

# **Proposal for Avian Influenza Rapid Assessment by Using Existing Constant-effort Monitoring Networks**

**C. John Ralph<sup>1</sup>, Ken Rosenberg<sup>2</sup>, and Terrell D. Rich**  
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## **Introduction**

The excellent work of the U.S. Interagency Asian H5N1 Early Detection Working Group (DeLiberto et al. 2006) has laid the groundwork for a comprehensive early warning system for H5N1 largely in wild waterbirds and primarily in Alaska. However, it has been brought to our attention by disease experts that it is likely advantageous to go beyond early detection, beyond waterbirds, and beyond Alaska. For example, potential vector species such as Yellow Wagtail, Northern Wheatear, Bluethroat, and pipit species share overwintering habitat with more common H5N1 vectors in Asia (where H5N1 appears to be becoming fixed in landbird populations) and Africa where H5N1 continues to spread.

Partners in Flight is offering assistance to extend H5N1 monitoring to hundreds of species of landbirds at up to 1230 existing monitoring sites in North America, Central America, and the Caribbean (see map below). The great strength in this proposal is that monitoring sites and trained personnel are already in place across this huge region, and that with relatively little additional funding and training, an enormous amount of potentially very valuable data can be quickly obtained.

## **Issues**

- Highly Pathogenic Avian Influenza H5N1 is a rapidly emerging health and safety issue. World health authorities state that if H5N1 continues to spread around the globe there is an increasing likelihood of transmission from bird hosts to humans.
- Low Pathogenic Avian Influenzas circulate among the many species of landbirds, not just waterfowl, and may carry polymorphisms that the H5N1 virus could assimilate to increase its transmissibility to humans and thereby trigger a human pandemic.
- There is a potential for profound effects on health delivery, agency planning processes, and the economy.
- Knowledge of the epidemiology of both the highly pathogenic H5N1 avian influenza, and other, less pathogenic, avian influenzas carried by landbirds is crucial to minimizing potential catastrophic effects of avian influenza on humans.
- The existing Partners in Flight bird monitoring networks can be cost-effectively used to track existing avian influenzas as well as the nearly-certain introduction of H5N1 and its spread through the Americas.

## **Solution**

Rapidly deploy trained teams of biologists at several hundred stations across the continent (see table and map below) monitoring approximately 150-200 species, with the intent of extending this effort through Mexico and Central America.

## **Cost**

We are urgently seeking start-up funding of \$60,500 (see budget below), needed in advance of the summer and fall 2006 field season in order to obtain “pre-invasion” or early-invasion data. These funds are needed for sampling kits, employing additional personnel to coordinate the various stations, and for preparation for sample collection. We and our collaborators have committed funding (from BLM Washington Office, Klamath Bird Observatory, UCLA, UC Davis, and others) of approximately \$45,000, and have submitted proposals to various organizations to cover the remaining costs. Additional funding is sought to carry this effort through the end of the calendar year.

## **Outcome**

We will be able to determine and predict the effects of the disease on bird populations both during and after the course of the epidemic. Furthermore, these efforts will document the occurrence and distribution of avian influenzas and contribute to our understanding of the global ecology of Influenza A. Monitoring the polymorphisms of the disease carried by landbirds provides important justification for monitoring prior to the arrival in North America of the highly-pathogenic H5N1.

This proposed work has additional value. Because we are having operators collect feather samples, we will also have the ability to use the DNA from those feathers to genetically and isotopically map connectivity. This will help elucidate migratory patterns and correlate those with virus presence, distribution, and epidemiology.

## **Background**

Constant effort mist-netting is the only way to rapidly capture and assay many species of landbirds. Many agencies, organizations, and individuals in Partners in Flight have consistently supported monitoring efforts throughout the Americas. Many are directly involved with bird capture stations, and we have had a leading role in organizing these stations into both regional and international networks (see below). While current concern in North America centers on monitoring waterbirds, monitoring landbirds is essential (Nott et al. 2006). Viruses that invade passerines may be more likely to invade human populations, and the pattern of movement of passerines puts them in more frequent contact with humans. And from the perspective of bird conservation, only constant effort mist-netting can provide the critical information on population declines and their causes.

## **Principal Field and Laboratory Collaborators**

At present, the following entities are collaborating in this effort (listed alphabetically): Institute for Bird Populations (IBP), Klamath Bird Observatory, Laboratory of Ornithology at Cornell University, Landbird Migration Monitoring Network of North America (LaMMNA), Los Alamos National Laboratory, North American Banding Council (NABC), Ornithological Council, Partners in Flight Monitoring Working Group, Point Reyes Bird Observatory, Redwood Sciences Laboratory of the U.S. Forest Service, University of California at Davis, and University of California at Los Angeles.

## **Proposed Methods**

We will organize the stations by region and train observers to follow protocols for precautions, data management, and sampling. Working closely with IBP who will take the lead during the 3-month breeding season (early May through early August), LaMMNA will take the lead during the non-breeding seasons. These existing networks will facilitate communication between and among the stations and other entities. After samples are taken by standardized methods (e.g., cloacal swabs) and capture data taken and transmitted to a central data repository, a multi-tiered survey of samples will be analyzed at a laboratory for the determination of the presence of virus (see “Details of Testing Samples for Avian Influenza” at the web sites). Principal groups involved in this are UCLA, University of California at Davis, and Los Alamos National Laboratories.

## **Important Contacts and References:**

DeLiberto, Tom, Kearney, et al. 2006. An Early Detection System for Asian H5N1 Highly Pathogenic Avian Influenza in Wild Migratory Birds. U.S. Interagency Strategic Plan. U.S. Interagency Asian H5N1 Early Detection Working Group. Departments of the Interior, Agriculture, and Health and Human Services. Issued March 20, 2006.

LaMMNA. (C.J. Ralph<sup>1</sup> and Philip Nott<sup>3</sup>) Call for Participation in Sampling Landbirds for Avian Influenza. Avian Influenza Monitoring across the Landbird Migration Monitoring Network of the Americas (LaMMNA).

<http://www.KlamathBird.org/~lammna>; CJR: [cjr2@humboldt.edu](mailto:cjr2@humboldt.edu); MPN: [pnott@birdpop.org](mailto:pnott@birdpop.org).

Nott, M. Philip<sup>3</sup>, Camille Bonneaud<sup>4</sup>, Elena Berg<sup>4</sup>, John Pollinger<sup>4</sup>, and Thomas B. Smith<sup>4,5</sup> Avian Influenza and Landbirds of North America – potential vectors and pathways. 2006. Contact the authors or LaMMNA for a review copy.

<sup>1</sup> USDA Forest Service, Redwood Sciences Laboratory, Arcata, California – 707-[825-2992](tel:707-825-2992)—[cjr2@humboldt.edu](mailto:cjr2@humboldt.edu) or [cralph@fs.fed.us](mailto:cralph@fs.fed.us)

<sup>2</sup> Cornell University, Laboratory of Ornithology, Ithaca, New York. 607-254-2412

<sup>3</sup> Institute for Bird Populations, Point Reyes Station, California – [pnott@birdpop.org](mailto:pnott@birdpop.org).

<sup>4</sup> Center for Tropical Research, Institute of the Environment, University of California, Los Angeles, California.

<sup>5</sup> Department of Ecology and Evolutionary Biology, University of California, Los Angeles, California.

**Associated Tasks and Estimated Personnel Costs FY 2006-7**

The costs are estimated for the capture of migratory and resident birds. Wildlife Biologists primarily act as resources for the 500+ stations, helping them implement various aspects of collection protocols. The database work is required to maintain continuity of the effort.

Item	Cost/FTE	May 2006 - July 2006		August 2006-April 2007	
		FTE	Cost	FTE	Cost
Wildlife Biologist	\$48,000	0.2	\$9,600	2.5	\$120,000
Database design and implementation	\$54,000	0.2	\$10,800	2.0	\$108,000
Analysis and outreach	\$44,000	0.1	\$4,400	0.5	\$22,000
Virus collection kits (\$1 per kit)			\$30,000		\$120,000
Equipment for compilation and stations			\$1,200		\$55,000
Training and travel			\$4,500		\$37,000
Subsidy for new operations			\$0		\$50,000
<b>TOTALS</b>			\$60,500		\$512,000

**Estimates of the number of constant effort capture stations by area and season.**

"# Stations" indicates the total number of stations running in that area. These stations are categorized into the number run for Spring Migration, MAPS (IBP program from May-August), Summer non-MAPS, Fall Migration, and Winter Season. Latin American indicates the number of stations run in Latin America.

update 3/17/2006							
Nation	State/province	# Stations	Spring Migration	MAPS	Summer Non-MAPS	Fall Migration	Winter Season
USA	Alabama	4	3	3		4	2
	Alaska	8	7	1	1	8	2
	Arizona	25	18	24	9	23	5
	Arkansas	4		4			
	California	72	29	72	20	39	18
	Colorado	18	12	2		18	3
	Connecticut	13	3	13		4	1
	Florida	9	6	1	2	9	2
	Georgia	6	2	5	1	5	2
	Idaho	12	8	5		12	4
	Illinois	7	5	4	1	7	1
	Indiana	15	8	15	2	10	10
	Kansas	2		2			

	Kentucky	9		9		2	1
	Louisiana	16	3	16	3	3	2
	Maine	13		13			
	Maryland	10	6	6	1	10	6
	Massachusetts	11	8	1	2	9	2
	Michigan	15	10	5	2	14	3
	Minnesota	14	8	4	3	11	2
	Mississippi	8	4		1	6	
	Missouri	8		8			
	Montana	12	5	12	1	7	1
	Nebraska	11		11			
	Nevada	6	2	6	1	3	
	New Hampshire	3		3		3	
	New Jersey	4	4	3		4	
	New Mexico	6	2	3		6	4
	New York	19	6	19	1	10	1
	North Carolina	14		14	1		
	Ohio	10	4	10		5	
	Oklahoma	3		3			
	Oregon	47	15	47	7	19	2
	Pennsylvania	10	6	7	1	10	2
	Rhode Island	3		1		3	
	South Carolina	5	3	3	1	2	1
	Tennessee	8		8			
	Texas	26	10	26	8	18	14
	Utah	10	6	10		9	1
	Vermont	3	1	3	3	2	
	Virginia	13	5	13	4	7	3
	Washington	21	4	21		10	2
	West Virginia	4		4			
	Wisconsin	7	3	7	3	5	3
	Wyoming	9	5	7		9	2
	<b>USA Totals</b>	<b>553</b>	<b>221</b>	<b>454</b>	<b>79</b>	<b>326</b>	<b>102</b>
	<b>Canada Totals</b>	<b>58</b>	<b>40</b>	<b>28</b>	<b>16</b>	<b>41</b>	<b>13</b>
	<b>Latin America</b>	<b>63</b>	<b>25</b>	<b>2</b>	<b>37</b>	<b>33</b>	<b>31</b>
	<b>TOTAL NUMBER OF STATIONS</b>	<b>674</b>	<b>286</b>	<b>484</b>	<b>132</b>	<b>400</b>	<b>146</b>

