

Washington Department of Fish and Wildlife
Wild Bird Avian Influenza Surveillance Report
July 1st 2009 – June 30th 2010

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Introduction

Avian influenza is caused by viruses that naturally occur in water-associated birds such as ducks, geese, swans, and shorebirds. Avian influenza viruses (AIV) are classified according to two types of proteins present on the surface of the virus, hemagglutinin (H), and neuraminidase (N). There are 16 known hemagglutinin proteins and 9 known neuraminidase proteins, for a total of 144 possible H/N combinations or “subtypes”. Virtually every possible H/N subtype has been found in wild birds, and AIV typically do not cause serious disease in these species.

In contrast to wild birds, domestic poultry such as chickens and turkeys can be extremely susceptible to certain strains of AIV. These strains are referred to as “highly pathogenic avian influenza” (HPAI) viruses. The HPAI designation refers only to the severity of disease caused in domestic poultry, and is not related to the potential to cause disease in humans or other species. To date, all known HPAI viruses have been of the H5 or H7 subtypes, although not all H5 and H7 viruses are HPAI viruses. Commercial poultry producers are aware of the potential threat that wild waterfowl present to domestic poultry, and for decades have taken precautions to prevent contact between domestic and wild birds.

On rare occasions, AIV can mutate or recombine with human influenza viruses and become infectious to humans. Beginning in 2005, an increasing number of human cases of influenza caused by an HPAI H5N1 subtype of an AIV were reported in southeast Asia. Prior to that time, infections with this particular virus had primarily been limited to birds. The human cases sparked worldwide concern that this virus could cause another worldwide epidemic (“pandemic”) of influenza in humans, such as those experienced in 1918, 1957, and 1968.

As a result of this concern, several wild bird surveillance programs were initiated in Washington to assess the prevalence of AIV in wild birds, and to provide an early warning to poultry producers and public health officials should the HPAI H5N1 virus of concern enter the United States via migratory birds. The purpose of this report is to summarize AIV sampling efforts and test results from wild birds collected by Washington Department of Fish and Wildlife (WDFW) between July 1st 2009 and June 30th 2010.

Methods

The avian influenza surveillance program (US Interagency Strategic Plan - USISP) is a collaboration between the U.S. Fish and Wildlife Service (USFWS), the U.S. Department of Agriculture (USDA), Tribal nations, and state wildlife agencies to sample migratory wild birds. This plan can be found at:

http://wdfw.wa.gov/wlm/avian_flu/ai_monitoring_plan.pdf.

The USISP delegated responsibility to the USGS for establishing a nationwide database to capture all avian influenza data from the various agencies throughout the United States. This database, known as the HPAI Early Detection Data System (HEDDS), is viewable by the public and includes data collected in Washington by WDFW, USDA, USFWS, Yakima Wildlife Resources, Quilleute Tribe Natural Resources, Washington State Department of Transportation, Olympic National Park, private citizens, and other entities. For more information about HEDDS data, please visit their website at <http://wildlifedisease.nbio.gov/ai/index.jsp>.

WDFW's samples were collected according to the USISP, as well as from birds during morbidity and mortality investigations. Oral-pharyngeal and/or cloacal swabs were collected from hunter-harvested birds, live-trapped and released birds, agency harvested birds, and birds that were either harvested or collected for routine morbidity and mortality investigations. Agency harvested birds are collected under special permits for a few reasons including: damage control, research purposes, or to meet certain disease-testing quotas. Samples were initially screened for the presence of AIV using a polymerase chain reaction (PCR) assay designed to detect the presence of a matrix protein common to all AIV. Samples that yielded positive matrix results were then screened with a PCR assay designed to detect the presence of H5 or H7 AIV. Samples that yielded positive H5 or H7 results were submitted to a second laboratory to undergo an additional confirmatory PCR test. Both labs further characterized the viruses through a variety of techniques to determine the subtype and whether or not they were HPAI viruses.

Results

WDFW collected a total of 1473 samples between July 1st 2009 and June 30th 2010 (Table 1). The number of samples collected utilizing each strategy are as follows: 791 hunter harvested (Table 2), 618 live-trapped and released (Table 3), and 64 morbidity/mortality (Table 4). WDFW surveillance efforts focused on 6 species of birds; however, additional samples collected through routine statewide avian mortality investigations and incidental sampling accounted for an additional 8 species.

Out of the 1473 samples collected, 38 mallard samples collected during live captures were found to be unsuitable upon arrival at the lab. They have been excluded from all

tables and final values in this report, which leads to a final total of 1435 birds with test results.

274 (19%) samples initially tested positive for the presence of an AIV. Tests indicated 64 samples were positive with an H5 subtype and none were an H7 subtype. Further virus isolation on the positive H5 samples indicated only 12 of these were positive with a detectable AIV. These isolations indicated 6 birds (4 mallards, 1 northern pintail, 1 cackling goose) were positive with a LPAI H5N2 subtype of AIV, 1 mallard had an H5N3 subtype, and 5 birds were ultimately found with non-H5 subtypes of AIV's. No samples were of the H5N1 subtype.

Dabbling ducks had the highest prevalence of AIV (30%), with 3 of 4 species tested yielding individuals with an AIV. In descending order of AIV prevalence, these were: 184/572 (32%) mallards (*Anas platyrhynchos*), 38/155 (25%) northern pintails (*Anas acuta*), 8/48 (17%) American green-winged teals (*Anas crecca*) and 0/1 American wigeon (*Anas americana*).

Geese had relatively low levels of AIV prevalence (7%), although all 3 species tested had positive individuals. In descending order of AIV prevalence, these were: 34/200 (17%) lesser snow geese (*Chen caerulescens*), 6/201 (3%) cackling geese (*Branta hutchinsii minima*), and 1/199 (0.5%) black brant (*Branta bernicla*).

Three species of swans were tested for AIV, but with very small sample sizes. Two of 38 (5%) trumpeter swans (*Cygnus buccinator*) had an AIV, while 1/4 (25%) tundra swans (*Cygnus columbianus*) and none of 3 mute swans (*Cygnus olor*) had an AIV.

No AIV's were detected in 7 red crossbills (*Loxia curvirostra*), 3 bald eagles (*Haliaeetus leucocephalus*), 3 cedar waxwings (*Bombicilla cedrorum*) and 1 ring-billed gull (*Larus delawarensis*) submitted for testing during mortality investigations. One mallard and one green-winged teal were found positive during a mortality investigation in which aspergillosis (*Aspergillus* fungus) was diagnosed as the cause of death. Results from these birds are reported in the paragraphs above.

Summary

Avian influenza viruses were detected at rates and from species that were expected based on numerous surveys done in the United States over the past several decades. Based on samples collected from wild birds in Washington and previous surveys done elsewhere, it appears that highly pathogenic AIV are rare in wild birds, while other AIV are not uncommon for many species. Continued surveillance for AIV in wild birds is advised, with particular emphasis on sick and dead birds to ensure timely detection of highly pathogenic H5N1 or any other highly pathogenic AIV should they enter the United States.

WDFW intends to continue surveillance into the 2010-2011 year, following the guidelines of the USISP. This plan is revised annually, in order to improve the effectiveness of the surveillance methods and to ensure optimal use of resources.

Table 1. Initial Avian Influenza Virus Matrix PCR Results for **All Bird** Samples
 Collected by WDFW, 7/1/09 - 6/30/10

Sp. Code	Common Name	Scientific Name	Total Number Tested	Total AI positive	Percent AI positive	Total H5 positive	Percent H5 positive	Total H5N1 positive	Total H7 positive	Percent H7 positive
<u>Dabbling Ducks</u>										
AGWT	American green-winged teal	<i>Anas crecca</i>	48	8	17 %	0	0	0	0	0
AMWI	American wigeon	<i>Anas americana</i>	1	0	0	0	0	0	0	0
MALL	mallard	<i>Anas platyrhynchos</i>	572	184	32 %	57	10 %	0	0	0
NOPI	northern pintail	<i>Anas acuta</i>	155	38	25 %	4	3 %	0	0	0
Subtotal:			776	230	30 %	61	8 %	0	0	0
<u>Geese</u>										
BLBR	black brant	<i>Branta bernicla</i>	199	1	0.5 %	1	0.5 %	0	0	0
CACG	cackling goose	<i>Branta hutchinsii</i>	201	6	3 %	2	1 %	0	0	0
LSGO	lesser snow goose	<i>Chen caerulescens</i>	200	34	17 %	0	0	0	0	0
Subtotal:			600	41	7 %	3	0.5 %	0	0	0
<u>Swans</u>										
MUSW	mute swan	<i>Cygnus olor</i>	3	0	0 %	0	0	0	0	0
TRUS	trumpeter swan	<i>Cygnus buccinator</i>	38	2	5 %	0	0	0	0	0
TUSW	tundra swan	<i>Cygnus columbianus</i>	4	1	25 %	0	0	0	0	0
Subtotal:			45	3	7 %	0	0	0	0	0
<u>Shorebirds, Misc. water-associated birds and Raptors</u>										
BAEA	bald eagle	<i>Haliaeetus leucocephalus</i>	3	0	0	0	0	0	0	0
CEDW	cedar waxwing	<i>Bobycilla cedrorum</i>	3	0	0	0	0	0	0	0
RBGU	ring-billed gull	<i>Larus delawarensis</i>	1	0	0	0	0	0	0	0
RECR	red crossbill	<i>Loxia curvirostra</i>	7	0	0	0	0	0	0	0
Subtotal:			14	0	0	0	0	0	0	0
Totals			1435	274	19 %	64	4 %	0	0	0 %

Table 2. Initial Avian Influenza Virus Matrix PCR Results for Hunter Harvested Bird
Samples Collected by WDFW, 7/1/09 - 6/30/10

Sp. Code	Common Name	Scientific Name	Total Number Tested	Total AI positive	Percent AI positive	Total H5 positive	Percent H5 positive	Total H7 positive	Percent H7 positive
<u>Dabbling Ducks</u>									
AGWT	American green-winged teal	<i>Anas crecca</i>	46	7	15 %	0	0	0	0
MALL	mallard	<i>Anas platyrhynchos</i>	125	11	9 %	1	1 %	0	0
NOPI	northern pintail	<i>Anas acuta</i>	21	2	10 %	1	5 %	0	0
Subtotal:			192	20	10 %	2	1 %	0	0
<u>Geese</u>									
CACG	cackling goose	<i>Branta hutchinsii</i>	200	6	3 %	2	1 %	0	0
LSGO	lesser snow goose	<i>Chen caerulescens</i>	200	34	17 %	0	0	0	0
BLBR	black brant	<i>Branta bernicla</i>	199	1	0.5 %	1	0.5 %	0	0
Subtotal:			599	41	7 %	3	0.5 %	0	0
Totals			791	61	8 %	5	1 %	0	0 %

Table 3. Initial Avian Influenza Virus Matrix PCR Results for Live Bird
Samples Collected by WDFW, 7/1/09 - 6/30/10

Sp. Code	Common Name	Scientific Name	Total Number Tested	Total AI positive	Percent AI positive	Total H5 positive	Percent H5 positive	Total H7 positive	Percent H7 positive
<u>Dabbling Ducks</u>									
AGWT	Am.green-winged teal	<i>Anas crecca</i>	1	0	0	0	0	0	0
MALL	mallard	<i>Anas platyrhynchos</i>	442	172	39 %	56	13 %	0	0
NOPI	northern pintail	<i>Anas acuta</i>	134	36	27 %	3	2 %	0	0
Subtotal:			577	208	36 %	59	10 %	0	0
<u>Swans</u>									
MUSW	mute swan	<i>Cygnus olor</i>	3	0	0	0	0	0	0
Subtotal:			3	0	0	0	0	0	0
Totals			580	208	36 %	59	10%	0	0 %

Table 4. Initial Avian Influenza Virus Matrix PCR Results for Morbidity/Mortality Bird
 Samples Collected by WDFW, 7/1/09 - 6/30/10

Sp. Code	Common Name	Scientific Name	Total Number Tested	Total AI positive	Percent AI positive	Total H5 positive	Percent H5 positive	Total H7 positive	Percent H7 positive
<u>Dabbling Ducks</u>									
MALL	mallard	<i>Anas platyrhynchos</i>	5	1	20 %	0	0	0	0
AGWT	Am. green-winged teal	<i>Anas crecca</i>	1	1	100 %	0	0	0	0
AMWI	American wigeon	<i>Anas americana</i>	1	0	0	0	0	0	0
Subtotal:			7	2	29 %	0	0	0	0
<u>Geese</u>									
CACG	Cackling goose	<i>Branta hutchinsii</i>	1	0	0	0	0	0	0
Subtotal:			1	0	0	0	0	0	0
<u>Swans</u>									
TRUS	trumpeter swan	<i>Cygnus buccinator</i>	38	2	5 %	0	0	0	0
TUSW	tundra swan	<i>Cygnus columbianus</i>	4	1	25 %	0	0	0	0
Subtotal:			42	3	7 %	0	0	0	0
<u>Other species</u>									
BAEA	bald eagle	<i>Haliaeetus leucocephalus</i>	3	0	0	0	0	0	0
CEDW	cedar waxwing	<i>Bombycilla cedrorum</i>	3	0	0	0	0	0	0
RBGU	ring-billed gull	<i>Larus delawarensis</i>	1	0	0	0	0	0	0
RECR	red Crossbill	<i>Loxia curvirostra</i>	7	0	0	0	0	0	0
Subtotal:			14	0	0	0	0	0	0
Totals			64	5	8 %	0	0 %	0	0 %