

TUNDRA SWANS AND AVIAN INFLUENZA



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Alaska Science Center

U.S. Geological Survey

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Avian Influenza

Why be interested or concerned about Tundra Swans (*Cygnus c. columbianus*)

Viral susceptibility

- ◇ Tundra swans can carry pathogenic avian influenza viruses
Japan (*C. columbianus bewickii*)
- ◇ Tundra swans can serve as intermediate hosts of pathogenic avian influenza viruses
Ito (2001) experimental re-innoculations of *C. columbianus bewickii*
led to creation of high path from a low path strain.
- ◇ Swans (*Cygnus* spp.) are indicator species of outbreaks of HP H5N1
Bewick's swan (*C. columbianus bewickii*)
Whooper swan (*C. cygnus bewickii*)
Mute swan (*C. olor*)

Potential for transport of AI viruses

- ◇ Tundra swans are known to breed in eastern Siberia
- ◇ Tundra swans migrate to diverse wintering areas in North America
- ◇ Tundra swans use areas in proximity to important poultry regions such as the Central Valley of California.

High Pathogenic H5N1 in Swans (Genus Cygnus)

Reference		Species	Country	Date
Munster et al		Bewicks	Netherlands	1998-2006
		Mute	Netherlands	
Vangeluwe		Mute Swan	Greece	Jan-06
	OIE	Mute	Bulgaria	Feb-06
WHO		Whooper	Iran	
WHO		swan	Austria	Feb-06
WHO		swan	Germany	Feb-06
WHO		swans	Bosnia-Herzegovina	
WHO		swans	Slovakia	Feb-06
WHO		swans	Georgia	Feb-06
WHO		swans	Serbia-Montenegro	Mar-06
WHO		swans	Poland	Mar-06
		Mute	S. England (Dorsett)	18-Jan-08
DEFRA		Whooper	Scotland	Mar-06
OIE		mute	Slovenia	Feb-06
WHO		swan	Azerbaijan	Jun-05
WHO		Mute	Czech Republic	Jan-Apr. 2006
WHO	OIE	mute	Italy	Feb-06
WHO		swans	Hungary	Feb-06
WHO		swans	UK	6-Apr
Danish Vet.		Mute	Denmark	2006
		swans	Russia -Volga,many regions	2005
	OIE	whooper	Mongolia	Aug-05



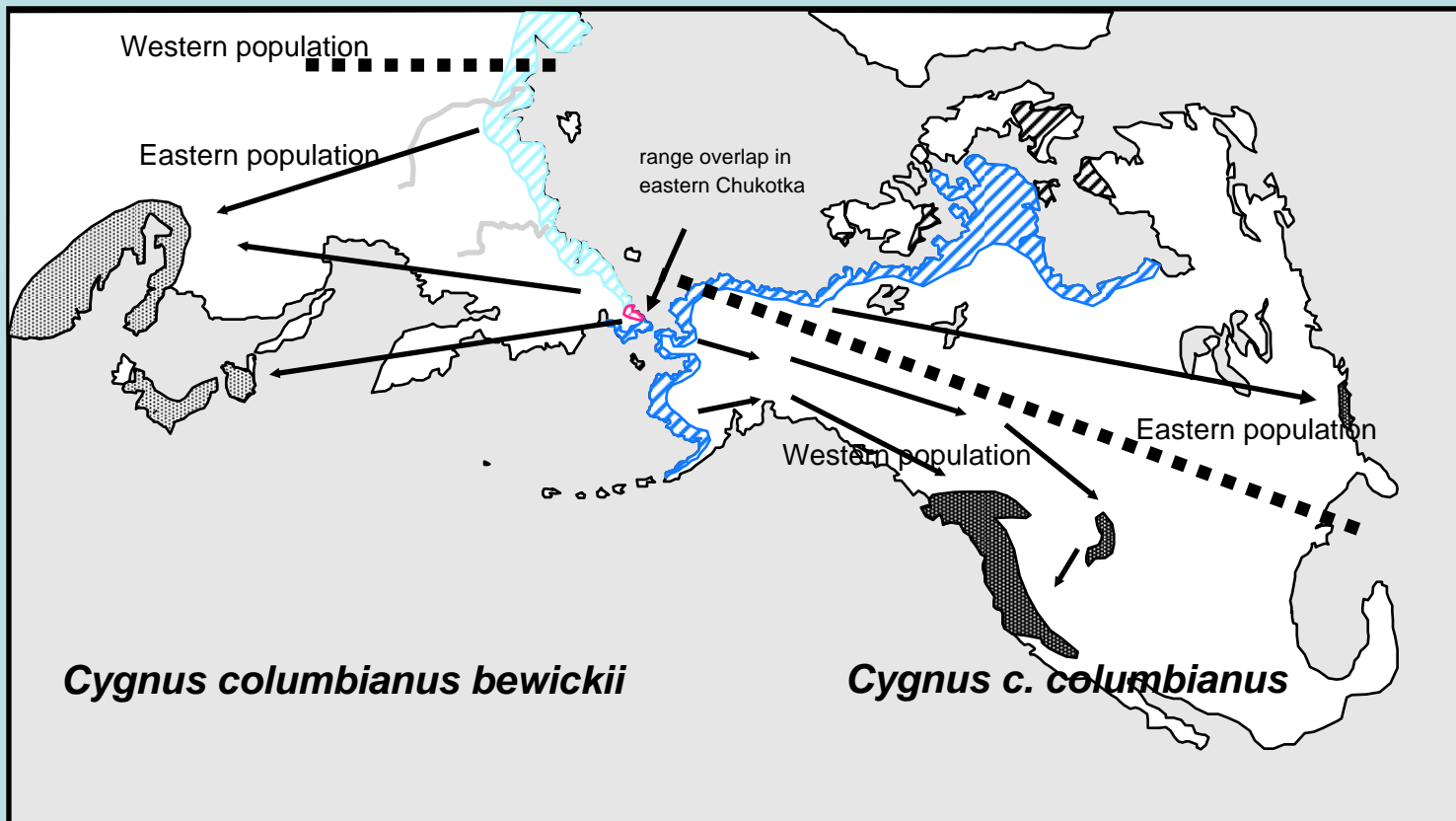
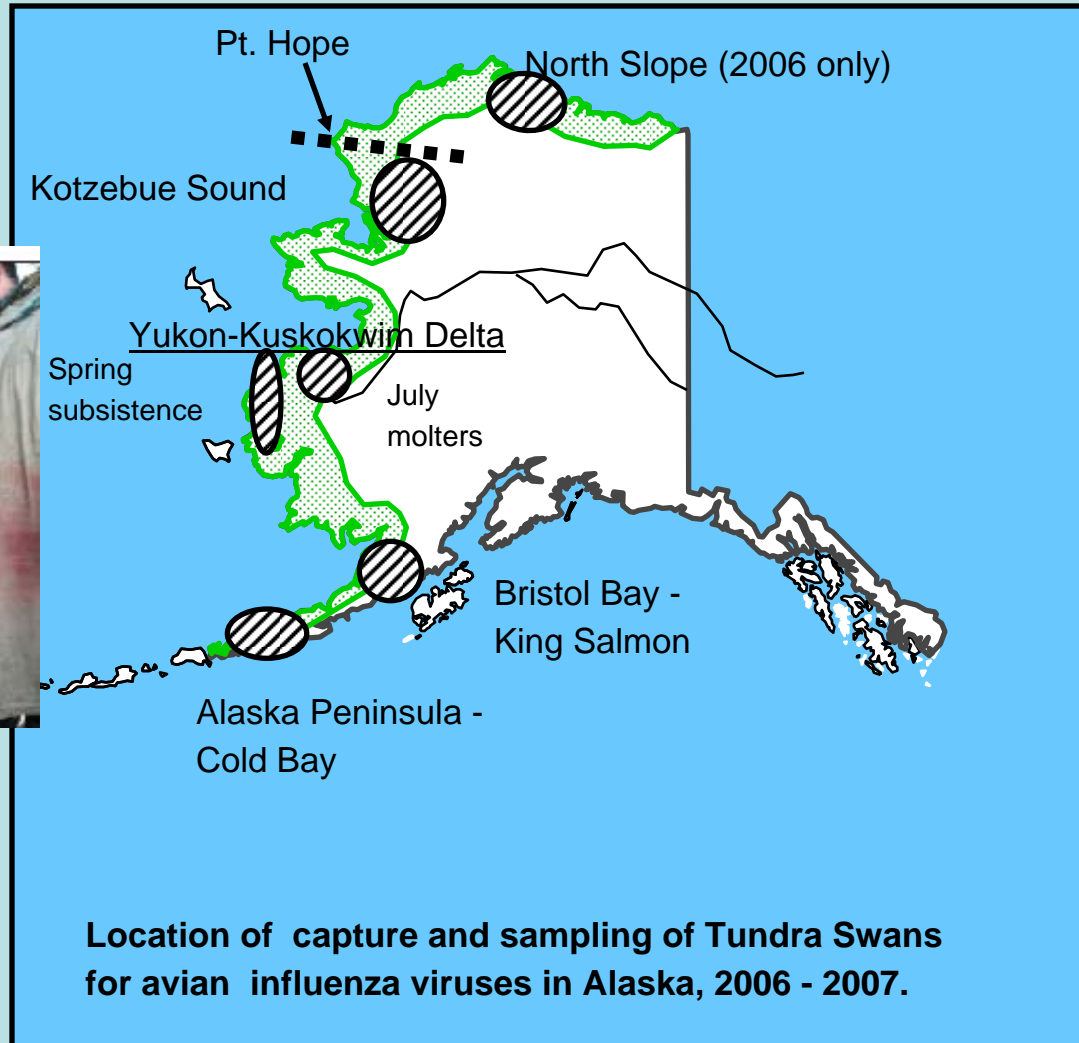


Figure 1. Breeding distribution of Tundra Swans, showing overlap with Bewick's Swans in eastern Asia (from Kondratiev 1991, and Limpert and Earnst 1994, Syroechkovskiy).



Results for 2006 and 2007 Field Seasons in Alaska



ACKNOWLEDGEMENTS



Table 1. Results of avian influenza surveillance testing in Alaska in 2006.

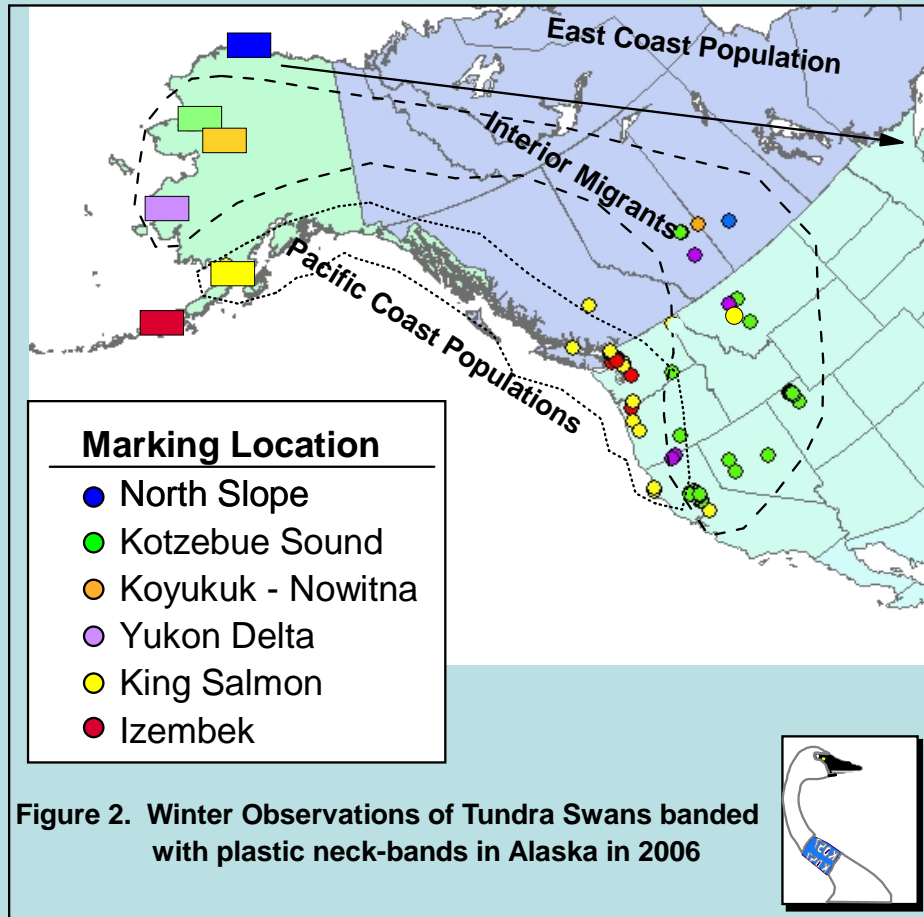
Family/Tribe	Common Name	Scientific Name	Number Sampled	Number RT-PCR Pos.	Number Sampled of Virus Isolation	Number Virus Isol. Positive	RT-PCR Positive (%)	Virus Isolation Positive (%)
Anatidae/Anserini		Geese	5,194	87	4,364	32	1.67	0.73
Anatidae/Cygnini		Swans	593	7	537	7	1.18	1.30
	Trumpeter swan	<i>Cygnus buccinator</i>	10	0	4	0	0.00	0.00
	Tundra swan	<i>C. columbianus</i>	583	7	533	7	1.20	1.31
Anatidae/Anatini	Surface-feeding	Ducks	2,342	164	1,309	107	6.99	8.17
Anatidae/Aythiini		Bay Ducks	29	0	24	0	0.00	0.00
Anatidae/Mergini		Sea Ducks	2,332	16	1,716	18	0.69	1.05

Results from 2006 Alaska samples for RT-PCR and virus isolation in geese and swan

		Cloacal Swab Results		Virus Isolation Results			
Species	Sample ID	Matrix	H5	HA	Matrix	H5	Isolate Subtype
Canada Goose	44049-035	Pos	Pos	Neg	Neg	-	-
Greater White-fronted Goose	44057-129	Pos	Pos	Neg	Neg	-	-
Greater White-fronted Goose	44067-089	Pos	Pos	Neg	Neg	-	-
Long-tailed Duck	44065-023	Pos	Pos	Neg	Neg	-	-
Long-tailed Duck	44067-061	Pos	Pos	Neg	Neg	-	-
Tundra Swan	44057-252	Pos	Pos	Neg	Neg	-	-
Canada Goose	44074-058	Pos	Pos	Pos	Pos	Pos	H5N2
Greater White-fronted Goose	44049-046	Pos	Pos	Pos	Pos	Pos	H5N2
Tundra Swan	44049-168	Pos	Pos	Pos	Pos	Pos	H5N2
Greater White-fronted Goose	44065-031	Pos	Neg	Pos	Pos	Pos	H5N2
Tundra Swan	44049-099	Neg	-	Pos	Pos	Pos	H5N2
Tundra Swan	44050-005	Neg	-	Pos	Pos	Pos	H5N2
Tundra Swan	44056-144	Neg	-	Pos	Pos	Pos	H5N2



Chad Avery





Eastern Chukotka

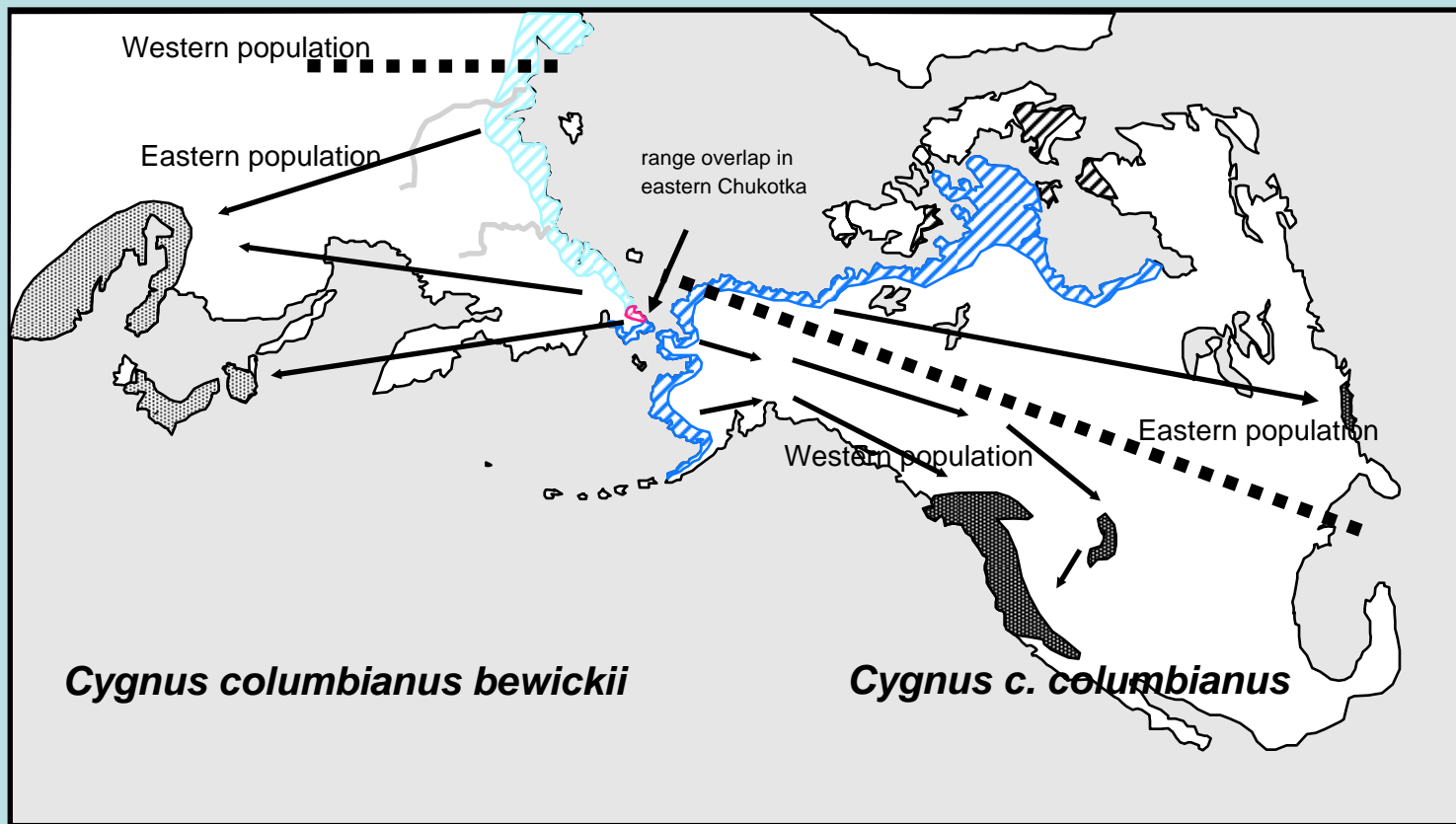


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