Surveillance Plan for Highly Pathogenic Avian Influenza in Wild Migratory Birds in the United States including Arizona

Valerie Burton, USDA APHIS Wildlife Services

Anne Justice-Allen, Arizona Game and Fish Department

Brandon Melton and Ryan Munes, U.S. Fish and Wildlife Service

David Bergman, USDA APHIS Wildlife Services

Shawna Begay and Erika Brown, Navajo Technical University

Wildlife Services

Protecting People
Protecting Agriculture
Protecting Wildlife

USDA

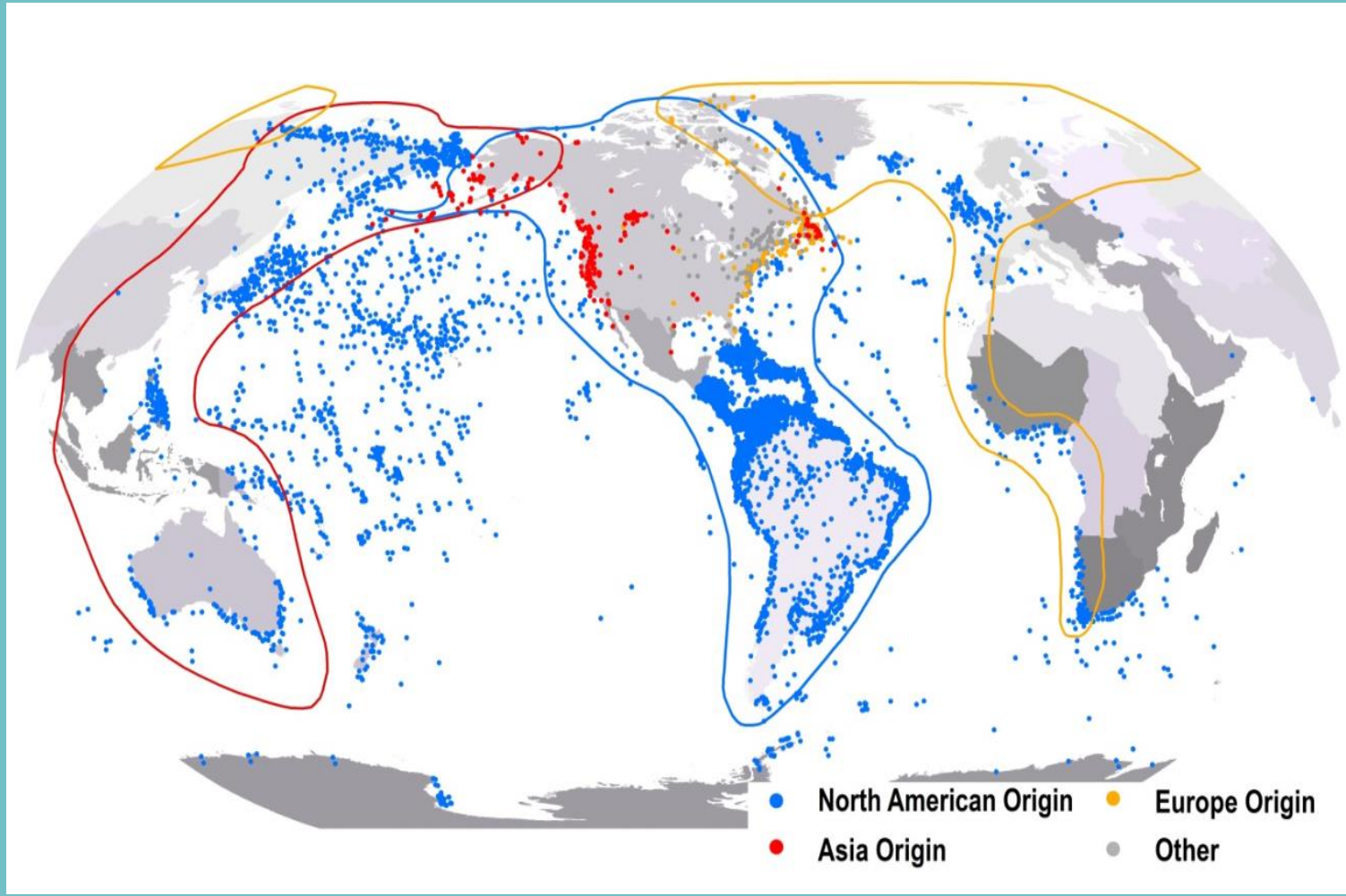
United States Department of Agriculture

Animal and Plant Health Inspection Service

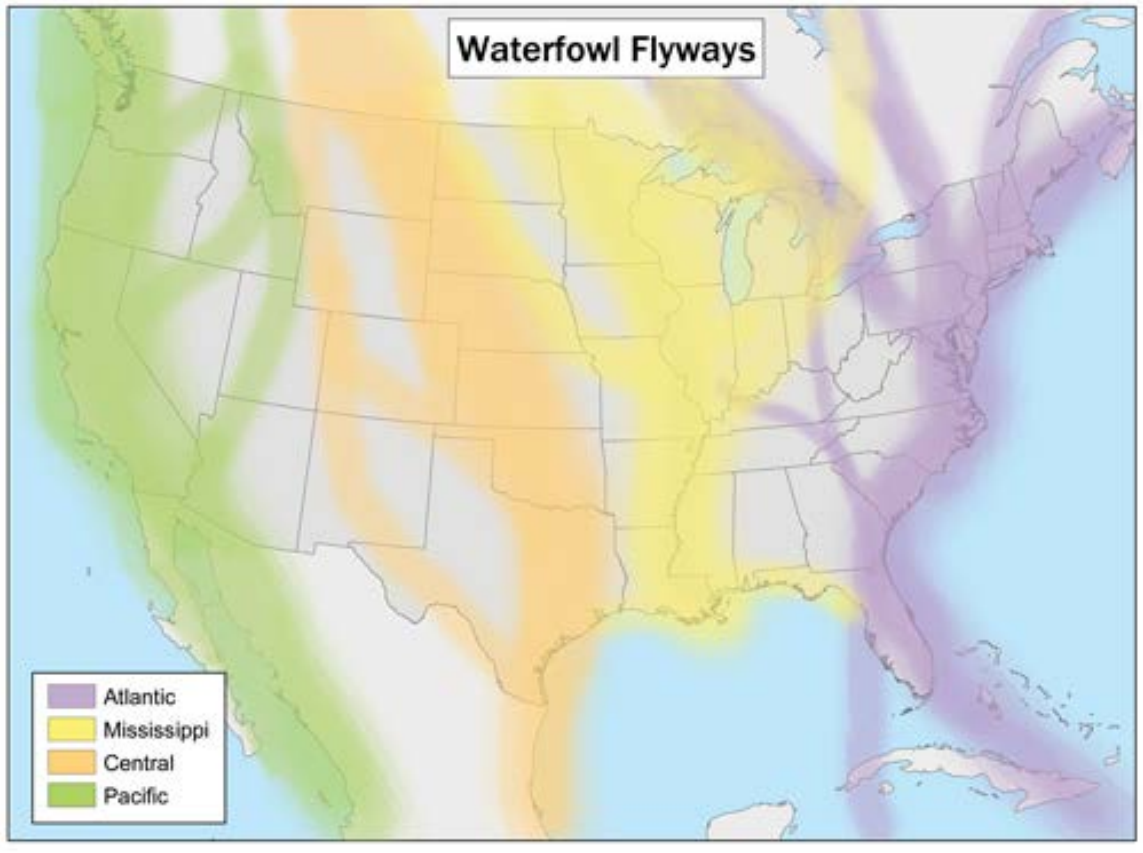
Background

- The first report of H5N1 HPAI occurred in Asia in 1996.
- Domestic goose - China
- The Asian H5N1 HPAI is the predecessor of multiple reassortants, including H5N2, H5N5, and H5N8.

World Migratory Flyways



Background



- In 2014 Eurasian HPAI H5N8 (EA-H5N8) spread rapidly along wild bird migratory pathways.
- The introduction of this EA-H5N8 into the Pacific Flyway has allowed mixing with North American (AM) lineage viruses and generated new combinations with genes from both EA and AM origin.

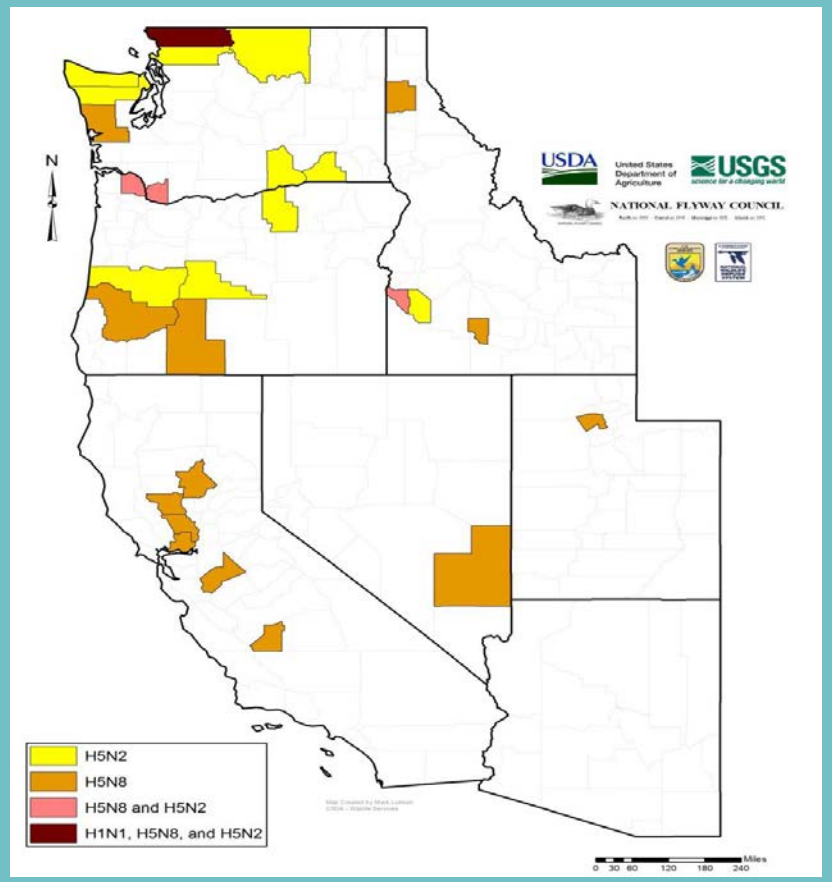
Background

- In the fall of 2014, EA-H5N2 was identified in commercial poultry in British Columbia, Canada
- Samples collected from wild birds in the United States
- Mortality events associated with captive raptors
- At least three Eurasian H5 HPAIs in circulation

Background

- Between March and June of 2015, HPAI outbreaks in US domestic poultry operations resulted in the loss of nearly 50 million birds.
- In January 2016, an HPAI event was identified in domestic turkeys in Indiana.
- Testing revealed a H7N8 virus of AM lineage and therefore different from the EA HPAIs responsible for poultry outbreaks in 2014 – 2015.

2014/2015 U.S.A. HPAI Outbreak

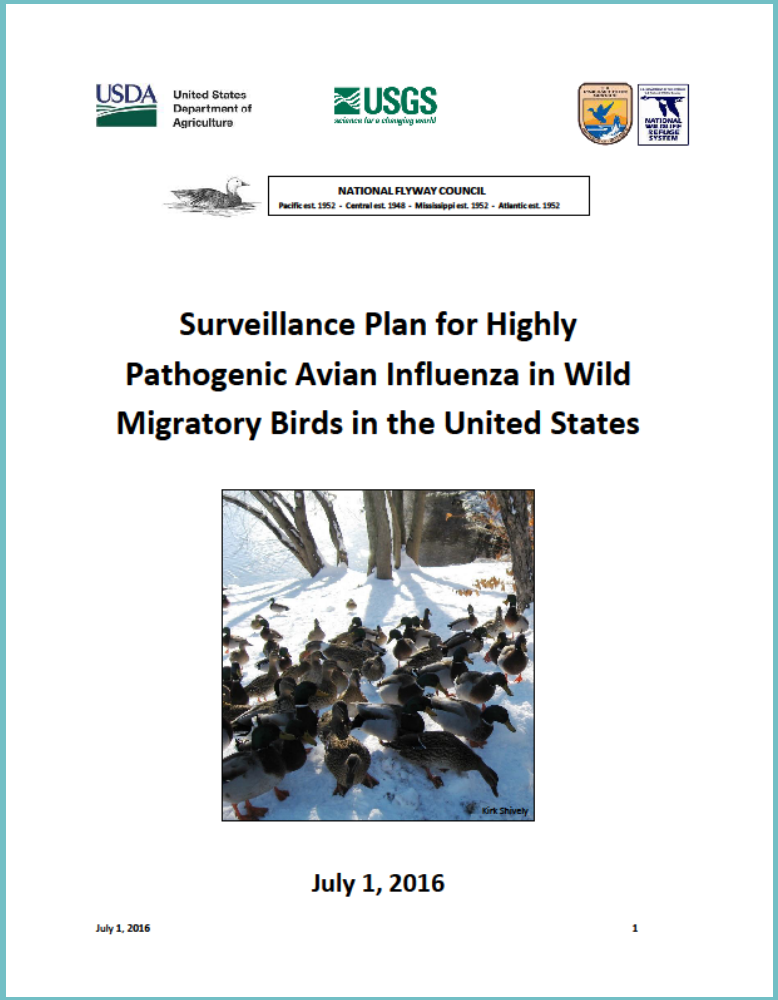


- 8 December 2014: H5N2, Northern Pintail (WA)
- 14 December 2014: H5N8 in captive reared Gyrfalcon (WA)
- 19 Dec 2015: H5N8, backyard flock (OR); H5N2 in 4 additional backyard flocks (ID, WA)
- 23 January 2015: H5N8, turkeys (CA)
- 4 March 2015: H5N2, turkeys (MN)
- 20 April 2015: H5N2, 3.8m table egg laying chickens (IA)

Development of a Early Detection System of HPAI in Wild Migratory Birds US Interagency Strategic Plan

- At the request of the Homeland Security Council for Pandemic Influenza Preparedness, USDA and DOI were asked to develop a coordinated National Strategic Plan for early detection of HPAI introduction into North America by wild birds. An interagency Working Group was created in 2005.

Surveillance Plan



USDA United States Department of Agriculture

USGS science for a changing world

NATIONAL FLYWAY COUNCIL

Pacific est. 1952 - Central est. 1948 - Mississippi est. 1952 - Atlantic est. 1952

Surveillance Plan for Highly Pathogenic Avian Influenza in Wild Migratory Birds in the United States

Kirk Shively

July 1, 2016

July 1, 2016 1

Objectives

- Identify the distribution of HPAI by US flyways and through select high priority watersheds
- Detect spread of HPAI to new areas of concern
- Provide a flexible surveillance framework that can be modified to monitor wild waterfowl populations for re-assortments of influenza and introductions of new viruses
- Sequence influenza viruses from wild birds to better understand pathways that lead to outbreaks in commercial and backyard poultry

National Surveillance Plan 2006 – 2017

Updated January 13, 2017

- 2006 – 2009: any species sampled and environmental sampling (live, hunter/agency harvested)
- 2010 – 2011: no environmental sampling and focus on morbidity/mortality events
  - Most important strategy for early detection of HPAI in wild birds
- 2012 – 2013: no sampling
- 2014 – present: targeted watersheds and sampling only dabbling ducks

Year	Samples Taken
2006	74,420
2007	63599
2008	80,426
2009	56,123
2010	31,403
2011	3,440
2012	0
2013	0
2013	433
2015	39,176
2016	41,464
2017	3,410

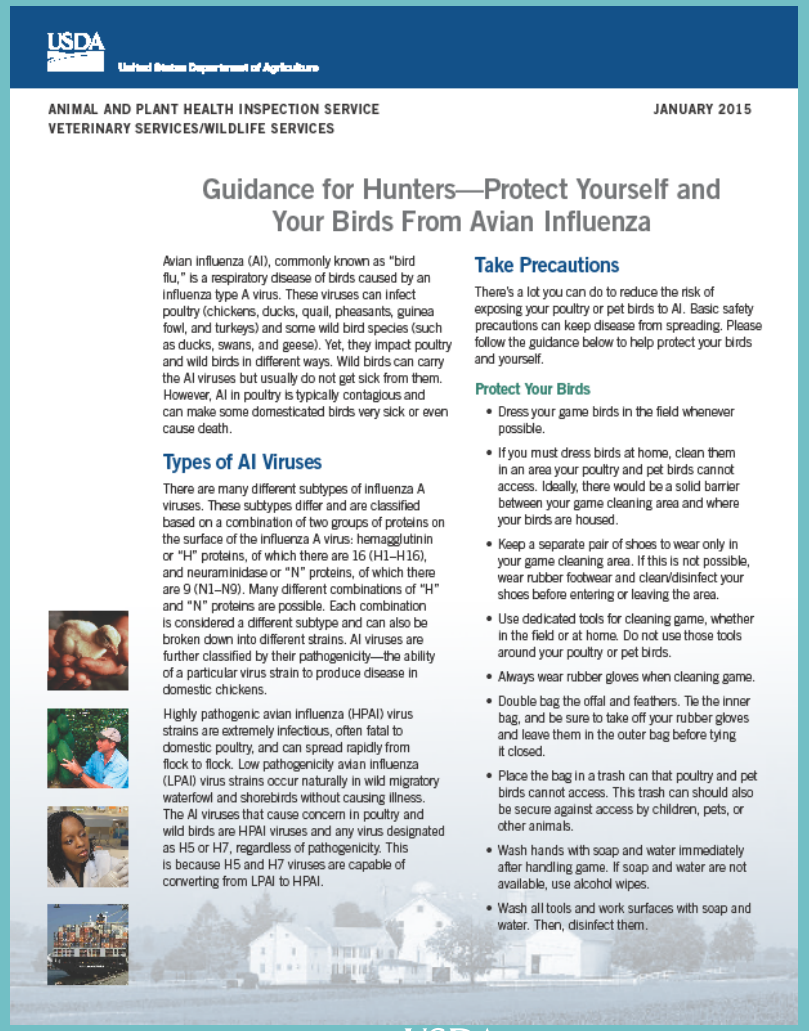
Surveillance Focus 2014 – present

Dabbling Ducks
American Green-winged Teal
Northern Pintail
Wood Duck
Cinnamon Teal
Gadwall
Mottled Duck
Fulvous Whistling Duck
Mallard
American Black Duck
Blue-winged Teal
Northern Shoveler
American Wigeon
Muscovy Duck

- Dabbling Ducks are a primary reservoir
  - Exhibit little to no signs
- Canada Geese
  - Primarily die from infection
  - Goslings acutely sensitive
  - Good morbidity/mortality sentinel

Morbidity/Mortality Events

- Questions or concerns about wild birds call USDA Wildlife Services 1-866-4-USDA-WS
- Questions or concerns about domestic poultry call USDA APHIS 1-866-536-7593



USDA
United States Department of Agriculture

ANIMAL AND PLANT HEALTH INSPECTION SERVICE
VETERINARY SERVICES/WILDLIFE SERVICES

JANUARY 2015

Guidance for Hunters—Protect Yourself and Your Birds From Avian Influenza

Avian influenza (AI), commonly known as "bird flu," is a respiratory disease of birds caused by an influenza type A virus. These viruses can infect poultry (chickens, ducks, quail, pheasants, guinea fowl, and turkeys) and some wild bird species (such as ducks, swans, and geese). Yet, they impact poultry and wild birds in different ways. Wild birds can carry the AI viruses but usually do not get sick from them. However, AI in poultry is typically contagious and can make some domesticated birds very sick or even cause death.

Types of AI Viruses

There are many different subtypes of influenza A viruses. These subtypes differ and are classified based on a combination of two groups of proteins on the surface of the influenza A virus: hemagglutinin or "H" proteins, of which there are 16 (H1–H16), and neuraminidase or "N" proteins, of which there are 9 (N1–N9). Many different combinations of "H" and "N" proteins are possible. Each combination is considered a different subtype and can also be broken down into different strains. AI viruses are further classified by their pathogenicity—the ability of a particular virus strain to produce disease in domestic chickens.

Highly pathogenic avian influenza (HPAI) virus strains are extremely infectious, often fatal to domestic poultry, and can spread rapidly from flock to flock. Low pathogenicity avian influenza (LPAI) virus strains occur naturally in wild migratory waterfowl and shorebirds without causing illness. The AI viruses that cause concern in poultry and wild birds are HPAI viruses and any virus designated as H5 or H7, regardless of pathogenicity. This is because H5 and H7 viruses are capable of converting from LPAI to HPAI.

Take Precautions

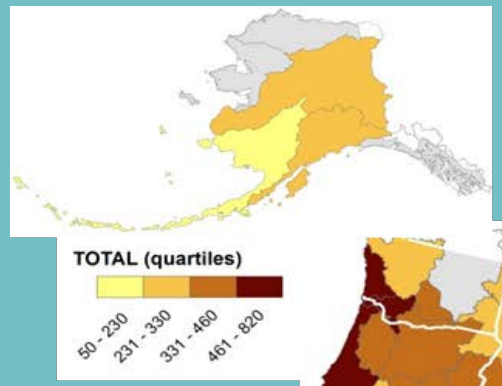
There's a lot you can do to reduce the risk of exposing your poultry or pet birds to AI. Basic safety precautions can keep disease from spreading. Please follow the guidance below to help protect your birds and yourself.

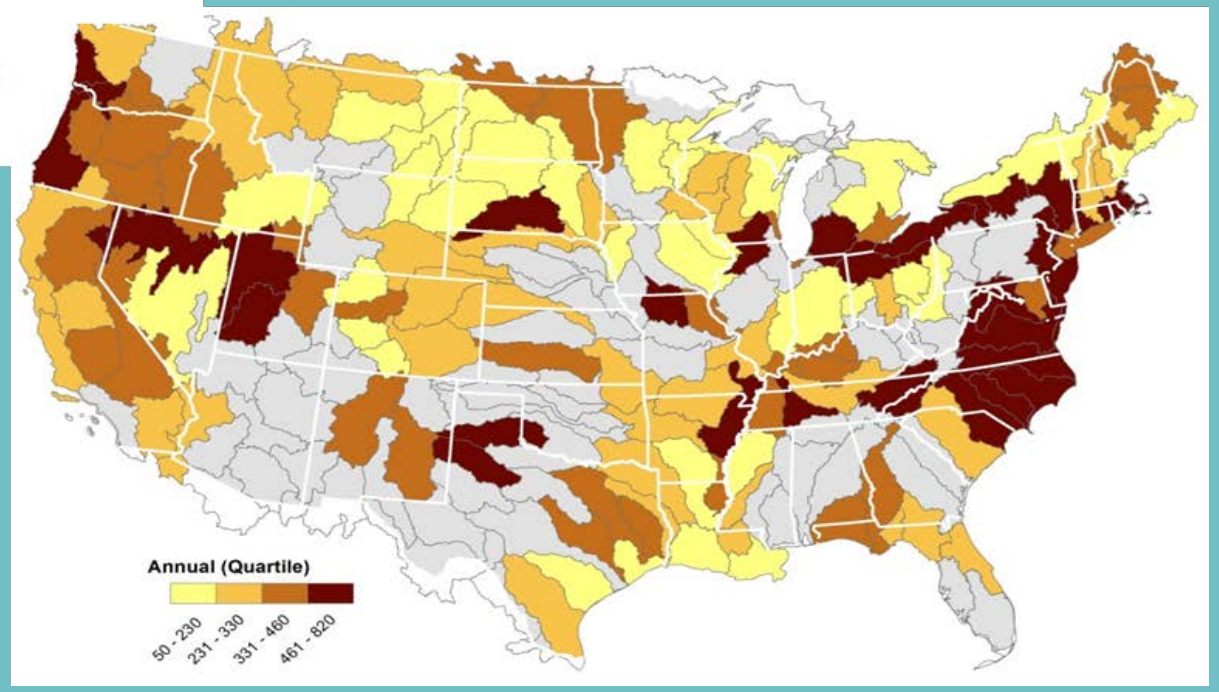
Protect Your Birds

- Dress your game birds in the field whenever possible.
- If you must dress birds at home, clean them in an area your poultry and pet birds cannot access. Ideally, there would be a solid barrier between your game cleaning area and where your birds are housed.
- Keep a separate pair of shoes to wear only in your game cleaning area. If this is not possible, wear rubber footwear and clean/disinfect your shoes before entering or leaving the area.
- Use dedicated tools for cleaning game, whether in the field or at home. Do not use those tools around your poultry or pet birds.
- Always wear rubber gloves when cleaning game.
- Double bag the offal and feathers. Tie the inner bag, and be sure to take off your rubber gloves and leave them in the outer bag before tying it closed.
- Place the bag in a trash can that poultry and pet birds cannot access. This trash can should also be secure against access by children, pets, or other animals.
- Wash hands with soap and water immediately after handling game. If soap and water are not available, use alcohol wipes.
- Wash all tools and work surfaces with soap and water. Then, disinfect them.

Surveillance Focus 2014 - present

- Identified high priority sample areas/watersheds to target for our sample collection efforts





Surveillance Focus

- High priority sample areas/watersheds were identified by using underlying biological aspects for influenza:
  - watersheds with significant historic influenza A clusters in dabbling ducks *(data from previous AI surveillance effort, 2007-2011)*
  - watersheds identified as having high inter- and intra-flyway mixing of dabbling ducks within the lower 48 States
- Plan was developed by a working group comprised of researchers from the WS NWRC, VS CEAH, and USGS NWHC
- Received input from the 4 Flyway Council Technical Working Group Committees, USFWS, and USGS NWHC

National Surveillance
December 2014 – June 2015

Biological Year

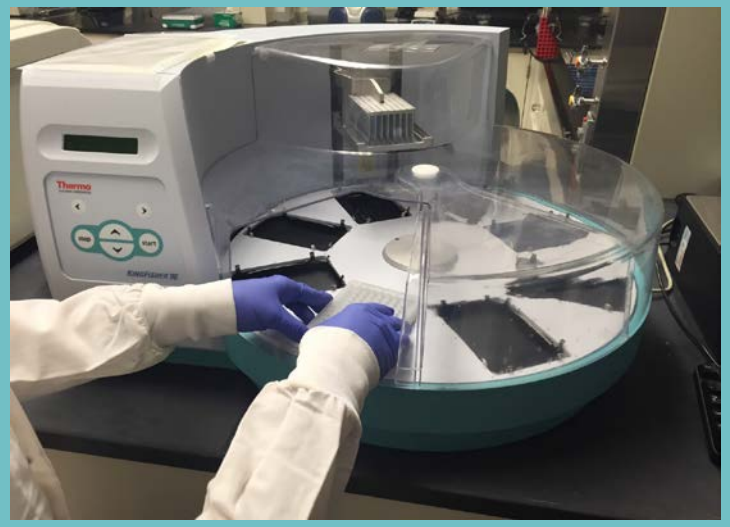
- Total birds sampled: 7,084
  - Atlantic Flyway: 1,000
  - Mississippi Flyway: 2,079
  - Central Flyway: 539
  - Pacific Flyway: 3,374
  - American Oceania (HI): 92
- HPAI confirmed positives: 65
- EA H5 RNA detected: 33

National Surveillance
July 2015 – June 2016

- Total birds sampled: 45,549
  - Atlantic Flyway: 10,663
  - Mississippi Flyway: 13,792
  - Central Flyway: 9,202
  - Pacific Flyway: 11,868
  - American Oceania (HI): 24
- HPAI confirmed positives: 0
- EA H5 RNA detected: 2
  - Mallards
    - ❖Utah – August 21, 2015
    - ❖Oregon – November 18, 2015

Current National Surveillance July 2016 – January 13, 2017

- Total birds sampled: 30,890
  - Atlantic Flyway: 7,743
  - Mississippi Flyway: 8,955
  - Central Flyway: 5,796
  - Pacific Flyway: 8,392
  - American Oceania (HI): 4
- HPAI confirmed positives: 2
  - EA/AM H5N2 HPAI
  - Mallards
    - ❖ Alaska – August 25, 2016
    - ❖ Montana – January 9, 2017



Wild Bird HPAI Positive Cases in the U.S.

2014 – 2017

Updated January 13, 2017

Wild Bird HPAI/icA Positive Species	
Ducks	**73**
American Green-winged Teal	*4*
American Wigeon	*33*
Cinnamon Teal	*1*
Gadwall	*1*
Mallard	*21*
Northern Pintail	*6*
Northern Shoveler	*3*
Ring-necked Duck	*1*
Wood Duck	*3*
Geese	**20**
Canada Goose	*16*
Lesser Snow Goose	*4*
Raptors	**7**
Bald Eagle	*1*
Cooper's Hawk	*2*
Peregrine Falcon	*1*
Red-tailed Hawk	*2*
Snowy Owl	*1*
Passerines	**2**
Black-capped Chickadee	*1*
European Starling	*1*

Wild Bird HPAI/icA Positive States	
California	31
Washington	18
Oregon	17
Michigan	12
Idaho	7
Missouri	3
Utah	2
Kentucky	2
Minnesota	2
Nevada	1
New Mexico	1
Kansas	1
Wyoming	1
Wisconsin	1
Iowa	1
Alaska	1
Montana	1

Wild Bird HPAI Positive Cases in the U.S.

2014 – January 13, 2017

- Total HPAI confirmed positives: 67
- Total EA H5 RNA detected: 35
- Collection strategies
  - Morbidity/mortality: 32
  - Hunter harvest: 66
  - Live bird released: 2
  - Agency harvested: 1

Wildlife Services
Protecting People
Protecting Agriculture
Protecting Wildlife

USDA
United States Department of Agriculture
Animal and Plant Health Inspection Service

Arizona Surveillance
Lower Colorado River

Wildlife Services

Protecting People | Protecting Agriculture | Protecting Wildlife

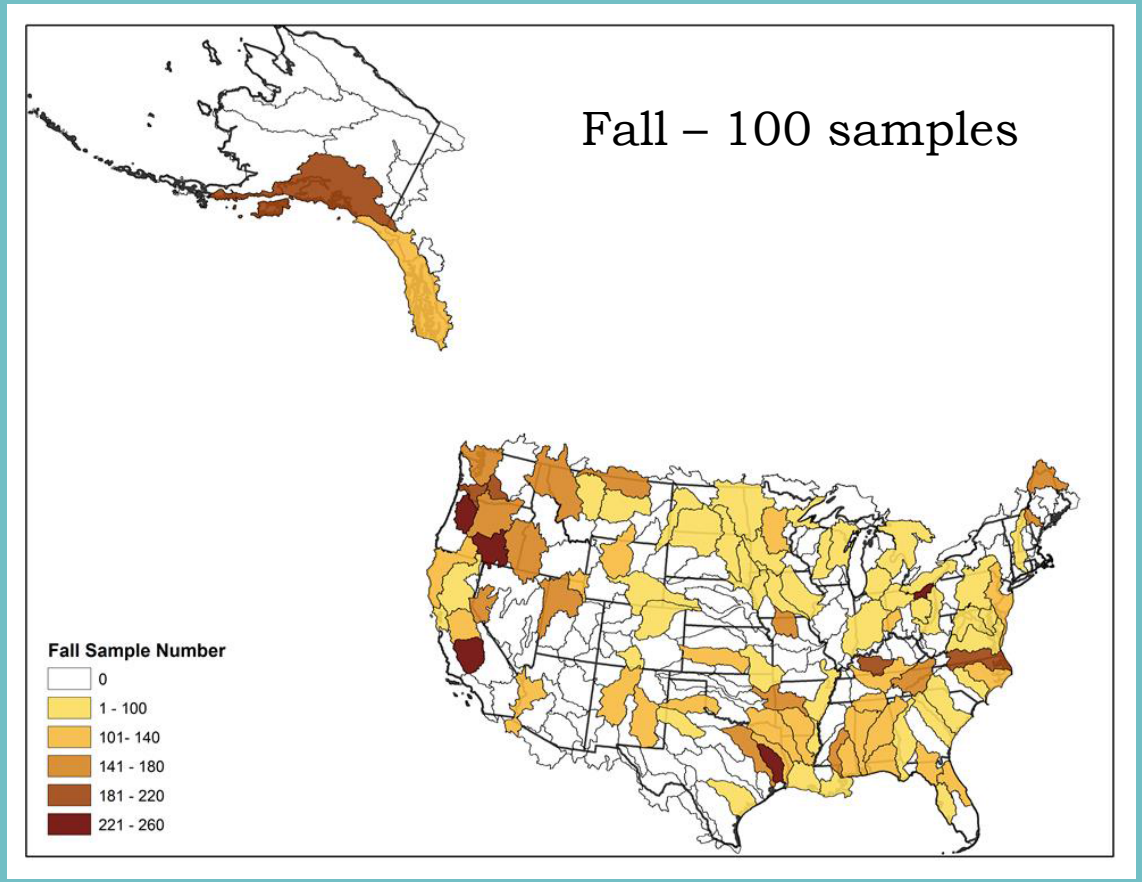
Wildlife Services

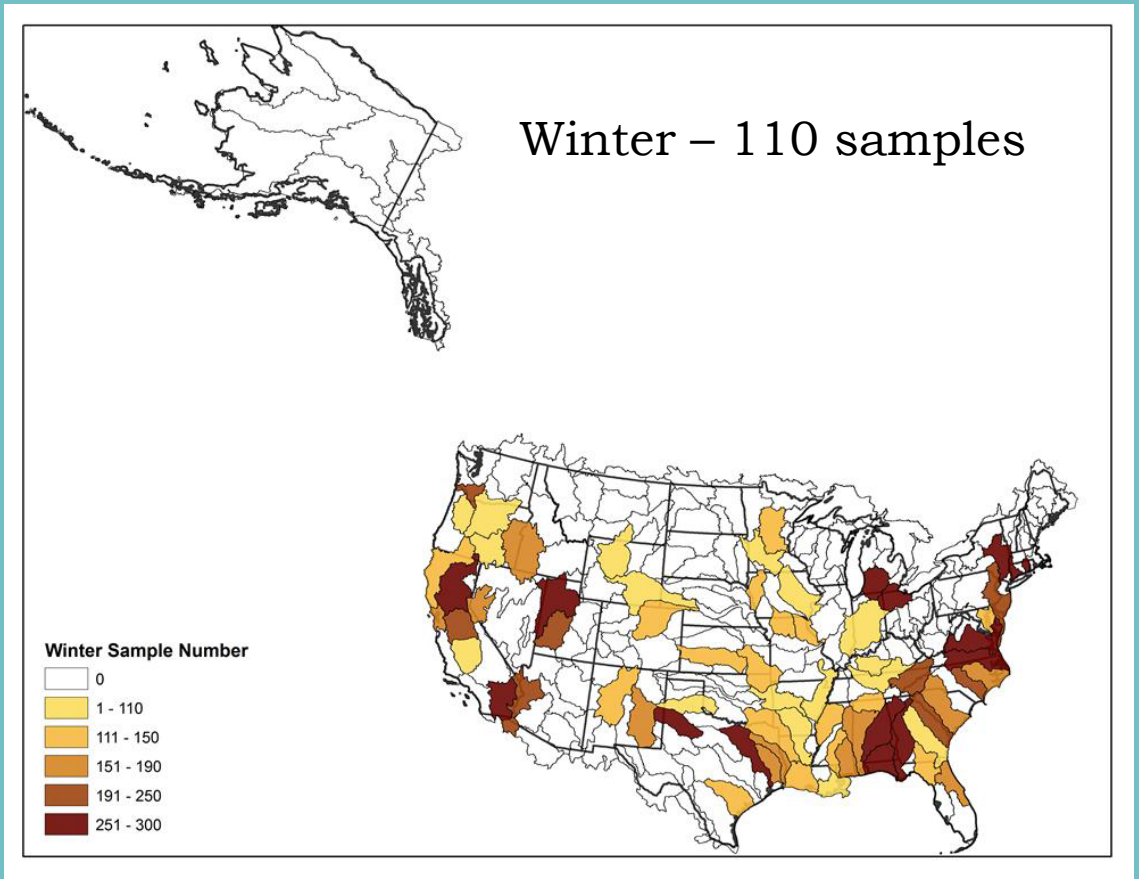
Protecting People
Protecting Agriculture
Protecting Wildlife

USDA

United States Department of Agriculture
Animal and Plant Health Inspection Service

Arizona Surveillance





Arizona Surveillance Results

- Pooled testing was used from 2006 – 2011
- Individual testing used from 2014 – present
- No HPAI found in AZ

year	samples	LPAI positives
2006	1122	
2007	903	
2008	548	
2009	210	
2010	0	
2011	0	
2012	0	
2013	0	
2014	0	
2015	456	10
2016	202	5
2017	148	1

Acknowledgements

Wildlife Services
NWRC
National Wildlife Research Center

For additional Information

https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/avian-influenza-disease/defend-the-flock/defend-the-flock-ai-wild-birds

Wildlife Services
Protecting People
Protecting Agriculture
Protecting Wildlife

USDA
United States Department of Agriculture
Animal and Plant Health Inspection Service

Questions?

Wildlife Services
Protecting People
Protecting Agriculture
Protecting Wildlife

USDA
United States Department of Agriculture
Animal and Plant Health Inspection Service