Washington Department of Fish and Wildlife
Wild Bird Avian Influenza Surveillance Report
July 1st 2010 – June 30th 2011

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 2010 and June 30th 2011.

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.nbii.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. Intensive morbidity and mortality field surveys were implemented this year to improve the likelihood of discovering ailing waterfowl.

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 1066 samples between July 1st 2010 and June 30th 2011 (Table 1). The number of samples collected utilizing each strategy are as follows: 663 hunter harvested (Table 2), 332 live-trapped and released (Table 3), 0 agency harvested, and 71 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 7 species.

Out of the 1066 samples collected, 180 (17%) samples initially tested positive or suspect for the presence of an AIV. The initial screening tests indicated 7 samples were positive with an H5 subtype; although, further virus isolation indicated only one of these samples was H5 positive. This sample came from an American green-winged teal (Skagit County) and was a LPAI H5N2 subtype. One H7 positive sample came from a northern pintail (Whatcom County) and was a LPAI H7N3 subtype upon further virus isolation.

Dabbling ducks had the highest prevalence of AIV, with all 3 species tested yielding positive individuals. In descending order of AIV prevalence, these were: 28% of mallards (*Anas platyrhynchos*), 12% of American green-winged teals (*Anas crecca*) and 11% of northern pintails (*Anas acuta*). One diving duck (lesser scaup, *Aythya affinis*) was tested during a mortality investigation and was found negative for AIV.

Geese had relatively low levels of AIV prevalence, although 3 of 4 species tested had positive individuals. In descending order of AIV prevalence, these were: 3% of lesser snow geese (*Chen caerulescens*), 0.5% of cackling geese (*Branta hutchinsii minima*), 0.5% of black brant (*Branta bernicla*) and 0% of Canada geese (*Branta canadensis*; n=1).

Two species of swans were tested for AIV during morbidity and mortaility investigations, yielding potentially biased results. Six percent of trumpeter swans (*Cygnus buccinator*) had an AIV, while none of the tundra swans (*Cygnus columbianus*) were positive.

Additional species were tested for AIV during routine morbidity mortality investigations, and all birds results were negative. Species included small quantities of each of the following: cooper's hawk, American white pelicans and brown pelicans.

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. 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 2011-2012 year, although at significantly reduced levels. This plan is revised annually, in order to improve the effectiveness of the surveillance methods and to achieve optimal use of resources.

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Table 1. Initial Avian Influenza Virus Matrix PCR Results for **All Bird** Samples
Collected by WDFW, 7/1/10 - 6/30/11

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
Dabbling and Diver Ducks										
AGWT	Am. green-winged teal	*Anas crecca*	42	5	12 %	1	2 %	0	0	0
MALL	mallard	*Anas platyrhynchos*	200	57	28 %	0	0 %	0	0	0
NOPI	northern pintail	*Anas acuta*	164	18	11 %	0	0 %	0	1	0.6 %
Subtotal:			**406**	**80**	**20 %**	**1**	**0.2 %**	0	**1**	**0.2 %**
LESC	Lesser scaup	*Aythya affinis*	1	0	0 %	0	0 %	0	0	0 %
Subtotal:			**1**	**0**	**0 %**	**0**	**0 %**	0	**0**	**0 %**
Geese										
BLBR	black brant	*Branta bernicla*	196	1	0.5 %	0	0 %	0	0	0
CACG	cackling goose	*Branta hutchinsii*	200	1	0.5 %	0	0 %	0	0	0
LSGO	lesser snow goose	*Chen caerulescens*	195	6	3 %	0	0 %	0	0	0
CAGO	Canada goose	*Branta canadensis*	1	0	0 %	0	0 %	0	0	0
Subtotal:			**592**	**8**	**1 %**	**0**	**0 %**	0	0	0 %
Swans										
TRUS	trumpeter swan	*Cygnus buccinator*	59	4	6 %	0	0	0	0	0
TUSW	tundra swan	*Cygnus columbianus*	2	0	0 %	0	0	0	0	0
Subtotal:			**61**	**4**	**6 %**	**0**	**0 %**	0	0	0 %
Other Bird Species										
AWPE	Am. white pelican	*Pelicanus erythrorhynchos*	2	0	0	0	0	0	0	0
BRPE	brown pelican	*Pelicanus occidentalis*	3	0	0	0	0	0	0	0
COHA	cooper's hawk	*Accipiter cooperii*	1	0	0	0	0	0	0	0
Subtotal:			**6**	**0**	**0 %**	**0**	**0 %**	0	**0**	**0 %**
TOTALS:			**1066**	**92**	**9 %**	**1**	**0.09 %**	0	**1**	**0.09 %**

Table 2. Initial Avian Influenza Virus Matrix PCR Results for **Hunter Harvested Bird**
Samples Collected by WDFW, 7/1/10 - 6/30/11

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
Dabbling Ducks									
AGWT	Am. green-winged teal	*Anas crecca*	42	5	12 %	1	2 %	0	0
MALL	mallard	*Anas platyrhynchos*	30	1	3 %	0	0 %	0	0
NOPI	northern pintail	*Anas acuta*	36	6	17 %	0	0 %	0	0
Subtotal:			**108**	**12**	**11 %**	**1**	**0.9 %**	**0**	**0**
Geese									
CACG	cackling goose	*Branta hutchinsii*	200	1	0.5 %	0	0 %	0	0
LSGO	lesser snow goose	*Chen caerulescens*	159	0	0 %	0	0 %	0	0
BLBR	black brant	*Branta bernicla*	196	1	0.5 %	0	0 %	0	0
Subtotal:			**555**	**2**	**0.4 %**	**0**	**0 %**	**0**	**0**
Totals			**663**	**14**	**2 %**	**1**	**0.2 %**	**0**	**0**

Table 3. Initial Avian Influenza Virus Matrix PCR Results for **Live Bird**
Samples Collected by WDFW, 7/1/10 - 6/30/11

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
Dabbling Ducks									
AGWT	Am. green-winged teal	*Anas crecca*	0	0	0 %	0	0 %	0	0 %
MALL	mallard	*Anas platyrhynchos*	167	56	34 %	0	0 %	0	0 %
NOPI	northern pintail	*Anas acuta*	128	12	9 %	0	0 %	1	0.8 %
Subtotal:			**295**	**68**	**23 %**	**0**	**0 %**	**1**	**0.3 %**
Geese									
LSGO	lesser snow goose	*Chen caerulescens*	**36**	**6**	**17 %**	**0**	**0 %**	**0**	**0**
Swans									
TRUS	trumpeter swan	*Cygnus buccinator*	1	0	0 %	0	0 %	0	0
Subtotal:			**1**	**0**	**0 %**	**0**	**0 %**	**0**	**0**
Totals			**332**	**74**	**22 %**	**0**	**0 %**	**1**	**0.3 %**

Table 4. Initial Avian Influenza Virus Matrix PCR Results for **Morbidity/Mortality Bird** Samples Collected by WDFW, 7/1/10 - 6/30/11

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
Dabbling Ducks									
MALL	mallard	*Anas platyrhynchos*	3	0	0	0	0	0	0
Subtotal:			**3**	**0**	**0 %**	**0**	**0 %**	**0**	**0 %**
Diving Ducks									
LESC	L. scaup	*Aythya affinis*	1	0	0	0	0	0	0
Subtotal:			**1**	**0**	**0 %**	**0**	**0 %**	**0**	**0 %**
Geese									
CAGO	Canada goose	*Branta canadensis*	1	0	0	0	0	0	0
Subtotal:			**1**	**0**	**0 %**	**0**	**0 %**	**0**	**0 %**
Swans									
TRUS	trumpeter swan	*Cygnus buccinators*	58	4	6 %	0	0	0	0
TUSW	tundra swan	*Cygnus columbianus*	2	0	0 %	0	0	0	0
Subtotal:			**60**	**4**	**6 %**	**0**	**0 %**	**0**	**0 %**
Other species									
AWPE	Am. white pelican	*Pelicanus erythrorhynchos*	2	0	0	0	0	0	0
BRPE	brown pelican	*Pelicanus occidentalis*	3	0	0	0	0	0	0
COHA	cooper's hawk	*Accipiter cooperii*	1	0	0	0	0	0	0
Subtotal:			**6**	**0**	**0 %**	**0**	**0 %**	**0**	**0 %**
TOTALS:			**71**	**4**	**6 %**	**0**	**0 %**	**0**	**0 %**