



Implementation Plan for HPAI Surveillance in Wild Migratory Birds in the United States



Photo courtesy of Nicole Rein



Photo courtesy of Tony Musante



Photo courtesy of Brad Otto

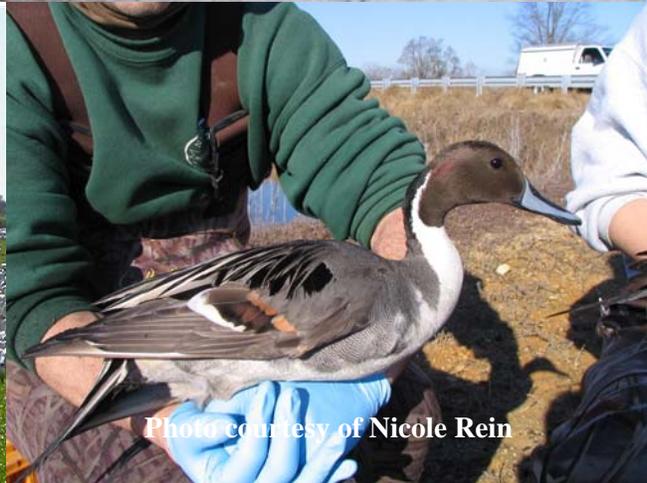


Photo courtesy of Nicole Rein

April 2009

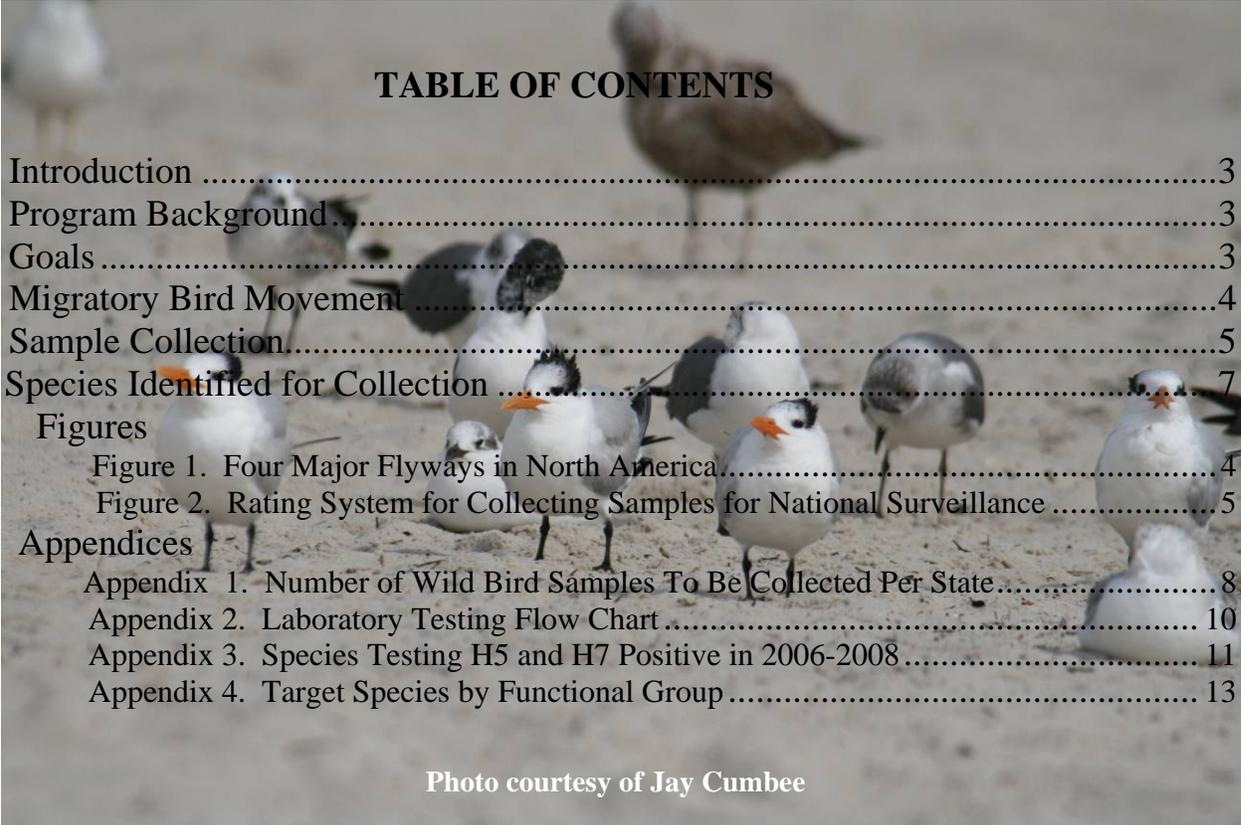


TABLE OF CONTENTS

Introduction	3
Program Background.....	3
Goals	3
Migratory Bird Movement	4
Sample Collection.....	5
Species Identified for Collection	7
Figures	
Figure 1. Four Major Flyways in North America.....	4
Figure 2. Rating System for Collecting Samples for National Surveillance	5
Appendices	
Appendix 1. Number of Wild Bird Samples To Be Collected Per State	8
Appendix 2. Laboratory Testing Flow Chart	10
Appendix 3. Species Testing H5 and H7 Positive in 2006-2008	11
Appendix 4. Target Species by Functional Group	13

Photo courtesy of Jay Cumbee

Introduction

This document provides an overview of how USDA/APHIS/Wildlife Services (WS) plans to conduct national level surveillance and support the collection, diagnostic testing, data management and analysis of data obtained by WS, state wildlife agencies, and tribal cooperators. Implementation of national level surveillance is in direct support of *An Early Detection System for Highly Pathogenic H5N1 Avian Influenza in Wild Migratory Birds, U.S. Interagency Strategic Plan* (US Strategic Plan).

Unfortunately, funding for biological year 2009 has decreased significantly with results impacting efforts in all 50 states. As a result, level 3 states will no longer be funded to conduct active surveillance for high pathogenicity avian influenza (HPAI) in apparently healthy wild, migratory birds. The exception for sampling would be in the case of morbidity/mortality events, where WS is encouraging investigation of these events and will provide diagnostic support. WS will continue to offer financial support to state wildlife agencies in level 1 and level 2 states, and diagnostic laboratory partners participating in the collection and testing of samples. Participants will continue to use the online data entry system implemented in November 2006 to connect field data with laboratory results. For initial screening, all samples collected in support of this partnership will continue to be shipped to National Animal Health Laboratory Network (NAHLN) laboratories approved for the testing of avian influenza viruses. Blanket purchase agreements with NAHLN laboratories will remain in level 1 and level 2 states. Level 3 states collecting samples from a morbidity/mortality event should submit them to either the USGS National Wildlife Health Center, a participating NAHLN laboratory listed in the AI Procedures Manual, or directly to Veterinary Services National Veterinary Services Laboratories (NVSL). Finally, all confirmatory testing for HPAI will be conducted at the NVSL in Ames, Iowa.

Program Background

WS is a program within the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS) that provides Federal leadership and expertise to resolve wildlife conflicts and create a balance that allows people and wildlife to coexist. Federal leadership and expertise include protecting livestock and poultry, natural resources, and public health and safety through an integrated wildlife management approach. WS works in every state to prevent and control the transmission of wildlife-borne diseases by providing assistance to federal and state agencies, tribes, and other entities. Assistance with wildlife-borne disease surveillance, prevention, and eradication is managed through the Wildlife Disease Surveillance and Emergency Response Program and Rabies Management Program. The Wildlife Disease Surveillance and Emergency Response Program is responsible for surveillance, monitoring, and response to wildlife disease events. This cooperative program includes federal, state, local and tribal partners dedicated to the design, implementation, research, and analysis of disease prevalence, ecology and epidemiology.

Goals

A goal of the WS Wildlife Disease Surveillance and Emergency Response Program is to properly develop, implement and maintain a nationwide system that can both monitor for

wildlife diseases and respond to a variety of emergencies, including natural disasters and disease outbreaks. WS has developed this *Implementation Plan for HPAI Surveillance in Wild, Migratory Birds in the United States, April 2009* (Implementation Plan) in support of the US Strategic Plan.

The purpose of this document is to outline implementation of the essential components of a national surveillance system for the early detection of HPAI in wild, migratory birds. This plan is intended to provide guidance for WS, state wildlife agencies, and tribal cooperators to conduct HPAI surveillance in support of the *Wildlife Services & State/Tribal Cooperator Avian Influenza Surveillance Procedures Manual, April 2009* (AI Procedure Manual).

Migratory Bird Movement

Waterfowl and water bird migration in North America generally consists of north-south seasonal movements between breeding grounds and wintering areas. There are four major flyways in North America (Figure 1) that are broadly defined corridors where the migratory paths of many species of interest tend to converge. They are associated with major topographical features in North America, which also tend to be aligned along a north-south axis. The four flyways, Atlantic, Mississippi, Central, and Pacific, have areas of overlap and convergence, particularly at the north and south ends. The flyway boundaries are defined administratively, and are not biologically fixed or sharply defined.

North American Flyways represent the predominant pathways of migratory bird movements within broad geographic areas. Many migratory bird species use specific flyways; however, many species migrate across flyways during fall and spring. Alaska and the Pacific Flyway are thought to be the most likely areas of introduction of infected wild, migratory birds because of their proximity to Siberia and the East Asian flyway. Other pathways of introduction are recognized and considered under other surveillance streams.

Figure 1. Four Major Flyways in North America



Sample Collection

Beginning in biological year 2006, a rating system was designed to allocate sample collection. Ratings assigned to each state in previous years remain the same for biological year 2009. Criteria originally used to determine and assign a rating to each state include: (1) historic low pathogenicity avian influenza prevalence, (2) species-specific migratory pathways, (3) geographic size and location of each state, (4) wetland habitat and amount of shoreline, (5) input from the four flyway council technical sections and the Association of Fish & Wildlife Agencies, and (6) band recovery data. The following rating system will be used to determine sample sizes in biological year 2009 (Figure 2 and Appendix 1):

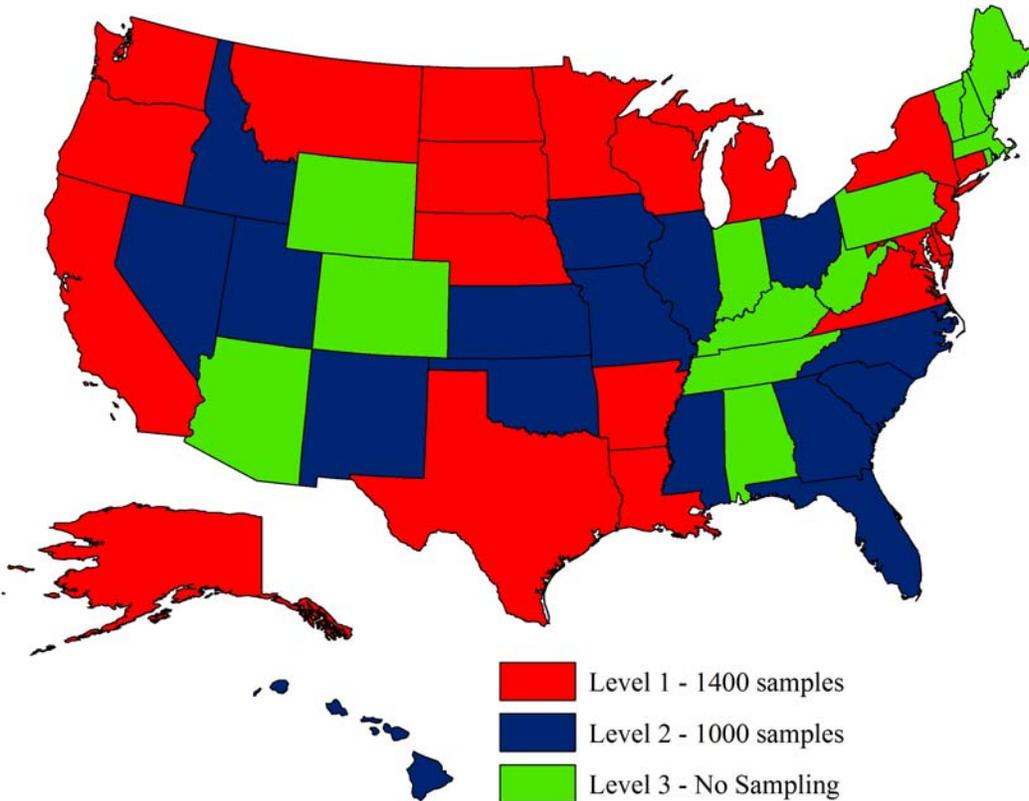


Figure 2. Map of the United States depicting the rating for biological year 2009 which equates to number of samples

- Level 1 states are rated the highest and are assigned 1400 wild bird samples per state (800 = WS and 600 = state wildlife agencies).
- Level 2 states are rated intermediate and are assigned 1000 wild bird samples per state (600 = WS and 400 = state wildlife agencies).
- Level 3 states will not be funded to collect samples from apparently healthy wild birds. WS employees and state wildlife agencies in level 3 states are encouraged to investigate morbidity/mortality events and collect samples when deemed appropriate.

State wildlife agencies in level 1 and level 2 states should work with their respective WS State Director to complete and submit a Work and Financial Plan for establishing a

Cooperative Agreement to obtain financial assistance for conducting surveillance. Templates are available from the WS State Director. While the Work and Financial Plan is centered on active surveillance, cooperators have the ability to use funds for passive surveillance as well as for supporting education/outreach programs. WS will directly reimburse laboratories for diagnostic costs and provide sample kits to cooperators at no charge. Level 3 states are encouraged to continue to investigate and submit samples from morbidity/mortality events and to explore possibilities for sampling using outside funding or sampling at a reduced cost.

In biological year 2009, a minimum of 44,000 wild bird samples will be collected through the cooperative efforts of the national surveillance plan. However, environmental (fecal) sampling will not be conducted or be included as part of the early detection of HPAI in wild, migratory birds.

National level surveillance for HPAI in wild, migratory birds will follow a biological year beginning April 1, 2009 through March 31, 2010. Approximately 70% of the samples should be collected during the time of year when the target species would be migrating into or through a specific state. Timing of seasonal migratory movements can vary widely dependent on the species, region of the country, and current weather patterns involved. The remainder of the samples will be collected from bird species that are suspected resident or non-migratory populations. Sample collection efforts should be coordinated within each state and include efforts by federal, state, local, university and non-governmental participants. Coordination will allow for the collection of wild bird samples that are distributed temporally and geographically, and will increase sampling efficiency by reducing the number of target species that are sampled. This approach will prevent duplication of sample effort and target surveillance of competent H5 and H7 carriers. Local expertise should be utilized to attempt to stratify sampling of distinct subpopulations of target species over space and time whenever possible.

Five collection strategies are identified in the US Strategic Plan: live wild bird, sentinel, hunter harvest, morbidity/mortality investigation, and environmental sampling. The environmental sampling strategy has been discontinued for biological year 2009. This Implementation Plan supports using any combination of strategies to increase the probability of detecting HPAI. A special focus should be given to investigating morbidity/mortality events. In the case of sick or dying birds, a subset of wild birds should be sampled depending on the circumstances surrounding the morbidity/mortality event including the number of wild birds involved and potential causes of death. Investigations related to morbidity/mortality events should be conducted regardless of the time of year, type of species involved, number of species involved, or the number of samples already collected in the state.

WS and its cooperators will continue to collect one cloacal and one oropharyngeal swab from each wild bird sampled by agency harvest, hunter harvest, sentinel, and live wild bird collection strategies. Cloacal and oropharyngeal swabs will be combined in the same tube of media per the AI Procedures Manual. Sampling during morbidity/mortality events will follow the same procedures as previous years, i.e., one tracheal and one cloacal sample will be collected from specimens and placed in different tubes. Details regarding sample

collection, packaging and shipping can be found in the AI Procedures Manual. All samples will be submitted to one of 35 approved National Animal Health Laboratory Network (NAHLN) laboratories. Samples will be screened to determine if type A influenza virus is present; if the test is positive, the sample will be further analyzed by H5 and H7 specific assays. Samples testing H5 or H7 positive at a NAHLN laboratory will be sent to NVSL for confirmatory testing and final diagnosis (Appendix 2).

Each participating agency, university, or other entity is responsible for entering field data directly into the APHIS Veterinary Services Laboratory Submission System website (<http://cowebapps.aphis.usda.gov/vslabsub/login.do>) within 24 hours of submitting samples to the laboratory. Once the field data has been entered into the system, results will be entered online and available for viewing. Collectors and submitters can also run reports and queries using this online system.

Detailed information regarding sample collection procedures, processing, and data entry is outlined in the AI Procedures Manual. To receive an electronic copy of the procedures manual please contact Kerri Pedersen (Kerri.Pedersen@aphis.usda.gov or 970-266-6272), Brandon Schmit (Brandon.B.Schmit@aphis.usda.gov or 970-266-6079) or Mark Lutman (Mark.W.Lutman@aphis.usda.gov or 970-266-6077).

Species Identified for Collection

The US Strategic Plan identifies lists of migratory bird species that could potentially be exposed to high pathogenicity H5N1 avian influenza. Flyway Councils also have developed regional plans which list priority species for sampling. This Implementation Plan recognizes these lists of bird species and targets surveillance within those lists toward competent H5 and H7 carriers or reservoirs. Species that have tested (LPAI) H5 or H7 positive in previous biological years (Appendix 3) will be targeted in biological year 2009. Since the majority of H5 positives have been detected in dabbling ducks the primary focus of sampling will continue to be on these species (Genus *Anas*, *Aix*, *Cairina*, and *Dendrocygna*) (American Green-winged Teal, Mallard, Northern Pintail, American Black Duck, Wood Duck, Blue-winged Teal, Cinnamon Teal, Northern Shoveler, Gadwall and American Wigeon). Each state should focus on one or more dabbling duck species with a goal of collecting 200 samples per species. If it is not feasible to collect 200 samples from one species, the state may opt to collect at least 200 samples from dabblers as a functional group. The secondary focus should be on collecting 200 samples per functional group of diving ducks (Genus *Aythya*, *Somateria*, *Melanitta*, *Polysticta*, *Bucelpha*, *Histrionicus*, *Clangula*, *Oxyura*, *Nomonyx*, *Lophodytes*, *Mergus*), or geese/swans (Genus *Anser*, *Chen*, *Branta*, *Cygnus*). A tertiary focus of sampling shorebirds (Family *Charadriidae*, *Haematopodidae*, *Jacaniidae*, *Recurvirostridae*, *Scolopacidae*), gulls (Genus *Xema*, *Rhodostethia*, *Rissa*, *Pagophila*, *Larus*), terns (Genus *Sterna*, *Chlidonias*, *Anous*), skimmers (Genus *Rynchops*), alcids (Family: *Alcidae*) and other birds (Appendix 4) can be considered for sampling if state wildlife agencies or other cooperators have current projects or interest. Close coordination should occur at the local level to ensure complementary and additive surveillance and sampling approaches. Coordinating sampling with planned banding activities, waterfowl hunts, or other similar projects would provide an opportunity to increase efficiency and provide valuable cost-saving measures.

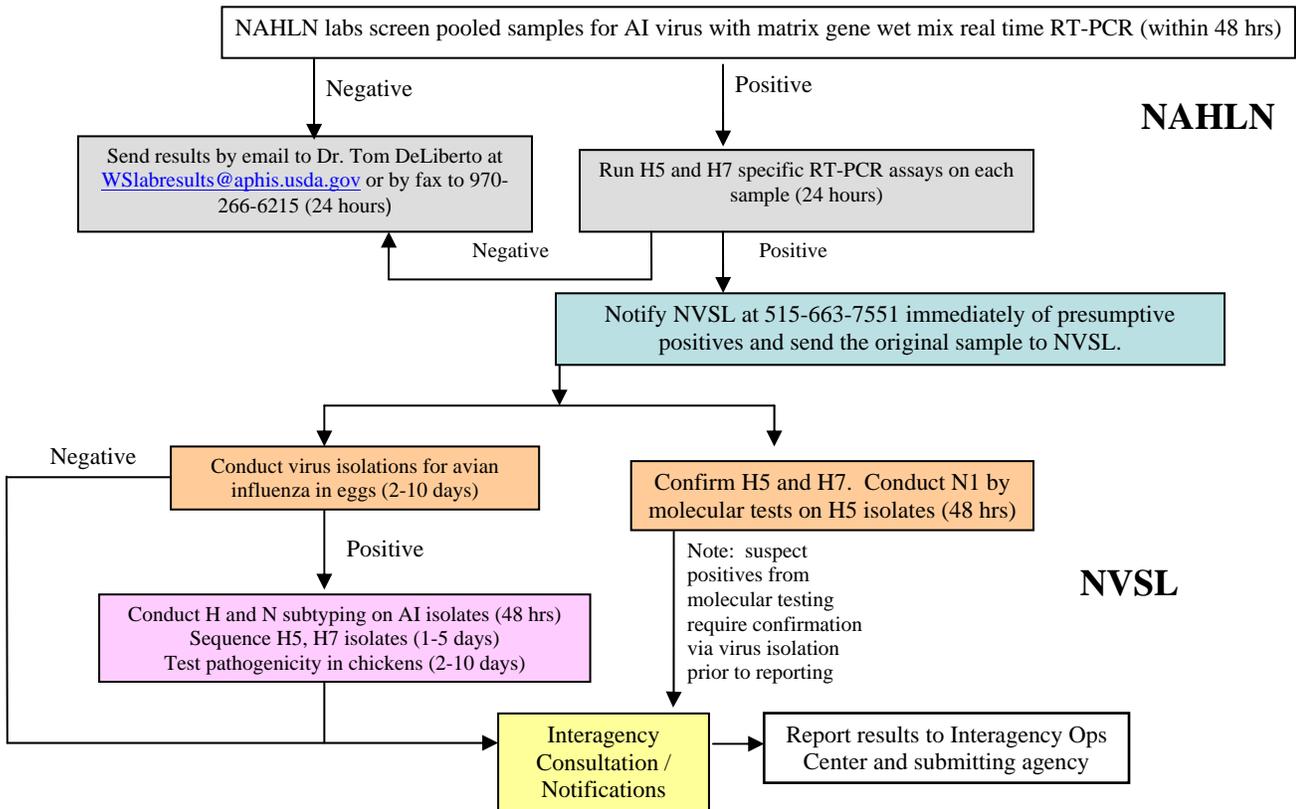
APPENDIX 1
Number of Wild Bird Samples to be collected per State

State	Ranking Level	# of Wildlife Services Samples	# of State Wildlife Agency Samples	Total # of Wild Bird Samples
Alabama	3	0	0	0
Alaska	1	800	600	1400
Arizona	3	0	0	0
Arkansas	1	800	600	1400
California	1	800	600	1400
Colorado	3	0	0	0
Connecticut	1	800	600	1400
Delaware	1	800	600	1400
Florida	2	600	400	1000
Georgia	2	600	400	1000
Hawaii	2	600	400	1000
Idaho	2	600	400	1000
Illinois	2	600	400	1000
Indiana	3	0	0	0
Iowa	2	600	400	1000
Kansas	2	600	400	1000
Kentucky	3	0	0	0
Louisiana	1	800	600	1400
Maine	3	0	0	0
Massachusetts	3	0	0	0
Maryland	1	800	600	1400
Michigan	1	800	600	1400
Minnesota	1	800	600	1400
Mississippi	2	600	400	1000
Missouri	2	600	400	1000
Montana	1	800	600	1400
Nebraska	1	800	600	1400
Nevada	2	600	400	1000
New Hampshire	3	0	0	0
New Jersey	1	800	600	1400
New Mexico	2	600	400	1000
New York	1	800	600	1400
North Carolina	2	600	400	1000
North Dakota	1	800	600	1400
Ohio	2	600	400	1000
Oklahoma	2	600	400	1000
Oregon	1	800	600	1400
Pennsylvania	3	0	0	0

Rhode Island	3	0	0	0
South Carolina	2	600	400	1000
South Dakota	1	800	600	1400
Tennessee	3	0	0	0
Texas	1	800	600	1400
Utah	2	600	400	1000
Vermont	3	0	0	0
Virginia	1	800	600	1400
Washington	1	800	600	1400
West Virginia	3	0	0	0
Wisconsin	1	800	600	1400
Wyoming	3	0	0	0

Level 1 States	Level 2 States	Level 3 States
Alaska	Florida	Alabama
Arkansas	Georgia	Arizona
California	Hawaii	Colorado
Connecticut	Idaho	Indiana
Delaware	Illinois	Kentucky
Louisiana	Iowa	Maine
Maryland	Kansas	Massachusetts
Michigan	Mississippi	New Hampshire
Minnesota	Missouri	Pennsylvania
Montana	Nevada	Rhode Island
Nebraska	New Mexico	Tennessee
New Jersey	North Carolina	Vermont
New York	Ohio	West Virginia
North Dakota	Oklahoma	Wyoming
Oregon	South Carolina	
South Dakota	Utah	
Texas		
Virginia		
Washington		
Wisconsin		

APPENDIX 2 Laboratory Testing Flow Chart



APPENDIX 3

Species testing H5 positive in 2006-2008

Biological Year 2006 (April 1, 2006 through March 31, 2007)

1. American Green-winged Teal (*Anas crecca*)
2. American Wigeon (*Anas americana*)
3. American Black Duck (*Anas rubripes*)
4. Blue-winged Teal (*Anas discors*)
5. Cackling Goose (*Branta canadensis*)
6. Canada Goose (*Branta canadensis*)
7. Common Goldeneye (*Bucephala clangula*)
8. Domestic Duck (*Anas platyrhynchos*)
9. Gadwall (*Anas strepera*)
10. Lesser Snow Goose (*Chen caerulescens*)
11. Mallard (*Anas platyrhynchos*)
12. Muscovy Duck (*Cairina moschata*)
13. Mute Swan (*Cygnus olor*)
14. Northern Pintail (*Anas acuta*)
15. Northern Shoveler (*Anas clypeata*)
16. Ring-necked Duck (*Aythya collaris*)
17. Tundra Swan (*Cygnus columbianus*)

Biological Year 2007 (April 1, 2007 through March 31, 2008)

1. American Green-winged Teal (*Anas crecca*)
2. American Wigeon (*Anas americana*)
3. American Black Duck (*Anas rubripes*)
4. Blue-winged Teal (*Anas discors*)
5. Bufflehead (*Bucephala albeola*)
6. Cackling Goose (*Branta canadensis*)
7. Canada Goose (*Branta canadensis*)
8. Canvasback (*Aythya valisineria*)
9. Common Goldeneye (*Bucephala clangula*)
10. Gadwall (*Anas strepera*)
11. Greater Scaup (*Aythya marila*)
12. Herring Gull (*Larus argentatus*)
13. Lesser Scaup (*Aythya affinis*)
14. Lesser Snow Goose (*Chen caerulescens*)
15. Mallard (*Anas platyrhynchos*)
16. Mottled Duck (*Anas fulvigula*)
17. Mute Swan (*Cygnus olor*)
18. Northern Pintail (*Anas acuta*)
19. Northern Shoveler (*Anas clypeata*)
20. Redhead (*Aythya americana*)
21. Ring-necked Duck (*Aythya collaris*)
22. Ruddy Turnstone (*Arenaria interpres*)
23. Wood Duck (*Aix sponsa*)

Biological Year 2008 (April 1, 2008 through March 31, 2009)

1. American Green-winged Teal (*Anas crecca*)
2. American Wigeon (*Anas americana*)
3. American Black Duck (*Anas rubripes*)
4. Blue-winged Teal (*Anas discors*)
5. Bufflehead (*Bucephala albeola*)
6. Canada Goose (*Branta canadensis*)
7. Common Goldeneye (*Bucephala clangula*)
8. Gadwall (*Anas strepera*)
9. Lesser Scaup (*Aythya affinis*)
10. Lesser Snow Goose (*Chen caerulescens*)
11. Mallard (*Anas platyrhynchos*)
12. Northern Pintail (*Anas acuta*)
13. Northern Shoveler (*Anas clypeata*)
14. Ring-necked Duck (*Aythya collaris*)
15. White-Fronted Goose (*Anser albifrons*)
16. Wood Duck (*Aix sponsa*)

Species testing H7 positive in 2008 (no confirmed H7 positives in 2006 or 2007)

1. American Green-winged Teal (*Anas crecca*)
2. American wigeon (*Anas americana*)
3. Blue-winged Teal (*Anas discors*)
4. Bufflehead (*Bucephala albeola*)
5. Canada Goose (*Branta canadensis*)
6. Domestic Duck (*Anas platyrhynchos*)
7. Gadwall (*Anas strepera*)
8. Mallard (*Anas platyrhynchos*)
9. Mute Swan (*Cygnus olor*)
10. Northern Pintail (*Anas acuta*)
11. Northern Shoveler (*Anas clypeata*)
12. Ring-necked Duck (*Aythya collaris*)

APPENDIX 4
Target Species by Functional Group

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

Diving Ducks		
Canvasback	Redhead	Spectacled Eider
Ring-necked Duck	Common Eider	Steller's Eider
Greater Scaup	Harlequin Duck	Long-tailed Duck
Lesser Scaup	Surf Scoter	Barrow's Goldeneye
White-winged Scoter	Common Merganser	Red-breasted Merganser
Bufflehead	Ruddy Duck	King Eider
Common Goldeneye	Tufted Duck	Black Scoter
Hooded Merganser	Masked Duck	

Shorebirds		
Semipalmated Plover	Willet	Curlew Sandpiper
Wilson's Plover	Long-Billed Curlew	Rock Sandpiper
Snowy Plover	Whimbrel	Stilt Sandpiper
Piping Plover	Bristle-thighed Curlew	Baird's Sandpiper
Killdeer	Upland Sandpiper	White-rumped Sandpiper
Mountain Plover	Black-tailed Godwit	Red Knot
Mongolian Plover	Bar-tailed Godwit	Purple Sandpiper
European Golden Plover	Hudsonian Godwit	Wilson's Phalarope
Pacific Golden Plover	Marbled Godwit	Red-Necked Phalarope
American Golden Plover	Wandering Tattler	Red Phalarope
Black Bellied Plover	Surfbird	Ruff
Black Oystercatcher	Ruddy Turnstone	Buff-Breasted Sandpiper
American Oystercatcher	Black Turnstone	American Woodcock
American Avocet	Western Sandpiper	Short-Billed Dowitcher
Black-Necked Stilt	Semipalmated Sandpiper	Long-Billed Dowitcher
Greater Yellowlegs	Least Sandpiper	Common Snipe
Lesser Yellowlegs	Sanderling	Sharp-Tailed Sandpiper
Spotted Redshank	Pectoral Sandpiper	Dunlin
Solitary Sandpiper	Spotted Sandpiper	

Geese and Swans	
Mute Swan	Greater White-fronted Goose
Tundra Swan	Emperor Goose
Trumpeter Swan	Lesser Snow Goose
Canada Goose	Greater Snow Goose
Black Brant	Ross's Goose
Barnacle Goose	Cackling Goose
Atlantic Brant	

Gulls, Terns, Skimmers & Alcids		
Sabine's Gull	Ross's Gull	Dovekie
Red-legged Kittiwake	Black-legged Kittiwake	Black Guillemot
Ivory Gull	Little Gull	Thick-billed Murre
Bonaparte's Gull	Black-headed Gull	Xantus's Murrelet
Franklin's Gull	Laughing Gull	Ancient Murrelet
Hermann's Gull	Mew Gull	Marbled Murrelet
Ring-Billed Gull	California Gull	Cassin's Auklet
Thayer's Gull	Iceland Gull	Least Auklet
Lesser Black-backed Gull	Slaty-backed Gull	Crested Auklet
Yellow-footed Gull	Western Gull	Tufted Puffin
Glaucous-winged Gull	Herring Gull	Pigeon Guillemot
Glaucous Gull	Great Black-backed Gull	Common Murre
Caspian Tern	Royal Tern	Razorbill
Elegant Tern	Sandwich Tern	Craveri's Murrelet
Common Tern	Arctic Tern	Kittlitz's Murrelet
Forster's Tern	Roseate Tern	Long-billed Murrelet
Least Tern	Aleutian Tern	Parakeet Auklet
Gull-Billed Tern	Sooty Tern	Whiskered Auklet
Bridled Tern	White-Winged Tern	Rhinoceros Auklet
Black Tern	Brown Noddy	Horned Puffin
Black Noddy	Black Skimmer	Atlantic Puffin

Miscellaneous Birds	
Cranes (Family: <i>Gruidae</i>)	Hérons (Family: <i>Ardeidae</i>)
Grebes (Family: <i>Podicipedidae</i>)	Loons (Family: <i>Gaviidae</i>)
Petrels (Family: <i>Procellariidae</i>)	Shearwaters (Family: <i>Procellariidae</i>)
Albatrosses (Family: <i>Diomedidae</i>)	Bitterns (Family: <i>Ardeidae</i>)
Egrets (Family: <i>Ardeidae</i>)	Coots (Family: <i>Rallidae</i>)
Moorhens (Family: <i>Rallidae</i>)	Rails (Family: <i>Rallidae</i>)