



**NATIONAL FLYWAY COUNCIL**

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

# Implementation Plan for Avian Influenza Surveillance in Waterfowl in the United States

## Summer 2023 – Spring 2024



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## INTRODUCTION

This document describes the plan to implement national level surveillance for avian influenza viruses (AIVs) in wild waterfowl. Collaborating entities include the U.S. Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) Wildlife Services (WS) National Wildlife Disease Program (NWDP) and Veterinary Services (VS); the U.S. Department of the Interior (DOI) U.S. Geological Survey (USGS) and U.S. Fish and Wildlife Service (USFWS); and the National Flyway Council. The Implementation Plan supports the collection of biological samples, diagnostic testing, data management, and analysis of data obtained by USDA-APHIS-Wildlife Services (WS), other Federal agencies, State wildlife agencies, Universities, and Tribal cooperators.

## HPAI SURVEILLANCE GOALS

The goals of this surveillance effort are to maximize our ability to detect and identify the distribution of AIVs in wild waterfowl in the U.S., detect spread of AIVs to new areas of concern, and monitor wild duck populations for introductions of novel viruses (e.g., Eurasian lineage H5 and H7).

The plan focuses on sample collection at the watershed level (HUC4 sub-regional watersheds), and specific watersheds have been selected for sample collection. Watersheds were selected based on areas that have a high mixing of wild bird populations (sometimes from multiple flyways) and previous evidence of influenza infections in wild birds. Sample numbers were based on dabbling and diving duck data from eBird and on populations data from the U.S. Fish and Wildlife Service. If targeted sample numbers are reached within each specified watershed, we can determine with 95% confidence whether the AIVs of interest are present at the time of the surveillance.

## IMPLEMENTATION PLAN

### 1. SAMPLE NUMBERS AND SPECIES

- a. **The sample target numbers are listed in [Appendix 1](#) and apply only to apparently healthy dabbling and diving ducks. This plan does not address any other bird groups or morbidity/mortality samples.**
- b. **The models used to generate 2023-2024 target sample numbers include updated bird population estimates and more recent avian influenza detection data compared to previous models. As a result, the target sample numbers across many States/watersheds are different than the 2022-2023 and earlier surveillance plans.**
- c. A list of target species can be found in [Table 1](#). The Fulvous Whistling duck is not taxonomically a dabbling duck, but because of its foraging habits it is included in the same functional group for purposes of this surveillance plan.
- d. Captive-reared and released ducks that are subsequently live-captured or hunter-harvested may be swabbed like any other dabbling duck and will be counted in the watershed target numbers.

### 2. WHAT TO COLLECT

- a. The target sample numbers in this manual represent samples collected from agency harvested birds, hunter harvested birds, and live wild birds.
- b. One cloacal and one oropharyngeal swab will be collected from each wild bird sampled. Cloacal and oropharyngeal swabs will be combined in the same tube of media.

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**Table 1.** Target Species for Wild Bird AIV Surveillance

Dabbling Ducks	
American Green-winged Teal	Mallard
American Black Duck	Mottled Duck
American Wigeon	Muscovy Duck
Blue-winged Teal	Northern Pintail
Cinnamon Teal	Northern Shoveler
Fulvous Whistling Duck	Wood Duck
Gadwall	
Diving Ducks	
Bufflehead	Lesser Scaup
Barrow's Goldeneye	Long-tailed Duck
Black Scoter	Red-breasted Merganser
Canvasback	Redhead
Common Eider	Ring-necked Duck
Common Goldeneye	Ruddy Duck
Common Merganser	Spectacled Eider
Common Pochards	Steller's Eider
Greater Scaup	Surf Scoter
Harlequin Duck	Tufted Duck
Hooded Merganser	White-winged Scoter
King Eider	

### 3. WHEN TO COLLECT

- a. Sample collection will occur from May 2023 through April 2024.
- b. There are three seasons in a sampling year: Summer (May – August), Fall (September – November), and a combined Winter/Spring\* season (December – April). [Appendix 1](#) lists the target sample numbers for each season. Generally, these seasons are intended to correspond with different stages of a bird's annual cycle: Summer = end of breeding season, Fall = fall migration, Winter/Spring = birds on their wintering grounds and spring migration. Because birds may experience these stages at different times depending on the collection site, bird migratory patterns, and climate, there is some flexibility in season cutoff dates if needed. **Contact the NWDP if you have questions about season cutoff dates for your area.**

*\*Note: In previous years, the third sampling season was restricted to Winter months (December – February) due to the limited availability of Spring sampling in some States. For the 2023-2024 surveillance year, a hybrid Winter/Spring season was adopted to allow for sampling in States where Spring sampling was of interest and permitted, while at the same time accommodating for other States where sampling would be primarily limited to Winter months.*

- c. It is best to collect a smaller number of samples during repeated sampling efforts than to collect all of a season's target numbers in 1-2 visits. Spacing out sampling collections over time provides a more accurate estimate of AIV activity on the landscape.

#### 4. WHERE TO COLLECT

A U.S. map of Hydrologic Unit Code 4 (HUC4) watersheds is shown in [Figure 1](#). Full page maps of watersheds in each state are available upon request. There is flexibility in watersheds and seasonal targets when on-the-ground conditions deviate from what was anticipated (e.g., no capture opportunities in a watershed due to drought). **Please contact the NWDP if you know that changes need to be made to watershed or seasonal targets.**



**Figure 1.** Sub-region watershed (hydrologic unit code 4) map of the continental United States. Watershed boundaries are in gray, state boundaries are in white.

#### 5. SAMPLE SUBMISSION

All samples will be submitted to one of the pre-approved National Animal Health Laboratory Network (NAHLN) laboratories. [Appendix 2](#) lists the names and contact phone numbers of participating laboratories. The NWDP has established Blanket Purchase Agreements (BPA's) with each lab. Each state is assigned to a specific laboratory to use for diagnostics. **Samples shipped to non-contracted labs will not be covered by the NWDP and will be the responsibility of submitting states.** The NAHLN lab will screen samples to determine if type A influenza virus is present; if the test is positive, the NAHLN lab will further analyze the sample using H5 and H7 specific assays. The NAHLN lab will send all samples testing positive for any AIV (including samples testing positive for H5 or H7) to NVSL for sequencing/subtyping.

#### 6. PERMITS

The NWDP has a “blanket” scientific collecting permit from USFWS that includes all States except Hawaii. The permit covers the swabbing of most species collected as live birds or hunter harvest by Wildlife Services personnel. **Agency harvest for the sole purpose of disease sampling is not permitted.** Wildlife Services personnel must have a copy of this permit in the field when sampling. State agency cooperators and banders will need their own permits from USFWS and the USGS Bird

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Banding Laboratory for live-capture activities, as usual. If HPAI swabbing of live birds is to be conducted as a 'piggyback' activity, the banding permit must be amended to allow this activity. The NWDP will complete and submit the annual reporting requirements outlined in the permit for all states collecting wild bird samples. To avoid submitting duplicate copies of reports, State WS offices should not submit their own copies of the annual report to USFWS. For a copy of the USFWS permit, see the document "Wild Bird Avian Influenza Surveillance – Field Procedures Manual" or contact the NWDP.

### 7. COORDINATION WITH OTHER AGENCIES

Sample collection can include efforts by federal, state, Tribal, local, university, and non-governmental participants as needed. Samples intended to count toward watershed target numbers must be entered into the APHIS Veterinary Services Laboratory Submission System (VSLS—see below), regardless of which agency collects the samples.

### 8. REPORTING FIELD DATA

Each biologist is responsible for entering field data directly into the APHIS Veterinary Services Laboratory Submission System application (VSLS) (<http://vsapps.aphis.usda.gov/vslabsub/login.do>) **within 24 hours** of submitting samples to the laboratory. Each biologist is also responsible for emailing electronic copies of data forms to [NWDPData@usda.gov](mailto:NWDPData@usda.gov) **within 24 hours** of submitting samples to the laboratory. Results may be requested only after field data is entered into the system and results have been received from the diagnostic lab. For new user accounts, please refer to the directions in the document "Wild Bird Avian Influenza Surveillance – Field Procedures Manual."

## MORBIDITY AND MORTALITY SURVEILLANCE

Agencies should investigate wild bird morbidity/mortality events regardless of the time of year, species involved, or the number of samples already collected in the state. **Morbidity/mortality samples do not count towards meeting the watershed targets, as morbidity/mortality events have a different disease risk associated with them, and the data are analyzed differently than those of apparently healthy birds (live-capture and hunter harvest).**

The [USGS National Wildlife Health Center](#) (NWHC) in Madison, WI, is our primary partner for performing diagnostics related to morbidity/mortality events and can provide guidance on the investigation, sampling, and diagnostics for observed avian mortality. Briefly, the NWHC guidance for specimen collection from mortality is to collect and submit whole carcasses. **Do not collect swabs from carcasses submitted to the NWHC. Always contact the NWHC for guidance prior to submitting samples. Sample types submitted will be determined on a case-by-case basis.** The NWHC should be contacted by phone (608-270-2480) or email ([NWHC-epi@usgs.gov](mailto:NWHC-epi@usgs.gov)) prior to shipping any carcass. If NWHC declines to test samples from a morbidity/mortality event and you are still interested in getting results, contact the NWDP.

State or regional veterinary diagnostic laboratories may also be used in morbidity/mortality investigations. Contact your local lab for sample submission instructions. **PLEASE NOTIFY YOUR STATE WILDLIFE SERVICES OFFICE AND THE NWDP IF YOU ARE SENDING MORTALITY SAMPLES TO A STATE OR REGIONAL LABORATORY. If a lab requests multiple sample types (e.g., 3 carcasses and swabs from all other birds involved in the morbidity/mortality event), please**

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**keep all samples from the same event together and submit to only one lab.**

**Do not swab carcasses you are submitting, as the NWHC or other lab of choice will swab the carcass at the lab as part of the necropsy procedure.**

### **OTHER SURVEILLANCE STRATEGIES**

Other strategies such as environmental (fecal) sampling and sentinels are useful in specific situations but are not part of this surveillance plan.

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**APPENDIX 1. Number of Wild Bird Samples to be Collected by State,  
2023-2024 Surveillance Year**

<b>Watershed by State</b>	<b>Summer (May - Aug) Sample Numbers</b>	<b>Fall (Sep - Nov) Sample Numbers</b>	<b>Winter/ Spring (Dec - Apr) Sample Numbers</b>	<b>Grand Total</b>
<b>Alabama</b>				
Middle Tennessee-Elk	308	0	320	<b>628</b>
<b>Alaska</b>				
Lower Yukon River	334	0	0	<b>334</b>
Middle Yukon River	334	334	0	<b>668</b>
South Central Alaska	334	334	334	<b>1002</b>
Southeast Alaska	0	333	0	<b>333</b>
<b>Arizona</b>				
Lower Colorado	0	333	0	<b>333</b>
<b>Arkansas</b>				
Lower Arkansas	0	0	150	<b>150</b>
Lower Mississippi-St. Francis	0	244	244	<b>488</b>
<b>California</b>				
Klamath-Northern California Coastal	317	0	0	<b>317</b>
Sacramento	0	334	334	<b>668</b>
San Francisco Bay	0	0	334	<b>334</b>
Tulare-Buena Vista Lakes	0	334	334	<b>668</b>
<b>Colorado</b>				
North Platte	0	100	0	<b>100</b>
Rio Grande Headwaters	333	333	0	<b>666</b>
South Platte	0	0	334	<b>334</b>
<b>Connecticut</b>				
Connecticut Coastal	0	0	330	<b>330</b>
<b>Delaware</b>				
Delaware-Mid Atlantic Coastal	0	119	119	<b>238</b>
<b>Florida</b>				
Southern Florida	0	0	330	<b>330</b>
St. Johns	0	333	333	<b>666</b>
<b>Georgia</b>				
Apalachicola	0	332	0	<b>332</b>
<b>Hawaii</b>				
Oahu	N/A*	N/A*	N/A*	<b>N/A*</b>
<b>Idaho</b>				
Middle Snake	301	0	0	<b>301</b>
Upper Snake	334	334	0	<b>668</b>



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Watershed by State	Summer (May - Aug) Sample Numbers	Fall (Sep - Nov) Sample Numbers	Winter/ Spring (Dec - Apr) Sample Numbers	Grand Total
<b>Illinois</b>				
Lower Illinois	0	334	334	<b>668</b>
Upper Mississippi-Kaskaskia-Meramec	0	333	334	<b>667</b>
Wabash	0	87	0	<b>87</b>
<b>Indiana</b>				
Upper Illinois	0	301	301	<b>602</b>
Wabash	0	243	0	<b>243</b>
<b>Iowa</b>				
Des Moines	0	334	0	<b>334</b>
Upper Mississippi-Iowa-Skunk-Waps	0	334	0	<b>334</b>
Upper Mississippi-Maquoketa-Plum	0	333	0	<b>333</b>
<b>Kansas</b>				
Middle Arkansas	0	334	334	<b>668</b>
Neosho-Verdigris	0	171	0	<b>171</b>
<b>Kentucky</b>				
Lower Ohio	0	0	270	<b>270</b>
<b>Louisiana</b>				
Boeuf-Tensas	0	0	334	<b>334</b>
Louisiana Coastal	0	334	334	<b>668</b>
<b>Maine</b>				
Kennebec	325	323	0	<b>648</b>
Maine Coastal	322	0	0	<b>322</b>
Penobscot	322	0	0	<b>322</b>
Saco	165	0	0	<b>165</b>
<b>Maryland</b>				
Lower Chesapeake	0	200	200	<b>400</b>
<b>Massachusetts</b>				
Connecticut	136	136	135	<b>407</b>
Massachusetts-Rhode Island Coastal	330	0	332	<b>662</b>
Merrimack	0	79	76	<b>155</b>
<b>Michigan</b>				
Southeastern Lake Michigan	333	0	333	<b>666</b>
Southwestern Lake Huron-Lake Huron	0	333	0	<b>333</b>
St. Clair-Detroit	332	333	0	<b>665</b>
<b>Minnesota</b>				
Minnesota	334	334	334	<b>1002</b>
Mississippi Headwaters	0	333	0	<b>333</b>
Red	125	125	0	<b>250</b>
St. Croix	0	151	0	<b>151</b>
Upper Mississippi-Black-Root	0	183	0	<b>183</b>

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Watershed by State	Summer (May - Aug) Sample Numbers	Fall (Sep - Nov) Sample Numbers	Winter/ Spring (Dec - Apr) Sample Numbers	Grand Total
<b>Mississippi</b>				
Lower Mississippi-Big Black	0	0	329	<b>329</b>
Lower Mississippi-Yazoo	0	334	334	<b>668</b>
<b>Missouri</b>				
Lower Mississippi-St. Francis	0	83	83	<b>166</b>
Lower Missouri	0	0	334	<b>334</b>
<b>Montana</b>				
Big Horn	0	334	0	<b>334</b>
Kootenai-Pend Oreille-Spokane	0	334	0	<b>334</b>
Missouri-Marias	334	334	0	<b>668</b>
<b>Nebraska</b>				
North Platte	0	75	75	<b>150</b>
<b>Nevada</b>				
Central Lahontan	0	334	0	<b>334</b>
<b>New Hampshire</b>				
Connecticut	145	145	145	<b>435</b>
Merrimack	0	328	319	<b>647</b>
Saco	113	0	0	<b>113</b>
<b>New Jersey</b>				
Delaware-Mid Atlantic Coastal	90	91	91	<b>272</b>
<b>New Mexico</b>				
Rio Grande-Elephant Butte	0	0	333	<b>333</b>
<b>New York</b>				
Southeastern Lake Ontario	0	0	332	<b>332</b>
Southwestern Lake Ontario	0	322	0	<b>322</b>
<b>North Carolina</b>				
Chowan-Roanoke	285	0	0	<b>285</b>
Neuse-Pamlico	0	333	333	<b>666</b>
<b>North Dakota</b>				
James	0	103	0	<b>103</b>
Missouri-Oahe	0	186	186	<b>372</b>
Red	149	149	0	<b>298</b>
<b>Ohio</b>				
Muskingum	0	327	0	<b>327</b>
Upper Ohio	137	139	0	<b>276</b>
Western Lake Erie	0	332	333	<b>665</b>
<b>Oklahoma</b>				
Lower Arkansas	0	0	183	<b>183</b>
Neosho-Verdigris	0	110	0	<b>110</b>

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Watershed by State	Summer (May - Aug) Sample Numbers	Fall (Sep - Nov) Sample Numbers	Winter/ Spring (Dec - Apr) Sample Numbers	Grand Total
<b>Oregon</b>				
Middle Columbia	0	334	0	334
Oregon Closed Basins	334	334	0	668
Willamette	333	0	334	667
<b>Pennsylvania</b>				
Delaware-Mid Atlantic Coastal	119	0	0	119
Susquehanna	0	0	408	408
Upper Ohio	131	133	0	264
<b>Puerto Rico</b>				
Puerto Rico	N/A*	N/A*	N/A*	N/A*
<b>South Carolina</b>				
Edisto-Santee	0	0	401	401
<b>South Dakota</b>				
James	0	231	0	231
Missouri-Oahe	0	148	148	296
<b>Tennessee</b>				
Lower Mississippi-Hatchie	0	0	334	334
<b>Texas</b>				
Brazos Headwaters	0	334	0	334
Neches	0	0	331	331
Trinity	0	334	0	334
<b>U.S. Virgin Islands</b>				
Virgin Islands	N/A*	N/A*	N/A*	N/A*
<b>Utah</b>				
Bear	0	334	0	334
Great Salt Lake	334	334	0	668
<b>Vermont</b>				
NE Lake Ontario-Lake Ontario- St. Lawrence	0	333	0	333
<b>Virginia</b>				
Lower Chesapeake	0	132	133	265
Potomac	204	205	206	615
<b>Washington</b>				
Lower Columbia	0	333	0	333
Puget Sound	0	334	0	334
Upper Columbia	334	334	0	668
<b>West Virginia</b>				
Potomac	79	79	79	237
Upper Ohio	57	57	0	114

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<b>Watershed by State</b>	<b>Summer (May - Aug) Sample Numbers</b>	<b>Fall (Sep - Nov) Sample Numbers</b>	<b>Winter/ Spring (Dec - Apr) Sample Numbers</b>	<b>Grand Total</b>
<b>Wisconsin</b>				
Northwestern Lake Michigan	0	331	0	<b>331</b>
Rock	0	333	0	<b>333</b>
St. Croix	0	177	0	<b>177</b>
Upper Mississippi-Black-Root	0	150	0	<b>150</b>
Wisconsin	331	330	0	<b>661</b>
<b>Wyoming</b>				
North Platte	0	137	237	<b>374</b>
<b>Grand Total</b>	<b>8,828</b>	<b>19,716</b>	<b>13,168</b>	<b>41,712</b>

\*Opportunistic sampling will occur in Hawaii, Puerto Rico, and U.S. Virgin Islands. No target numbers have been assigned to these States/Territories. Samples from these regions may also include wild bird species other than dabbling and diving ducks.

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**APPENDIX 2. Participating NAHLN Laboratories**

STATES	NAHLN LAB	SHIPPING ADDRESS	TELEPHONE
<b>AK, AZ</b>	Arizona Veterinary Diagnostic Lab  <b>PO# Contact NWDP</b>	Arizona Veterinary Diagnostic Laboratory 2831 North Freeway Tucson, AZ 85705-5021	Phone: 520-621-2356
<b>CA, NV</b>	California Animal Health & Food Safety Laboratory  <b>PO# Contact NWDP</b>	California Animal Health & Food Safety Laboratory University of California, School of Vet Med 620 West Health Science Drive Davis, California 95616	Phone: 530-752-8709
<b>ID, OR, UT, WA</b>	Oregon State University Veterinary Diagnostic Lab  <b>PO# Contact NWDP</b>	Oregon State University Veterinary Diagnostic Laboratory Magruder Hall 134 700 SW 30th St Corvallis, Oregon 97331-8628	Phone: 541-737-3261
<b>FL, ME, NH, NC, VT, PR/USVI</b>	Bronson Animal Disease Diagnostic Laboratory  <b>PO# Contact NWDP</b>	Bronson Animal Disease Diagnostic Laboratory 2700 North John Young Parkway Kissimmee, Florida 34741	Phone: 321-697-1400
<b>GA, NJ, NY, SC, VA, WV</b>	Animal Health Diagnostic Center College of Vet Med, Cornell University  <b>PO# Contact NWDP</b>	Animal Health Diagnostic Center College of Veterinary Medicine Cornell University 240 Farrier Road Ithaca, New York 14853-8002	Phone: 607-253-3900
<b>CT, DE, MD, MA, PA</b>	Pennsylvania Veterinary Laboratory  <b>PO# Contact NWDP</b>	PA Veterinary Laboratory, Pennsylvania Department of Agriculture 2305 North Cameron Street, Harrisburg, PA 17110	Phone: 717-787-8808
<b>IL, IN, MI, OH</b>	Michigan State University Veterinary Diagnostic Laboratory <b>PO# Contact NWDP</b>	Michigan State University Veterinary Diagnostic Laboratory College of Veterinary Medicine 4125 Beaumont Road Lansing, MI 48910	Phone: 517-353-0635
<b>AR, IA, MN, MO</b>	University of Missouri Veterinary Medical Diagnostic Laboratory  <b>PO# Contact NWDP</b>	University of Missouri Veterinary Medical Diagnostic Laboratory 901 E. Campus Loop Columbia, MO 65211	Phone: 573-882-6811
<b>AL, KY, LA, MS, TN</b>	Mississippi State University Veterinary Research and Diagnostic Lab  <b>PO# Contact NWDP</b>	Mississippi Veterinary Research & Diagnostic Laboratory 3137 Highway 468 West Pearl, MS 39208	Phone: 601-420-4768
<b>CO, MT, NM, ND, SD, WY</b>	Colorado State University College of Veterinary Medicine  <b>PO# Contact NWDP</b>	Colorado State University Veterinary Diagnostic Laboratory 2450 Gillette Drive Fort Collins, CO 80526	Phone: 970-297-1281
<b>KS, NE, OK, TX, WI</b>	Kansas State University, Diagnostic Laboratory  <b>PO# Contact NWDP</b>	Kansas State Veterinary Diagnostic Laboratory 2005 Research Park Manhattan, KS 66502	Phone: 785-532-5651

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<b>HI</b>	State of Hawaii, Department of Health State Laboratories Division  <b>PO# Contact NWDP</b>	State Laboratories Division 2725 Waimano Home Road Pearl City, HI 96782	808-453-6650
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