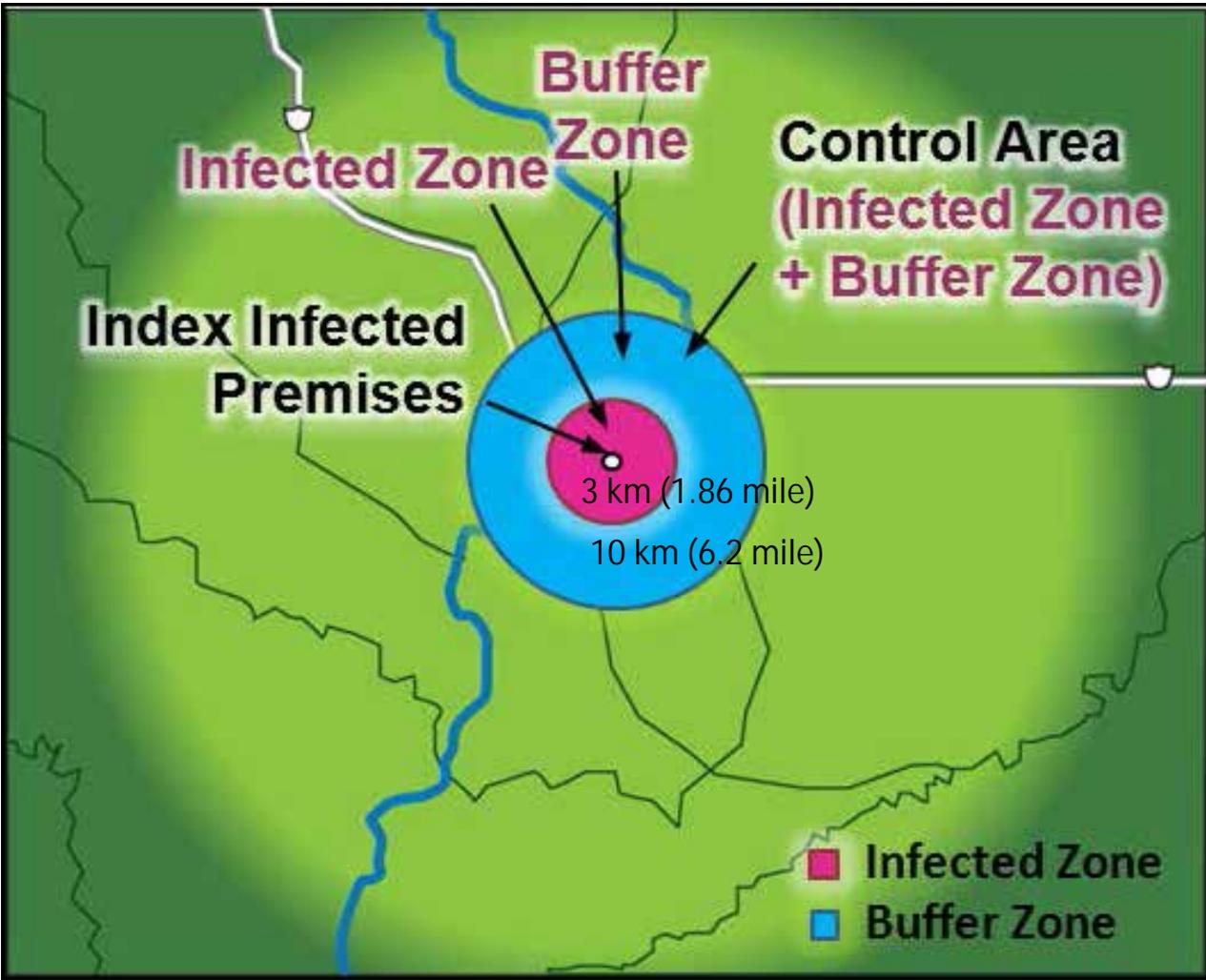
Environmental samples for AI are collected prior to repopulation

Consequences of a HPAI Diagnosis

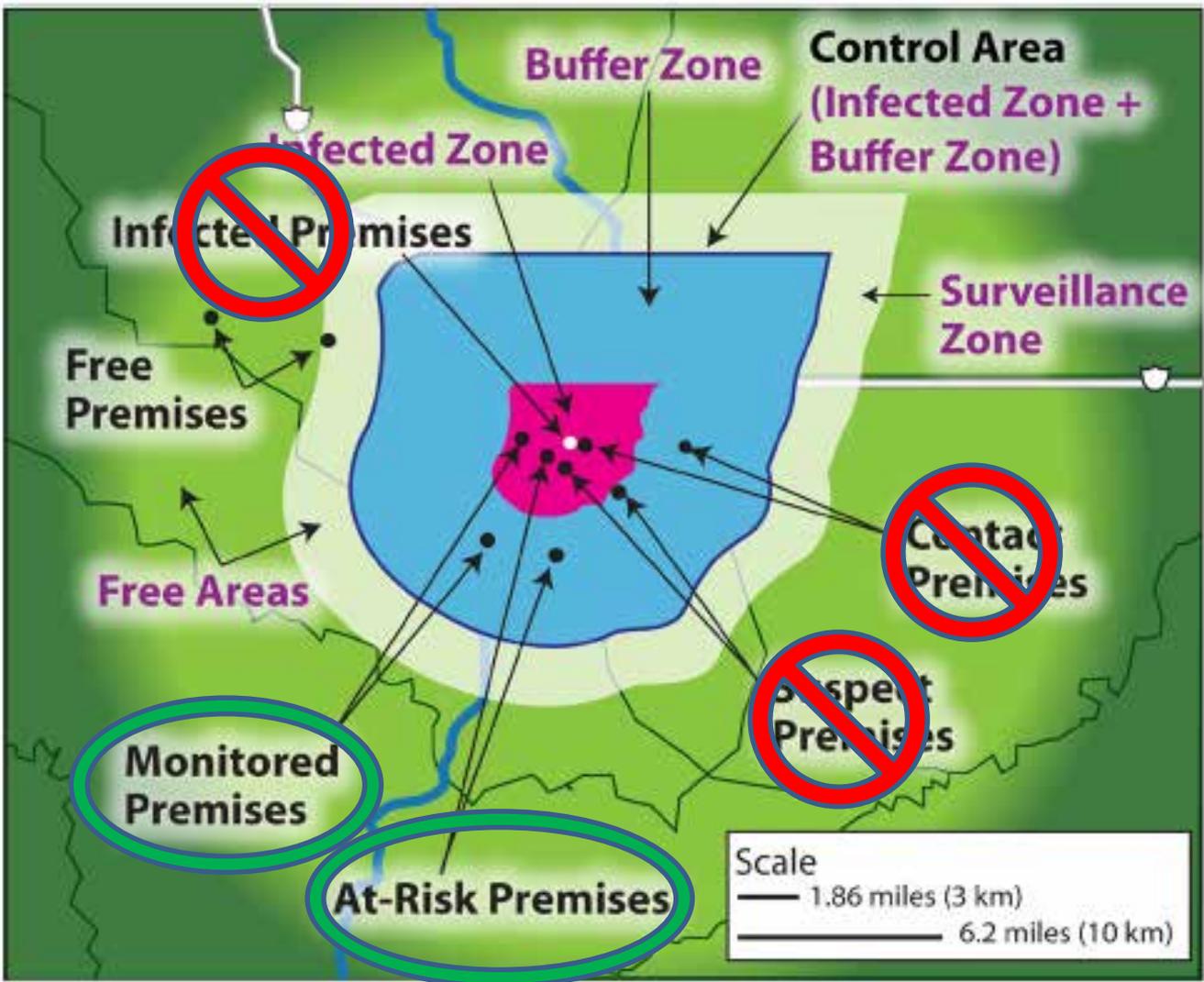
- Establishment of Control Area/Zones
 - Infected zone – nothing moves
 - Buffer and Surveillance zones
- Quarantine and Stop Movement orders will affect movement of...
 - Animals
 - Animal Products, e.g. eggs
 - Equipment and materials
- Balancing conflicting objectives
 - Controlling disease spread
 - Maintaining product movement to market



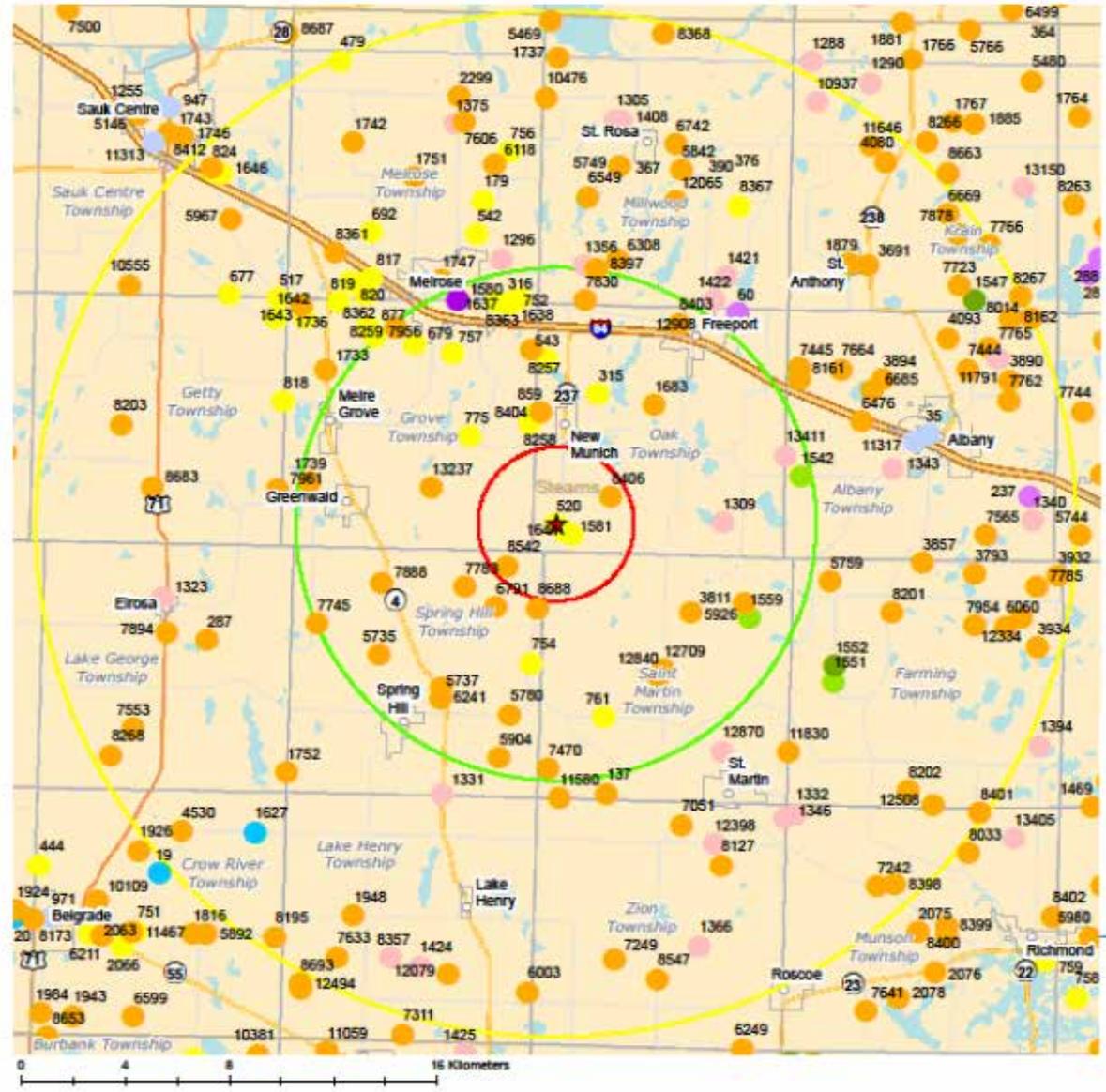
Establishment of a Control Area



Management of a Control Area



Management of a Control Area



Avian Influenza
2015

Legend

- ★ Infected Premises
- Broiler - Meat-Type
- Company - Office
- Dealer - WEBY
- Egg Layer - Commercial
- Hatchery - WEBY
- Non-Permitted - WEBY
- Plant - Processing Commercial
- Pullet Farm
- Turkey - Commercial
- Turkey - Multiplier Breeder
- 3 kilometers
- 10 kilometers
- 20 kilometers



Secure Egg Supply

- Moving beyond 'Stop Movement'
 - Don't kill the industry to cure the disease
- AKA...
 - Continuity of Business Planning
 - Biosecure Movement and Marketability Plans
 - Permitting

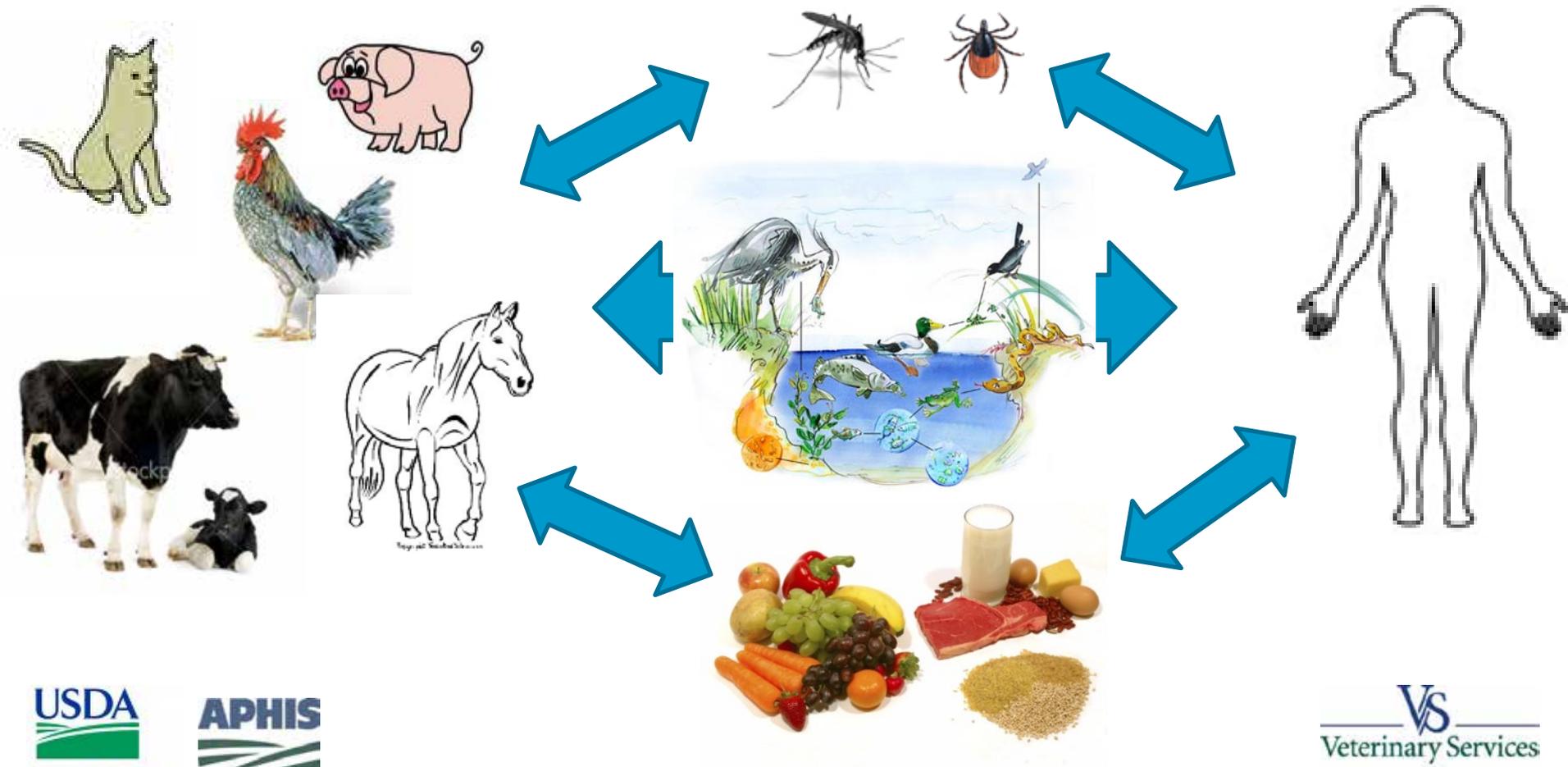


Avian Influenza

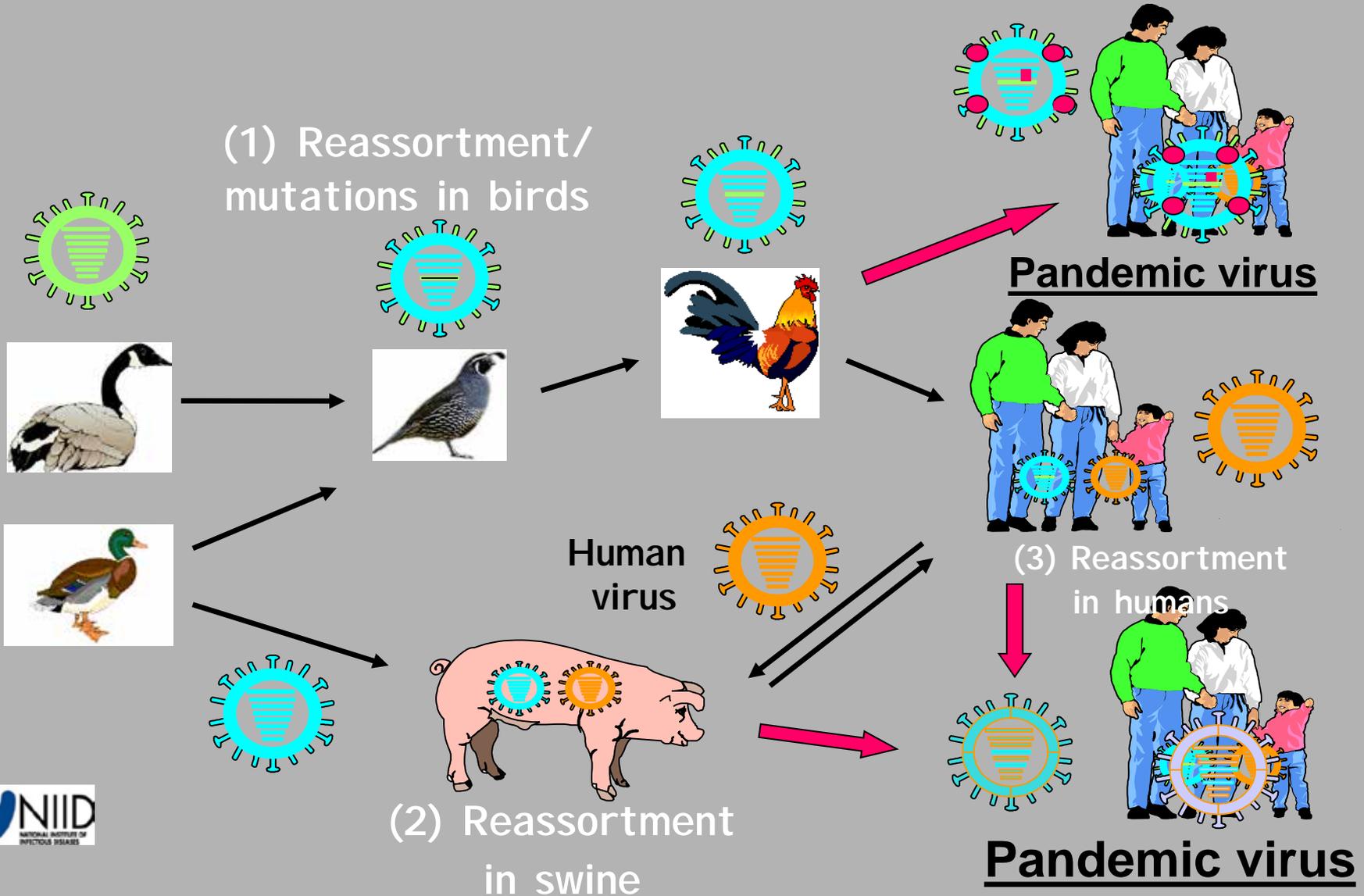
Summary:

- **Worldwide distribution**
- **Sporadic outbreaks of HP H5 and H7**
- **Aquatic birds are reservoir, others??**
- **Viruses can change quickly (mutation)**
- **Avian-origin influenza viruses contribute to outbreaks in humans and other animals**
- **Vaccination not routinely practiced**
- **Control policy influenced by international trade**

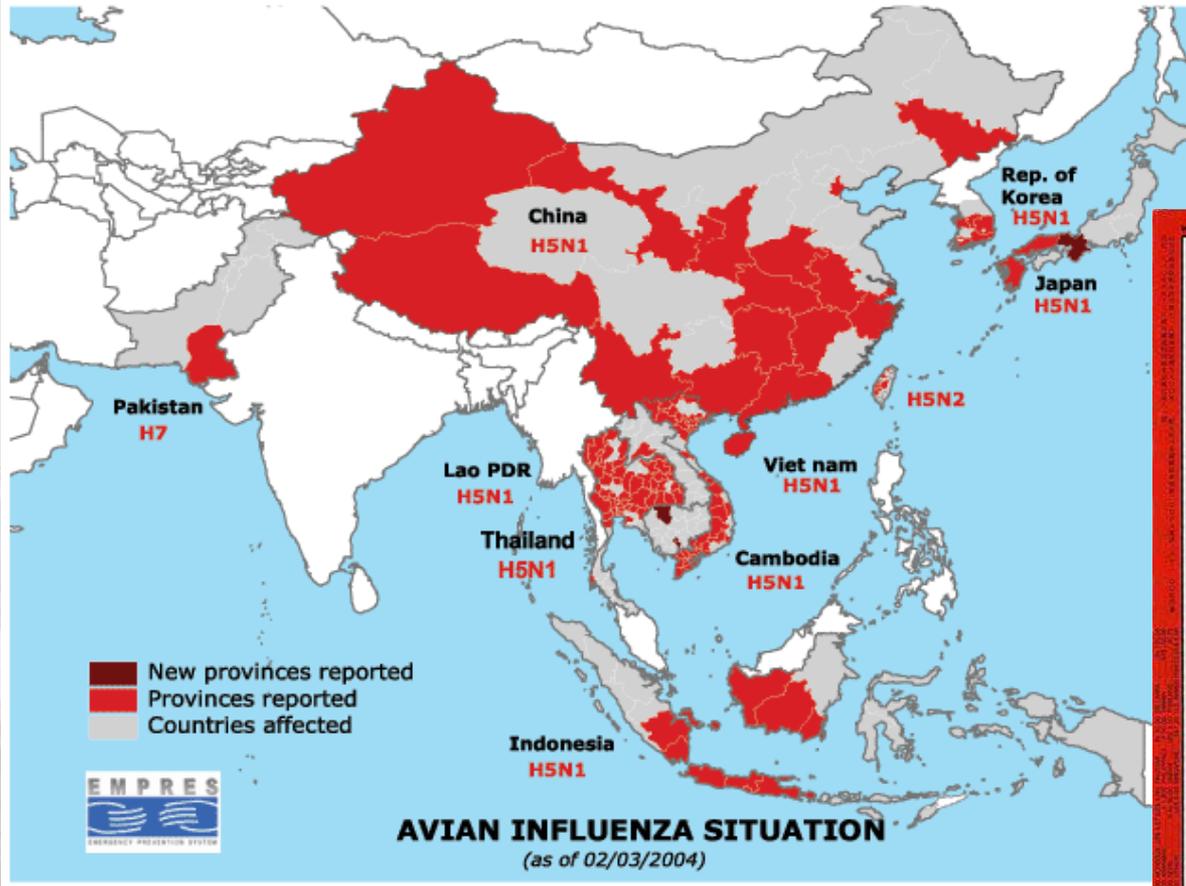
Transmission Modes for Zoonotic Diseases



Emergence of a Pandemic Virus



H5N1 Asian Bird Flu: *History*



Highly Pathogenic H5N1 Bird Flu in Asia

- Unprecedented in size and scope
- H5N1 infections in 16 countries
- 650 confirmed human cases, 386 fatalities
 - Human infections a result of direct contact with birds
 - Limited evidence of human-to-human spread
- >150 million birds died or destroyed

H5N1 Asian Bird Flu: How Did it Spread (highway or flyway)?

Backyard game fowl and village poultry



Layers over pond

Farm raised ducks and geese

Questions?

Washington Post