Early detection and Surveillance For Highly Pathogenic Avian Influenza

Keith Wehner
USDA Wildlife Services
Avian Influenzas

- LPAI- Low Pathogenic
  - Minimal concern, potential mutation threat in poultry

- HPAI- Highly Pathogenic
  - Highly virulent and can be lethal to birds
  - Mutations and re-assortment common
Influenza Subtypes

- 16 Hemagglutinin subtypes
- 9 Neuraminidase subtypes
- 2 Nonstructural subtypes
- Can occur in any combination
History of Wild Bird AI Surveillance: 2006-2011

• 283,434 wild birds sampled (250+ species).
• 98% of birds sampled were hunter harvested, agency harvested, or live wild birds.
• 0.09% of birds sampled were morbidity/mortality events.
• 1.51% of birds sampled were sentinel species.
• 86.2% of birds sampled were dabbling ducks, diving ducks, geese, and swans.
Wild Bird AI Testing 2006-2011: Lessons Learned

- All 283,434 birds tested were negative for HPAI.
- About 11% of wild birds carried low pathogenic AI virus.
- Waterfowl in particular had the highest AI virus prevalence rates as well as the greatest subtype variety.
- Dabbling ducks had a disproportionally high prevalence of AI viruses. This reinforces their role as a natural reservoir for AIVs.
Initial Detections of Eurasian HPAI Strains in the Pacific Flyway

December 2014
Whatcom county
Washington
Captive Gyrfalcons
Wild Mallard and Northern Pintail
Current HPAI Detections By County

Figure 7. HPAI Detections in All Birds, by Date of Confirmation, as of 8/27/2015
*If more than one confirmation in county, date of first confirmation is illustrated. (as reported on www.aphis.usda.gov)
## Positive HPAI Wild Birds by Species and State

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# HPAI Wild Bird Positives By State

* Increased sampling effort in Pacific Flyway  
* As of Sep. 5, 2015

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2015-16 Interagency Surveillance Plan for Highly Pathogenic Avian Influenza in Wild Birds in the United States
2015-2016 Wildlife Surveillance Goals

- Identify distribution across U.S.
- Detect early spread into new flyways/regions
- Provide flexible surveillance framework that can monitor wild waterfowl populations for:
  - re-assortments of influenzas
  - introductions of new viruses
  - estimate prevalence of important influenzas once detected in an area of concern
Dabbling Duck Target Species

Dabbling Ducks
Green-winged Teal
Mallard
Northern Pintail
American Black Duck
Wood Duck
Blue-winged Teal

American Wigeon
Mottled Duck
Muscovy Duck
Fulvous Whistling Duck
Gadwall
Northern Shoveler
Cinnamon Teal
Sampling Effort Map by Watershed
North Carolina Watersheds for HPAI Sampling Efforts BY 2015

- Upper Tennessee Watershed
- Chowan-Roanoke Watershed
- Cape Fear Watershed
- Neuse-Pamlico Watershed
Common Wildlife Hosts of Avian Influenza Virus
North American Wildlife Hosts of AI Virus

Striped Skunk
(Mephitis mephitis)

Raccoon
(Procyon lotor)


North American Wildlife Hosts of AI Virus

Cottontail Rabbit
*Sylvilagus spp.*


House Mouse
*Mus musculus*

Surveillance Update

Nationwide
- 24,583 samples
- 11,843 live wild birds
- 415 agency harvest
- 138 morbidity/mortality
- 12,187 hunter harvest
- 3,664 (14.9%) LPAI

North Carolina
- 1,079 samples
- 14 (1.2%) LPAI
National Feral Swine Management Program
National Feral Swine Management Program
Feral Swine Surveillance

Swine Sampling
- Classical Swine Fever
- Swine Brucellosis
- Pseudorabies
- Toxoplasmosis
- Porcine Reproductive Respiratory Syndrome
- Leptospirois

Influenza
Nasal Swabs
- 114 samples
- 0 positive

Serology
- 136 samples
- 30 (22%) positive
  - Johnston, Duplin, and Bladen Counties