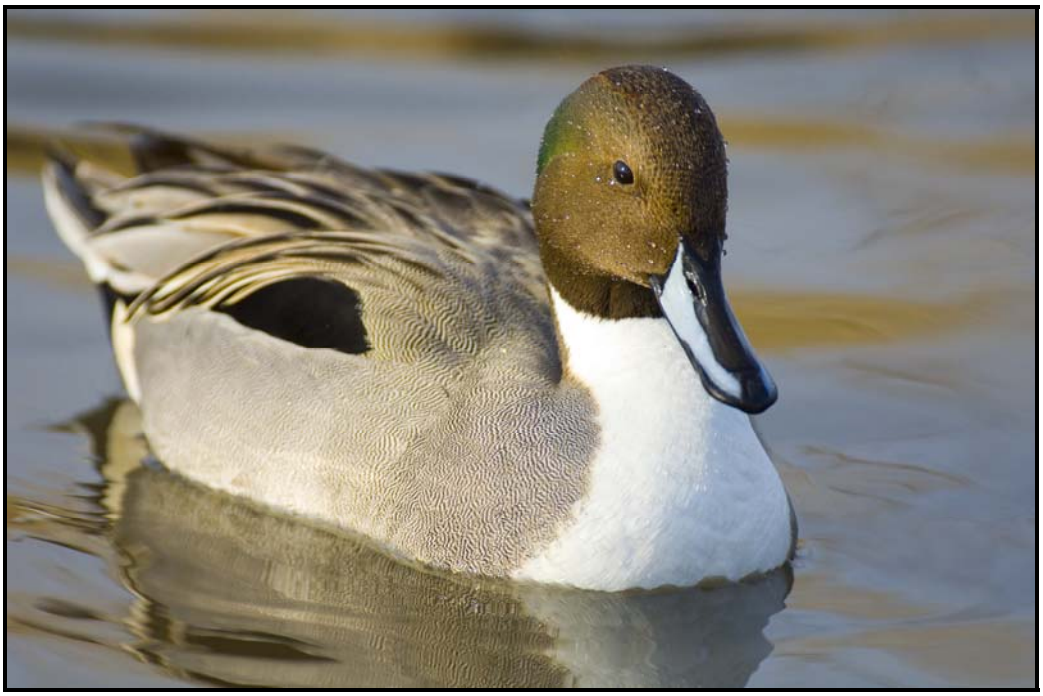
SAMPLING FOR HIGHLY PATHOGENIC ASIAN H5NI AVIAN INFLUENZA IN MIGRATORY BIRDS IN ALASKA

Results of 2007 Field Season



U.S. Fish and Wildlife Service, Region 7 (Alaska)
U.S. Geological Survey, Alaska Science Center
U.S. Geological Survey, National Wildlife Health Center

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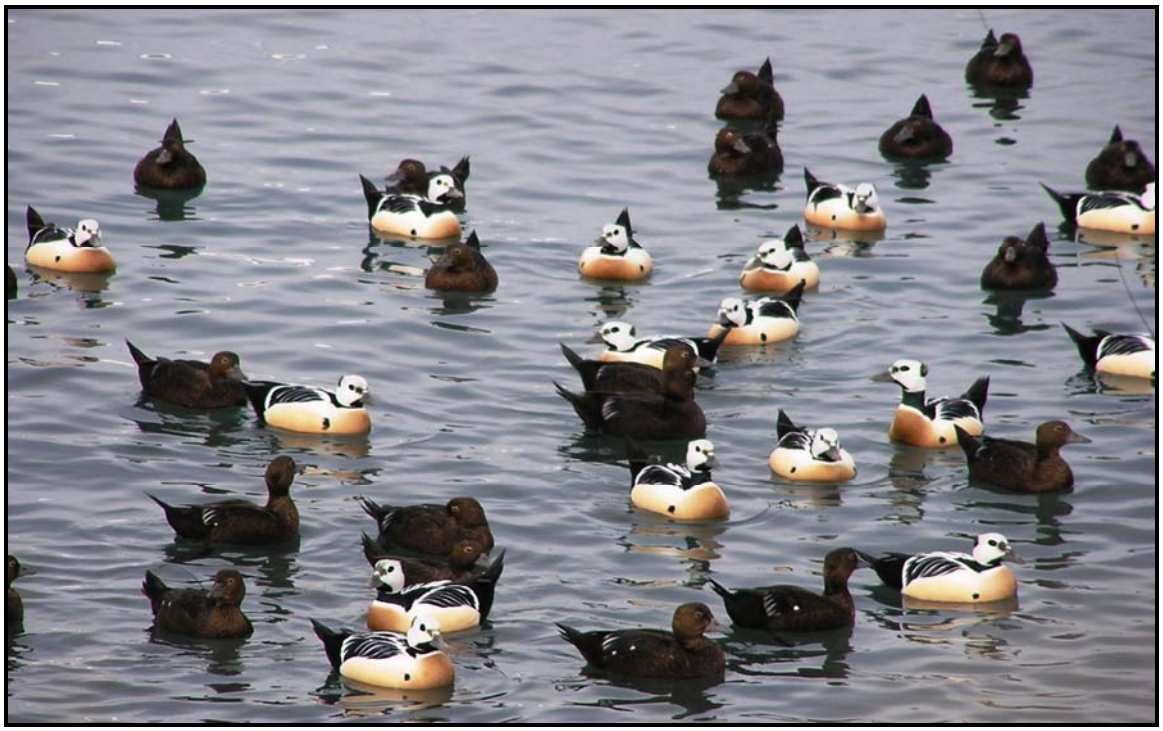

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Executive Summary

The Department of the Interior's (DOI) role in the *National Strategy for Pandemic Influenza* is to sample and test high priority migratory bird species for Highly Pathogenic Avian Influenza (HPAI). This report summarizes the 2007 accomplishments of the U.S. Fish and Wildlife Service – Region 7, the U.S. Geological Survey (USGS) – Alaska Science Center (ASC) and the National Wildlife Health Center (NWHC), and our partners for early monitoring and detection of HPAI in wild birds from Alaska.

In 2005, an interagency National Strategic Plan was developed to sample wild bird species in North America that have the highest risk of being exposed to or infected with HPAI; specifically those that migrate directly between Asia and North America. The geographic focus of this plan is Alaska because it represents a unique crossroads where migratory flyways from Asia and North America overlap. An interagency committee developed a suite of high priority species which have been sampled during the spring subsistence and fall harvest, through a live bird sampling strategy, and from mortality investigations. (See the National Plan for details on ranking criteria, species selection, and the final ranking scores [http://alaska.usgs.gov/science/biology/avian_influenza/monitoring.html]).

The National Strategic Plan called for Alaska DOI and our partners to sample over 15,000 birds from high priority species in Alaska. In 2006, 16,807 samples were analyzed for HPAI: the results of this effort can be found at http://alaska.usgs.gov/science/biology/avian influenza/monitoring. In 2007, 8,671 samples were collected from 73 species of wild birds (Table iia): This total comprised 2,936 samples from hunter harvested birds, and 5,735 live bird samples. In addition, nine birds found dead were also evaluated.

All samples were sent to the NWHC for AI testing. Samples were screened via RT-PCR for the presence of avian influenza viruses: pooled results represent combined oral-pharyngeal (OP) and cloacal (CL) swabs from each bird. In Alaska, cloacal swabs were also analyzed independently. All positive samples from the screening test, as well as a subset of negative samples were further tested using virus isolation techniques.

Avian influenza viruses were detected in four of the species collected, although none of the samples were positive for HPAI. Analysis of the different matrices (pooled vs cloacal only) yielded slightly different results with 0.7% and 0.8% of the pooled and cloacal samples testing positive for avian influenza viruses, respectively. Virus isolation results are pending.

Results from the 2007 DOI HPAI surveillance program in Alaska indicate a lower overall prevalence of AI viruses in wild birds than in 2006 (1.6%). According to the United Nations-Food and Agriculture Organization (FAO), as of January 2008, the global pattern indicated fewer HPAI outbreaks and fewer countries documenting infected birds in 2007 when compared to the same period in 2006 (S. Newman, FAO, pers. comm.). However,

HPAI outbreaks continue to occur in new geographic locations, and the virus has become endemic in many areas of Africa and Asia. Thus, it is important to maintain vigilance in testing migratory birds in Alaska for the presence of HPAI.

Table iia: Summary of 2007 results from the Department of the Interior's Highly Pathogenic Avian Influenza (HPAI) Surveillance Program in Alaska. Samples were analyzed via RT-PCR for the presence of avian influenza viruses: pooled results represented analysis of a combined oral-pharyngeal swab and a cloacal swab sample. Cloacal (CL) swabs were also analyzed independently.

Species	Samples Collected			AI Positive		Total Prevalence	
	Live	Harvest	Total	Pooled	CL only	Pooled	CL only
Steller's Eider	367	0	367	9	13	0.025	0.035
Northern Pintail	1417	133	1550	36	37	0.023	0.024
Lesser Snow Goose	0	228	228	1	1	0.004	0.004
Emperor Goose	350	136	486	4	4	0.008	0.008
Spectacled Eider	171	2	173	0	0	0.0	0.0
Black Brant	879	514	1393	0	0	0.0	0.0
Lesser Sandhill Crane	74	57	131	0	0	0.0	0.0
Tundra Swan	339	53	392	0	0	0.0	0.0
Long-tailed Duck	9	12	21	0	0	0.0	0.0
Pacific Common Eider	77	16	93	0	0	0.0	0.0
King Eider	0	102	102	0	0	0.0	0.0
Dunlin	698	2	700	0	0	0.0	0.0
Sharp-tailed Sandpiper	52	0	52	0	0	0.0	0.0
Bar-tailed Godwit	1	3	4	0	0	0.0	0.0
Ruddy Turnstone	12	0	12	0	0	0.0	0.0
Pectoral Sandpiper	142	29	171	0	0	0.0	0.0
Red Knot	4	1	5	0	0	0.0	0.0
Long-billed Dowitcher	51	2	53	0	0	0.0	0.0
Rock Sandpiper	265	0	265	0	0	0.0	0.0
Pacific Golden Plover	3	0	3	0	0	0.0	0.0
Buff-breasted Sandpiper	10	0	10	0	0	0.0	0.0
Glaucous Gull	10	4	14	0	0	0.0	0.0
Eastern Yellow Wagtail	105	0	105	0	0	0.0	0.0
Non-target species	699	1642	2341	11	13	0.005	0.006
Sub Total	5735	2936	8671	61	68		
*Mortalities			9	NA	NA		
Total	5735	2936	8680	61	68		

*Mortality samples are not included in HEDDS results

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Acknowledgments

We appreciate continuing support for the highly pathogenic avian influenza surveillance program from management in the U.S. Fish and Wildlife Service, and the U.S. Geological Survey. We especially thank all the dedicated biologists and technicians who participated in the 2007 interagency sampling effort of migratory birds. We acknowledge and thank native subsistence hunters from villages across Alaska who provided hunter shot birds for sampling. Collection of these samples would not have been possible without participation of the Yukon Kuskokwim Health Corporation and Kawerak, Inc. We also thank personnel with the Alaska Department of Fish and Game and sport hunters who provided samples from live and hunter shot waterfowl. In addition, several non-government organizations participated in sampling, and we extend our gratitude to them. We thank John Terenzi for his help with creating the species sampling location maps. Finally, this year's sampling effort and completion of the report would not have been so thorough without the tireless efforts of Yvette Gillies.

SAMPLING FOR HIGHLY PATHOGENIC ASIAN H5N1 AVIAN INFLUENZA IN MIGRATORY BIRDS IN ALASKA

INTRODUCTION

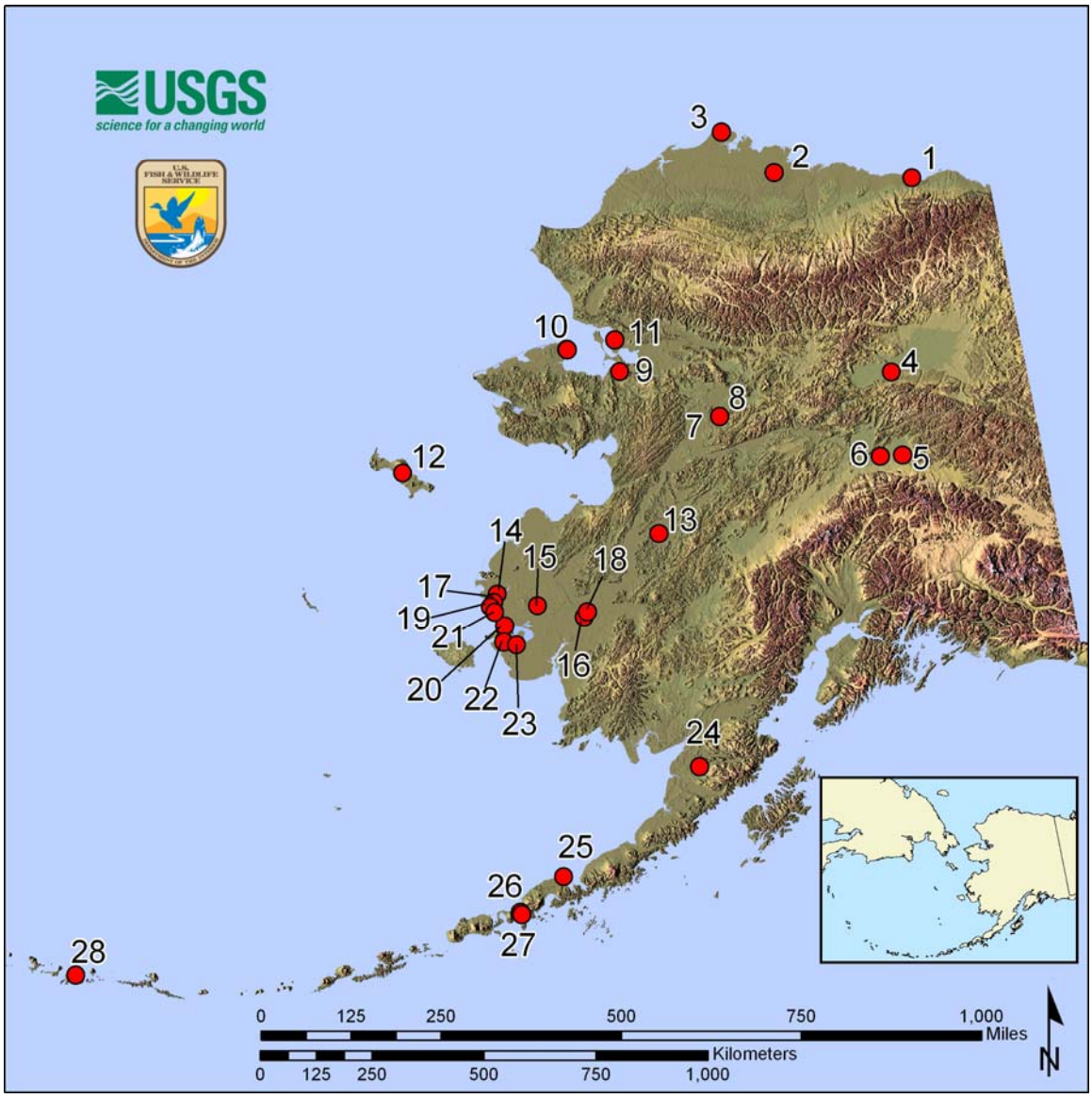
Highly pathogenic avian influenza (HPAI) type A of the subtype H5N1 has spread widely from southeast Asia into Europe, the Middle East, Africa, China, South Korea, Japan, and Russia (Webster et al. 2006, WHO 2006). As of January 2008, sixty-one countries had experienced outbreaks (S. Newmann, pers.com.). Much debate centers on whether HPAI is spread by wild migratory birds, or through movement of domestic poultry and smuggled birds (Chen et al. 2005, Normile 2005, Van Borm et al. 2005, Kilpatrick et al. 2006, Muzaffar et al. 2006). Clearly, this disease occurs in wild birds, but the observed die-offs indicate that wild birds suffered high mortality and thus were not likely efficient carriers (Chen et al. 2005). However, recent data suggest that apparently healthy, wild birds are carriers of HPAI H5N1 (Gilbert et al. 2006), substantiating concerns that migrating birds may distribute this virus around the globe (Chen et al. 2006).

Alaska represents a unique crossroads where migratory flyways from Asia and North America overlap. Species of birds that winter in southern Asia return and breed in Alaska each summer. Conversely, species of birds that winter in North America cross the Bering Straits and spend a portion of the summer in Asia. Alaska was identified as the most likely location that Asian H5N1 would first occur in North America if introduced by wild birds (Interagency Working Group 2006). Therefore, in 2006, the Alaska Interagency HPAI Bird Surveillance Working Group developed a sampling protocol for testing migratory birds in Alaska for HPAI (Alaska Interagency HPAI Bird Surveillance Working Group 2006, Ip et al. 2008).

Here, we report the 2007 results of the HPAI surveillance program of migratory bird species in Alaska by the U.S. Fish and Wildlife Service, U.S. Geological Survey, and their partners. Sampling of live birds occurred throughout the state (Fig. 1) and hunter harvest samples were collected in regions that traditionally participate in subsistence (Fig. 25, pg. 113) and sport harvest (Fig. 3, pg. 118). The report is separated into the following sections: introduction, sampling methods, species sampled, number of samples secured within a geographic area, and the avian influenza test results.

In 2007, the national sample collection strategy for HP H5N1 changed from only collecting cloacal (CL) swabs to collecting a paired sample. A paired sample consisted of a cloacal swab and an oral- pharyngeal (OP) swab sample collected from one bird. In Alaska only, paired samples (CL + OP swabs) were placed into separate vials containing viral transport media. In other geographic areas, both sample types were placed into the same vial. Samples were analyzed via Real Time Transcriptase-Polymerase Chain Reaction (RT-PCR). Pooled results represent an analysis of a combined oral-pharyngeal swab and a cloacal swab from each bird. Results from the analysis of cloacal (CL)-only swabs are also presented.

Figure 1. Live bird sampling locations for H5N1 Avian Influenza in Alaska, 2007. For information on species sampled and specific locations see key following map.



Site #	Species	General location	Specific location
1	Buff-breasted Sandpiper	Arctic NWR	Canning River Delta
1	Dunlin	Arctic NWR	Canning River Delta
1	Long-billed Dowitcher	Arctic NWR	Canning River Delta
1	Long-tailed Duck	Arctic NWR	Canning River Delta
1	Pectoral Sandpiper	Arctic NWR	Canning River Delta
1	Ruddy Turnstone	Arctic NWR	Canning River Delta
2	Black Brant	North Slope	Teshekpuk Lake
2	Buff-breasted Sandpiper	North Slope	Teshekpuk Lake
2	Dunlin	North Slope	Teshekpuk Lake

Site #	Species	General location	Specific location
2	Long-billed Dowitcher	North Slope	Teshekpuk Lake
2	Pectoral Sandpiper	North Slope	Teshekpuk Lake
2	Ruddy Turnstone	North Slope	Teshekpuk Lake
3	Buff-breasted Sandpiper	North Slope	Barrow
3	Dunlin	North Slope	Barrow
3	Long-billed Dowitcher	North Slope	Barrow
3	Long-tailed Duck	North Slope	Barrow
3	Northern Pintail	North Slope	Barrow
3	Pectoral Sandpiper	North Slope	Barrow
3	Spectacled Eider	North Slope	Barrow
3	Steller's Eider	North Slope	Barrow
4	Northern Pintail	Yukon Flats NWR	Mallard Lake
5	Sandhill Crane	Interior	Creamers Field
6	Northern Pintail	Minto Flats State Game Refuge	Minto Lakes
7	Northern Pintail	Koyukuk NWR	Kaiyuh Flats
8	Northern Pintail	Koyukuk NWR	Willow Lake
9	Northern Pintail	Selawik NWR	Kauk River
10	Common Eider	Seward Peninsula	Cape Espenberg
10	Long-tailed Duck	Seward Peninsula	Cape Espenberg
11	Tundra Swan	Kotzebue Sound	Buckland River, Evok Lake, Noatak Delta
12	Glaucous Gull	St. Lawrence Island	Savoonga
13	Northern Pintail	Innoko NWR	Innoko River
14	Eastern Yellow Wagtail	Yukon Delta NWR	Kagankaguti Lake
15	Northern Pintail	Yukon Delta NWR	Kgun Lake
16	Tundra Swan	Yukon Delta NWR	Israthorak
17	Emperor Goose	Yukon Delta NWR	Old Chevak
18	Tundra Swan	Yukon Delta NWR	Pikmikalik
19	Bar-tailed Godwit	Yukon Delta NWR	Tutakoke
19	Dunlin	Yukon Delta NWR	Tutakoke
19	Long-billed Dowitcher	Yukon Delta NWR	Tutakoke
19	Pacific Golden Plover	Yukon Delta NWR	Tutakoke
19	Red Knot	Yukon Delta NWR	Tutakoke
19	Rock Sandpiper	Yukon Delta NWR	Tutakoke
19	Ruddy Turnstone	Yukon Delta NWR	Tutakoke
19	Sharp-tailed Sandpiper	Yukon Delta NWR	Tutakoke
20	Black Brant	Yukon Delta NWR	Hazen Bay
21	Emperor Goose	Yukon Delta NWR	Manokinak River
22	Black Brant	Yukon Delta NWR	Kigigak Island
22	Common Eider	Yukon Delta NWR	Kigigak Island
22	Emperor Goose	Yukon Delta NWR	Kigigak Island

Site #	Species	General location	Specific location
22	Spectacled Eider	Yukon Delta NWR	Kigigak Island
23	Black Brant	Yukon Delta NWR	Baird Inlet
23	Emperor Goose	Yukon Delta NWR	Baird Inlet
24	Tundra Swan	Alaska Peninsula	King Salmon area
25	Steller's Eider	Alaska Peninsula	Nelson Lagoon, Walrus Island
26	Steller's Eider	Alaska Peninsula	Izembek Lagoon
27	Tundra Swan	Alaska Peninsula	Caribou River area
28	Common Eider	Aleutians	Adak Island

Taxon: Steller's Eider (*Polysticta stelleri*)

Justification: The vast majority of Steller's Eiders breed in east Asia and return to Alaska each fall to molt and winter.

Ranking score: 15

Background: The Pacific population of Steller's Eider, currently estimated at approximately 80,000 birds, primarily breeds in the Siberian Arctic and molts, winters and stages along the Alaska Peninsula and northern Bristol Bay (Kertell 1991). Spring migration starts in April as birds disperse to breeding grounds; males and failed- and non-breeding females return to Alaskan molting areas in July and August. Successful breeders and juvenile birds likely return to Alaska in October.

Important molting areas include Izembek Lagoon and Nelson Lagoon. Molting eiders congregate in large dense flocks, which may facilitate transmission of disease amongst individuals by concentrating birds from a number of different breeding locations into relatively small areas.

Over 300 birds were sampled from Nelson Lagoon, Izembek Lagoon, and North Slope (Fig. 2). Each location is discussed separately and final tables with analytical results are presented at the end of this section.

Nelson Lagoon:

Steller's Eiders were captured, sampled, and released in Nelson Lagoon, a shallow bay sheltered by a series of barrier islands about 150 km northeast of Cold Bay, Alaska. There, Steller's Eiders occur as single-species flocks of flightless, molting birds during September and October.

Capture Methods*:* Boats and equipment were staged out of the remote village of Nelson Lagoon and eider capture operations were based from the village and two remote campsites on Walrus and Deer Islands, approx. 25 km southeast of the village. Flocks of flightless Steller's Eiders were herded onto the beach of barrier islands and into a holding pen using trap nets, motorboats, kayaks, and by persons wading in shallow water. All birds were banded with #7A incoloy metal leg bands.

Results: A total of 1096 Steller's eiders were captured and banded on Walrus Island during two successful drives. Cloacal and oral-pharyngeal samples were collected from

293 Steller's eiders (Table 1). Of those, thirty were adult females, 262 were adult males, and 1 male was undermined for age.

AI Results: Eight of the 293 Steller's Eider pooled samples tested positive for avian influenza and 13 of the cloacal samples tested positive for avian influenza. One sample was invalid. None of the samples were H5 or N1 positive. The pooled samples represent a 3% prevalence of avian influenza in the Nelson Lagoon molting birds. The cloacal samples represent a 4.5 % prevalence of avian influenza in the Nelson Lagoon birds.

Table 1. Birds captured and both cloacal and oral-pharyngeal swabs collected from molting Steller's Eiders at Nelson Lagoon, September 2007.

Location	Total birds captured	AI samples		AI Paired samples		Total AI samples
		Female	Male	CL	OP	
Walrus Island	1096	30	263	293	293	293

Other Accomplishments: Of the 1096 captured eiders, 101 were "recaptures" (i.e., birds banded in prior years), most of which were banded in previous years at Nelson Lagoon. Two of the recaptured birds were banded during winter at Dutch Harbor in 2003 and 2005, one was banded during winter at Kodiak Island in 2004 (blue tarsal band), and one recaptured male was banded as a molter on the Kuskokwim Shoals in 2006 (unmarked yellow tarsal band). Excessively worn bands were replaced with new bands on 30 of these recaptures; therefore, new bands were placed on a total of 1025 eiders. All 2007 data on new and recaptured birds will be added to the important and growing Steller's Eider database for further analyses.

Izembek Lagoon:

More than 20,000 Steller's Eiders arrive at Izembek Lagoon each fall to molt; these individuals include eiders from across their breeding range in northern Siberia and Alaska (Dau et al. 2000). The Steller's Eider Recovery Plan tasks Izembek NWR with quantifying annual survival rates at Izembek Lagoon through a systematic mark-recapture program. Izembek Refuge has been capturing and banding eiders in Izembek Lagoon on an intermittent basis from 1961-1984 and on an annual basis since 1991.

Capture Methods: Capture operations consist of driving flocks of flightless eiders by boat into a corral set up on shore. Usually 3-5 boats and 1-2 kayaks are used during a drive. Most drives are conducted during a daytime low tide when eiders are concentrated in the channels of the lagoon and can be driven directionally toward a trap site.

Results: A total of 690 Steller's Eiders (97 females, 592 males, and 1 sex unknown) was captured and banded during two drives at two locations in Izembek Lagoon (Neumann Island and Blaine Point). Two additional attempts at drives had to be aborted due to bad weather or poor tidal conditions. No mortalities or injuries occurred during the capture operations. Cloacal and oral-pharyngeal swab samples were collected from 55 Steller's

Eiders (Table 2). Of those, 13 were adult females, 41 were adult males, and 1 adult sex unknown.

AI results: None of the 55 Steller's Eider pooled or cloacal samples tested positive for avian influenza in the Izembek molting birds.

Table 2. Birds captured and both cloacal and oral-pharyngeal swabs collected from Steller's Eiders at Izembek National Wildlife Refuge, September 2007.

Location	Total birds captured	Female	Male	UNK	AI Paired samples CL	OP	Total AI samples
Neumann Is.	658	13	37	1	51	51	51
Blaine Point	32	0	4	0	4	4	4
Total	690	13	41	1	55	55	55

Other Accomplishments: Izembek Refuge captures up to 2,500 eiders to estimate annual survival rates of the Steller's Eider population. To assess health and energetic demands, blood and morphometric data are also obtained. The Refuge also hosts the *Eider Journey* program, which provides a safe and informative educational experience for North Slope high school students to learn about birds that nest in their hometown.

North Slope:

Since 1991, a long-term study of Alaska's breeding biology of Steller's Eiders has been conducted near Barrow, Alaska. This study provides a unique opportunity to collect samples from individual breeding Steller's Eiders at nesting sites.

Capture Methods: Captures were conducted with a 4-person crew by placing a mist net over the nest while hens were incubating. Because Steller's eiders are threatened species, only hens were captured late in incubation to reduce the likelihood of nest abandonment. Cloacal and, if possible, oral-pharyngeal swab samples were collected and placed in individual sample vials containing preservation media. All captured birds were banded with a metal band and a colored leg band.

Results: A total of 12 nests were found and 5 Steller's Eiders (all adult females) were captured, sampled, banded and released (Table 3). One of the five samples was sent directly to Bob Gerlach, the Alaska State Veterinarian in Anchorage.

AI Results: None of the cloacal only samples tested positive for avian influenza in the Barrow birds.

Table 3. Birds captured and cloacal swabs collected from nesting Steller's Eiders at Barrow, July 2007.

Location	Total birds captured	AI samples		AI Paired samples		Total AI samples
		Female	Male	CL	OP	
Barrow	12	5	0	5	0	4

Other Accomplishments: Biometric measurements, fecal and feather samples were collected. In addition, blood samples were collected from four of the five captured birds.

Table 4. Avian influenza analytical results for Steller's Eiders collected July and September, 2007: pooled cloacal and oral-pharyngeal samples.

Location	Total samples	Total AI Pooled positive	Prevalence
Nelson Lagoon	292	8	0.27
Izembek Lagoon	55	0	0.0
North Slope	4	0	0.0
Total	351	8	0.027

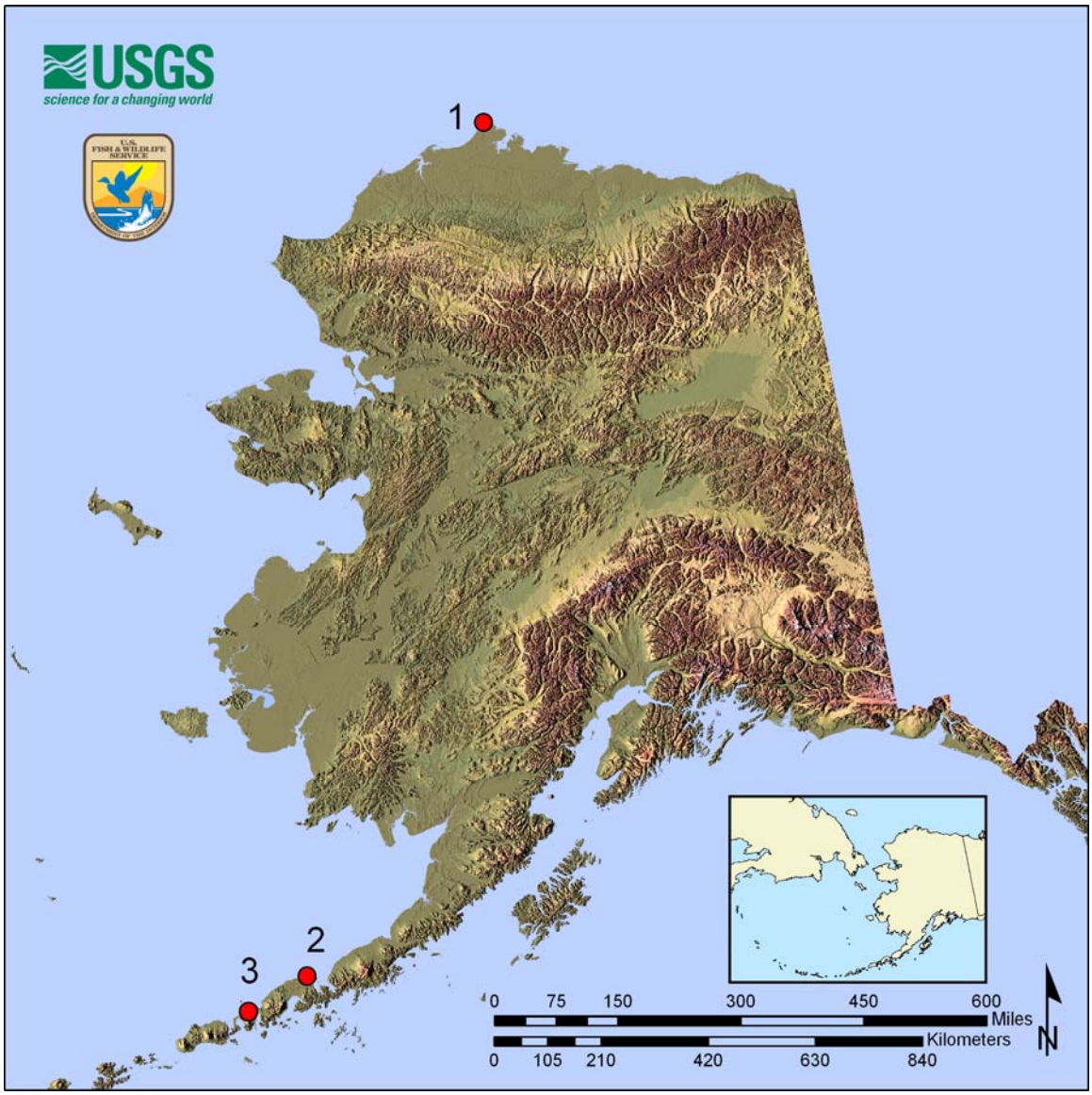
Table 5. Avian influenza analytical results for Steller's Eiders collected July and September, 2007: cloacal only samples.

Location	Total samples	Total AI Cloacal positive	Prevalence
Nelson Lagoon	292	13	0.045
Izembek Lagoon	55	0	0.0
North Slope	4	0	0.0
Total	351	13	0.045

Table 6. Comparative avian influenza results for Steller's Eiders collected July and September, 2007: pooled results and cloacal swab results.

Pooled results	Clocal swab results	Total
Negative	Negative	336
Positive	Positive	6
Negative	Positive	6
Positive	Negative	2
Invalid sample	Invalid sample	1
Total samples tested		351

Figure 2. Live sampling locations for Steller's Eiders in Alaska 2007. For specific location names see key following map.



Site #	Geographic Location	Specific Location	Total samples
1	North Slope	Barrow	4
2	Alaska Peninsula	Nelson Lagoon, Walrus Island	292
3	Alaska Peninsula	Izembek Lagoon	55
	Total		**351**

Taxon: Northern Pintail (*Anas acuta*)

Justification: Northern Pintails are one of the most common ducks found in Alaska during the breeding season. The combination of band recovery and satellite telemetry data indicate that birds wintering in Asia are found in Alaska in summer and birds that winter in North America cross to Asia in summer. Thus, this species has regular contact with Asian species making it a likely vector for disease transmission.

Ranking score: 15

Background: Approximately 50% of the North American population of Northern Pintails is counted in Alaska each summer. Birds sampled in western Alaska in spring likely represent small proportions of Asian wintering birds. Pintails captured in late July and August likely represents some proportion of North American wintering birds returning from Asia. In developed areas, pintails prefer ephemeral wetlands and regularly utilize farm fields and wetlands. Thus, the habitats used by pintails increases their likelihood of exposure to poultry wastes.

Over 1,500 birds were sampled from thirteen geographic locations around the state using a 2-stage stratified design. Of those, 1417 were live bird samples (Fig. 3) and 133 were hunter killed (see Spring Subsistence and Fall Harvest chapter). Each location is discussed separately and final tables present analytical results at the end of this section.

Koyukuk NWR:

Northern Pintails were captured, sampled and released at Kaiyuh Flats and Willow Lake. Kaiyuh Flats is 35 miles southeast of Nulato on the Northern Unit of Innoko NWR. The Kaiyuh Flats are an extensive network of lakes, sloughs, creeks, and rivers on the south side of the Yukon River. Willow Lake is a large, shallow lake approximately eight miles east of the village of Huslia on the Koyukuk NWR. Dulbi Slough originates at the north east end of Willow Lake and runs south ending at the confluence with the Koyukuk River.

Capture Methods: Six rolled traps were pre-baited with cracked corn and barley. The traps were set up and left open at the baited sites to allow the birds to get accustomed to their presence. Once trapping began, a two-person crew with the use of an aluminum canoe checked traps twice a day.

Results: Four hundred thirty-five Northern Pintails were captured and banded at Kaiyuh Flats and Willow Lake. Cloacal and oral-pharyngeal samples were collected from 435 Northern Pintails (Table 7). Of those, 28 were adult females, 3 were adult males, 224 were juvenile females and 180 were juvenile males.

AI Results: One of the 435 Northern Pintail pooled and cloacal samples tested positive for avian influenza. The sample was not H5 or N1 positive. Both the pooled sample and the cloacal sample represents <1% prevalence of avian influenza in the Kaiyuh Flats and Willow Lake birds.

Table 7. Birds captured and both cloacal and oral-pharyngeal swabs collected from Northern Pintails at Koyukuk National Wildlife Refuge, August 2007.

Location	Total birds captured	AI samples		Paired samples		Total AI samples
		Female	Male	CL	OP	
Kaiyuh Flats	190	107	83	190	190	190
Willow Lake	245	145	100	245	245	245
Total	435	252	183	435	435	435

Other Accomplishments: Duck banding was initiated on the Koyukuk NWR at Willow Lake in 1989. This was the first banding project conducted on the Kaiyuh Flats. All birds were banded at both sites.

Innoko NWR:

Northern Pintails were captured, sampled and released at Netletna River and Upper Iditarod River Lakes on the Innoko NWR.

Capture Methods: Trapping locations were selected based on successful sampling of pintails in 2006. Eight trap sites were established along the lower reaches of the Netletna River near the confluence with the Innoko River but, due to extremely high water levels, 6 of the 8 traps were moved to new locations along the Innoko River. Trap sites were pre-baited a week before trapping began with a mixture of cracked corn and barley. Walk-in clover-leaf traps were set up at wetland edges and left open during the pre-baiting period. Traps were checked twice a day.

Results: A total of 121 Northern Pintails was captured and banded along the Innoko River. Cloacal and oral-pharyngeal samples were collected from 121 Northern Pintails (Table 8). Of those, forty-eight were adult females, fourteen were adult males, 42 were juvenile females, 13 were juvenile males, 1 was a female duckling, 1 female was undermined for age, 1 was a duckling sex undetermined, and one was undetermined for sex and age.

AI Results: Three of the 121 Northern Pintail pooled samples tested positive for avian influenza and 3 of the cloacal swabs tested positive for avian influenza. None of the 3

samples was H5 or N1 positive. Both the pooled samples and the cloacal samples represent a 2.5% prevalence of avian influenza in the Innoko NWR birds.

Table 8. Birds captured and both cloacal and oral-pharyngeal swabs collected from Northern Pintails at Innoko National Wildlife Refuge, August 2007.

Location	Total birds captured	Female	Male	UNK	AI Paired samples CL	OP	Total AI samples
Innoko River	121	92	27	2	121	121	121

Other Accomplishments: All captured birds were aged, sexed, and banded.

Yukon Delta NWR:

Northern Pintails were captured, sampled and released at Kgun Lake on the YDNWR.

Capture Methods: Cloverleaf swim-in traps were pre-baited with whole-kernel corn on traditional trapping sites in marshy areas along the northwest shoreline of Kgun Lake.

Results: One thousand four hundred twelve Northern Pintails were captured and banded at Kgun Lake. Cloacal and oral-pharyngeal samples were collected from 450 Northern Pintails (Table 9). Of those, 133 were adult females, 133 were adult males, 108 were juvenile females, and 76 were juvenile males.

AI Results: Eight of the 450 Northern Pintail pooled samples and one of the cloacal samples tested positive for avian influenza. None of the samples were H5 or N1 positive. The pooled samples represent a 1.8 % prevalence of avian influenza in the Kgun Lake birds. The cloacal samples represent less than 1 % prevalence of avian influenza in the Kgun Lake birds.

Table 9. Birds captured and both cloacal and oral-pharyngeal swabs collected from Northern Pintails at Kgun Lake, July through August 2007.

Location	Total birds captured	AI samples Female	Male	AI Paired samples CL	OP	Total AI samples
Kgun Lake	1412	241	209	450	450	450

Other Accomplishments: Since 1990, YDNWR has participated in the Northern Pintail banding program established by the USFWS - Division of Migratory Bird Management. All birds banded at Kgun Lake will continue to provide baseline data for a Pacific Flyway management plan.

Minto Lakes:

Minto Flats State Game Refuge has been a long-term banding site for both locally produced and migrant ducks, including pintails. Northern Pintails were captured, sampled and released at Minto Flats State Game Refuge.

Capture Methods*:* Welded wire swim-in traps were deployed and baited with barley at Minto Lakes. Traps were checked at least twice each day. All captured ducks were classified to species, sex, and age, and banded.

Results: A total of 223 pintails was captured and banded at Minto Lakes. Cloacal and oral-pharyngeal samples were collected from 223 Northern Pintails (Table 10). Of those, 30 were adult females, two were adult males, 99 were juvenile females, and 92 were juvenile males. Water levels remained low throughout the summer and were far below normal at the initiation of trapping. As a result, thick stands of submergent vegetation were prevalent throughout the study area making it difficult to access potentially productive trapping sites. Consequently fewer ducks were trapped but collection goals for AI samples were achieved.

AI Results: Three of the 223 Northern Pintail pooled samples and three of the cloacal samples tested positive for avian influenza. None of the samples were H5 or N1 positive. Both the pooled and the cloacal samples represent a 1.3% prevalence of avian influenza in the Minto Lakes birds.

Table 10. Birds captured and both cloacal and oral-pharyngeal swabs collected from Northern Pintails at Minto Flats State Game Refuge, August 2007.

Location	Total birds captured	AI samples		AI Paired samples		Total AI samples
		Female	Male	CL	OP	
Minto Lakes	223	129	94	2	221	223

Other Accomplishments: The Minto Lakes area has been the subject of research on avian influenza ecology and prevalence for over 10 years and Alaska Department of Fish and Game facilitated sampling of ducks by University of Alaska Fairbanks for several research projects.

Yukon Flats NWR:

Northern Pintails were captured, sampled and released at Mallard Lake on the Yukon Flats NWR. The camp was located on Mallard Lake which is part of the Long Lake complex of lakes approximately 20 miles southwest of Beaver, Alaska.

Capture Methods: Walk-in and swim-in traps were baited with cracked corn and situated on the shorelines of Mallard Lake. Captured birds were fitted with a leg band, sexed, aged, and morphological measurements were taken.

Results: One hundred sixty-seven Northern Pintails were captured and banded at Mallard Lake. Cloacal and oral-pharyngeal samples were collected from 167 Northern Pintails (Table 11). Of those, 4 were adult females, one was an adult male, 65 were juvenile females, and 97 juvenile males.

AI Results: Twenty-one of the 167 Northern Pintail pooled samples and twenty-two of the cloacal samples tested positive for avian influenza. None of the samples were H5 or N1 positive. The pooled samples represent a 12.6 % prevalence of avian influenza in the Mallard Lake birds. The cloacal samples represent a 13.2% prevalence of avian influenza in the Mallard Lakes birds.

Table 11. Birds captured and both cloacal and oral-pharyngeal swabs collected from Northern Pintails at Mallard Lake, August 2007.

Location	Total birds captured	AI samples		AI Paired samples		Total AI samples
		Female	Male	CL	OP	
Mallard Lake	167	69	98	167	167	167

Selawik NWR:

Northern Pintails were captured, sampled and released at the Kauk River, 35 miles north of Buckland.

Capture Methods: Northern pintails were trapped two and half miles north of the mouth of the Kauk River. Coastal areas were scouted using fixed wing aircraft and an inflatable outboard motor boat for suitable sampling, camp, and access sites. Traps were pre-baited with whole barley and placed along the shorelines. Green plastic fencing enclosed the trap and small mesh bird netting topped the swim-in trap preventing escape.

Results: Twenty Northern Pintails were captured and banded at Kauk River. Cloacal and oral-pharyngeal samples were collected from 20 Northern Pintails (Table 12). Of those, six were adult females, three were adult males, three were juvenile females, and eight were juvenile males.

AI Results: None of the 20 Northern Pintail pooled or cloacal samples tested positive for avian influenza in the Kauk River birds.

Table 12. Birds captured and both cloacal and oral-pharyngeal swabs collected from Northern Pintails at Selawik National Wildlife Refuge, August 2007.

Location	Total birds captured	AI samples		AI Paired samples		Total AI samples
		Female	Male	CL	OP	
Kauk River	20	9	11	20	20	20

North Slope:

One Northern Pintail was captured, sampled and released at Barrow.

Capture Methods: A two person crew captured a breeding Northern Pintail by placing a bow net over the nest. Banding did not occur at this site.

Results: One Northern Pintail was captured and released at Barrow. A cloacal and oral-pharyngeal sample was collected (Table 13). The bird was an adult female.

AI Results: The pooled sample was not positive for avian influenza in the Barrow bird.

Table 13. Bird captured and both cloacal and oral-pharyngeal swab collected from Northern Pintail at Barrow, July 2007.

Location	Total birds captured	AI samples		AI Paired samples		Total AI samples
		Female	Male	CL	OP	
Barrow	1	1	0	1	1	1

Table 14. Avian influenza analytical results for Northern Pintails collected July through August, 2007: pooled cloacal and oral-pharyngeal samples.

Location	Total samples	Total AI Pooled positive	Prevalence
Koyukuk NWR	435	1	0.002
Innoko NWR	121	3	0.025
Yukon Delta NWR	450	8	0.017
Interior	223	3	0.013
Yukon Flats NWR	167	21	0.126
Selawik NWR	20	0	0.0
North Slope	1	0	0.0
Total	1,417	36	0.025

Table 15. Avian influenza analytical results for Northern Pintails collected July through August, 2007: cloacal only samples.

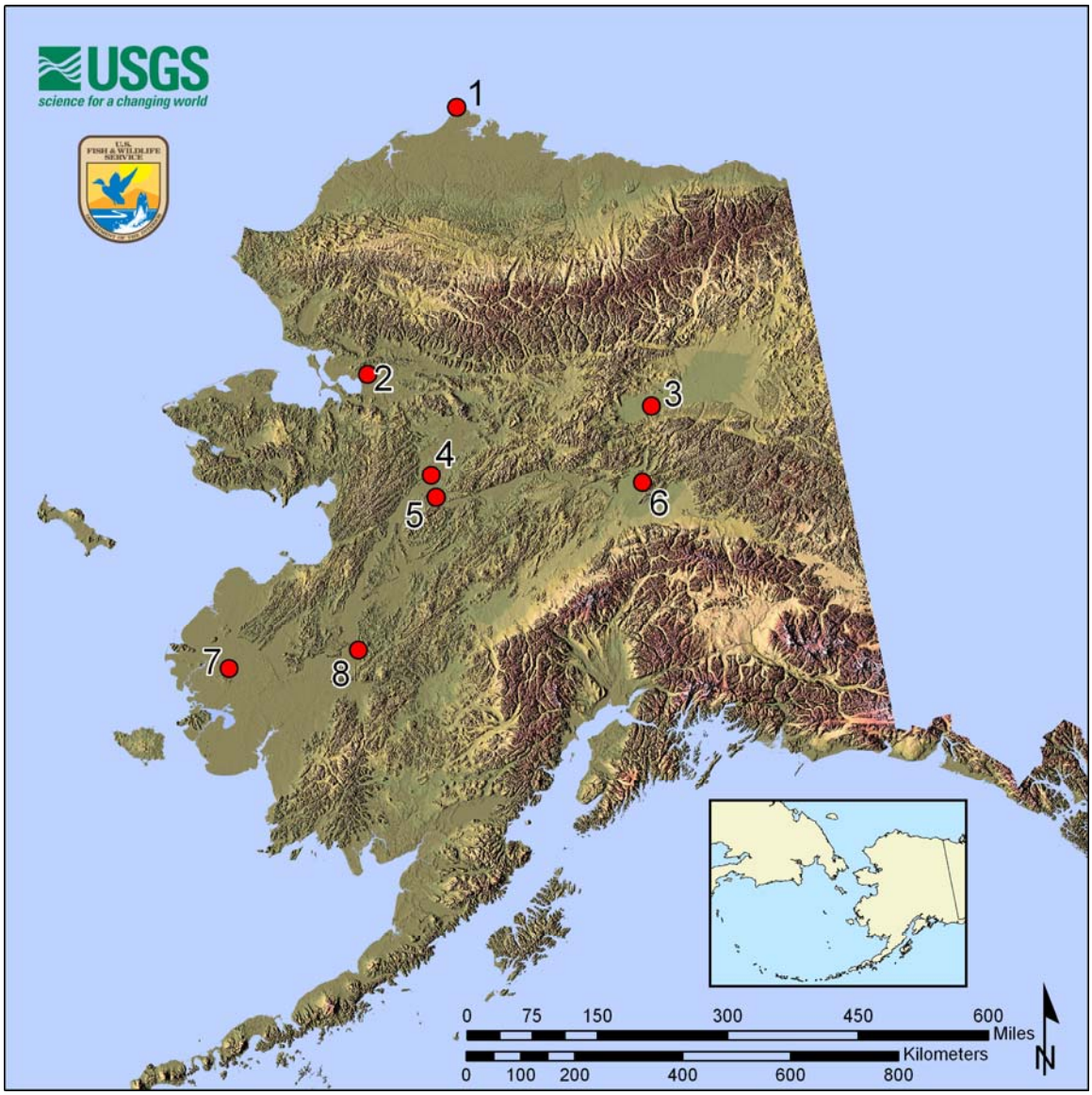
Location	Total samples	Total AI Cloacal positive	Prevalence
Koyukuk NWR	435	1	0.002
Innoko NWR	121	3	0.025
Yukon Delta NWR	450	1	0.002
Interior	223	3	0.013
Yukon Flats NWR	167	22	0.131
Selawik NWR	20	0	0.0
North Slope	1	no result	0.0
Total	1,417	30	0.021

Table 16. Comparative avian influenza results for Northern Pintails collected July through August, 2007: pooled results and cloacal swab results.

Pooled results	Clocal swab results	Totals
Negative	Negative	1375
Positive	Positive	28
Negative	Positive	5
Positive	Negative	8
Negative	No result	1
Total samples tested		1,417

Brain Guzzetti, USGS ASC

Figure 3. Live sampling locations for Northern Pintails in Alaska, 2007. For specific location names see key following map.



Site #	Geographic Location	Specific Location	Total samples
1	North Slope	Barrow	1
2	Selawik NWR	Kauk River	20
3	Yukon Flats NWR	Mallard Lake	167
4	Koyukuk NWR	Kaiyuh Flats	190
5	Koyukuk NWR	Willow Lake	245
6	Minto Flats State Game Refuge	Minto Lakes	223
7	Yukon Delta NWR	Kgun Lake	450
8	Innoko NWR	Innoko River	121
	Total		**1417**

Taxon: Lesser Snow Goose (*Chen caerulescens caerulescens*)

Justification: The entire breeding population of Lesser Snow Geese from Wrangel Island, Russia migrates to Alaska and to the southern Pacific Flyway. A very small segment of this Asian-breeding population also winters in Japan.

Ranking score: 15

Background: Lesser Snow Geese that nest on Wrangel Island, Russia, migrate through Alaska to wintering areas in British Columbia and California. Wrangel Island Lesser Snow Geese use St. Lawrence Island and the Yukon-Kuskokwim Delta (YKD) in western Alaska as stopover areas during autumn migration (Ely et al. 1993). Part of the population also stops on the Stikine River Delta in southeast Alaska in fall. In spring, the population uses stopover areas in southeast Alaska, Cook Inlet, and the YKD. Approximately 2,000-3,000 snow geese are harvested for subsistence purposes on the YKD in fall and spring. A small number (<100) is shot by sport hunters in southeast Alaska.

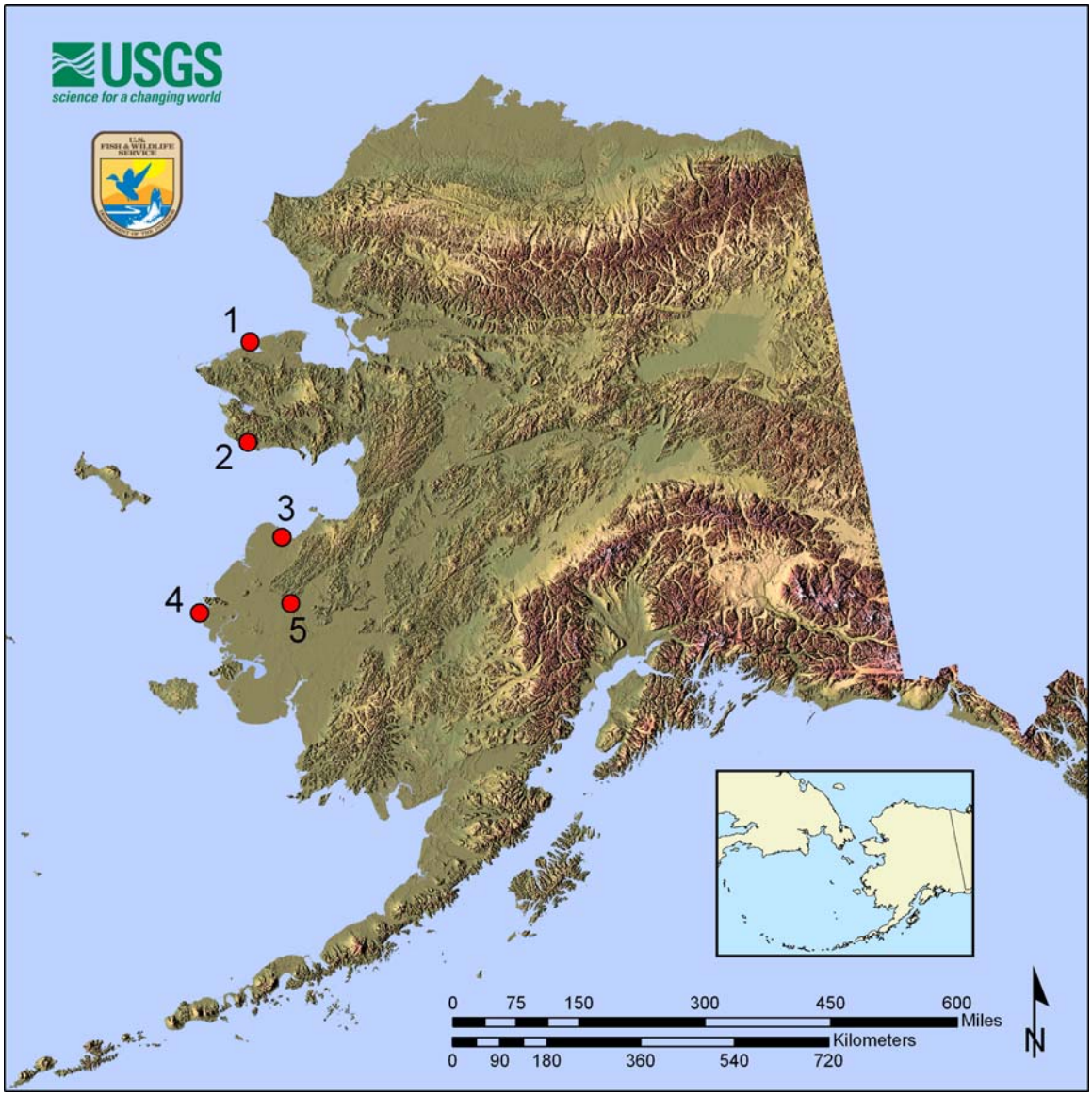
Methods: No live capture project focused on Lesser Snow Geese due to the difficulty in trapping birds. All sampling for HPAI in snow geese occurred through spring subsistence harvested birds (Figure 4).

Results: Two hundred twenty-eight cloacal and oral-pharyngeal samples were collected from Lesser Snow Geese (see Spring Subsistence chapter). All 228 were analyzed for avian influenza viruses.

AI Results: One of the 228 Lesser Snow Geese pooled samples and one of the cloacal samples tested positive for avian influenza. None of the samples were H5 or N1 positive. Both the pooled and cloacal samples represent < 1% prevalence of avian influenza in spring subsistence harvested Lesser Snow Geese.

Donna Dewhurst, USFWS

Figure 4. Sampling locations for Lesser Snow Geese in Alaska, 2007. For specific location names see key following map. A total of 228 samples were collected through spring subsistence harvested birds. Note: No live sampling of this species occurred.



Site #	Geographic Location	Specific Location
1	Seward Peninsula	Shishmaref
2	Seward Peninsula	Nome
3	Yukon Delta NWR	Kotlik
4	Yukon Delta NWR	Hooper Bay
5	Yukon Delta NWR	Pilot Station

Taxon: Emperor Goose (*Chen canagica*)

Justification: Ninety percent of the world population of Emperor Geese breeds on the Yukon-Kuskokwim Delta.

Ranking score: 13

Background: Most of the global population of Emperor Geese breeds on the outer coast of the Yukon-Kuskokwim Delta (Eisenhauer and Kirkpatrick 1977), with as many as 35,000 nests estimated in some years (Fischer et al. 2005). These geese are not colonial nesters, but are readily captured in small numbers in June while nesting and in large numbers (with young) in late July/early August during the flightless primary molt (Petersen et al. 1994). Most Emperor Geese that fail to incubate a nest migrate in early June from the YKD to northern Chukotka in eastern Russia where they molt their flight feathers. Most of the global population spends spring and fall staging periods on the Alaska Peninsula (Nelson Lagoon having the greatest number), and during winter they are distributed from Kodiak Island to the Commander Islands, Russia, with the majority on the Aleutian Islands (Petersen et al. 1994).

More than 450 birds from Manokinak River, Kigigak Island, Baird Inlet, and Old Chevak, were sampled. All of these sites are located in the YDNWR. Of these, 350 were live bird samples (Fig. 5) and 136 hunter-killed samples (see Spring Subsistence chapter). Each location is discussed separately and a final table presents the analytical results at the end of this section.

Manokinak River:

The lower Manokinak River is a high density nesting area for Emperor Geese on the YKD. Emperor Geese were sampled at the Manokinak River during two stages of the breeding season. Adult females were captured in late June during nest incubation and adults and goslings of both genders were sampled during brood rearing in early August.

Capture Methods: In June, Emperor Geese nests were located by systematically searching a ~20 km^2 area on the lower Manokinak River. A subset of unbanded nesting females was trapped on nests during late incubation using bow traps.

In August, molting adults and flightless gosling Emperor Geese were herded into drive traps at three sites along the lower Manokinak River. Birds were herded into a holding pen on an open mud flat by persons walking in a line through the capture area and boats were used to keep birds from re-entering the river.

Total birds captured during molt drives were low due to poor weather conditions including nearly a week of consistent rain. Molt drives cannot be conducted in wet conditions due to the risk of hypothermia in the down covered goslings.

Results: A total of 68 Emperor Geese was captured and banded at Manokinak River. Cloacal and oral-pharyngeal samples were collected from 68 Emperor Geese (Table 17). Of those, 54 were adult females, 7 were adult males, 4 were juvenile females, and 3 were juvenile males.

AI Results: None of the 68 Emperor Geese pooled or cloacal samples tested positive for avian influenza.

Table 17. Birds captured and both cloacal and oral-pharyngeal swabs collected from nesting and molting Emperor Geese at Yukon Delta National Wildlife Refuge, June and August 2007.

Location	Total birds captured	AI samples		AI Paired samples		Total AI samples
		Female	Male	CL	OP	
Manokinak River	68	58	10	68	68	68

Other Accomplishments: Studies of Emperor Geese nesting and brood rearing ecology have been conducted on the lower Manokinak River for more than a decade. Of the 68 captured Emperor Geese (all adult females) all were banded with stainless steel metal leg bands on one leg and a colored plastic tarsal band with a unique 3-digit alpha numeric code on the other. A total of 189 female Emperor Geese was found incubating nests; of these, 49 were captured and sampled for AI. A total of 27 adult females were uniquely banded and added to the population of marked birds. All nests were revisited at hatch to mark goslings with webtags. In August, 4 of the molting birds were recaptured individuals (i.e., previously banded); an additional 7 females were given unique tarsal bands. Additionally, feathers and eggshell membranes, and blood were collected from nesting females for stable isotopic analysis.

Old Chevak:

Emperor Geese were captured, sampled and released in Yukon-Kuskokwim Delta's outer coast, about four km SSE of Chevak.

Capture Methods: Brood drives were conducted by biologists and teenage volunteers from the village of Old Chevak. Flocks of flightless Emperor Geese were herded into holding pens by the banding crew walking across the tundra in a coordinated effort. All captured birds were banded with an aluminum leg band.

Results: A total of 188 Emperor Geese (88 females and 100 males) was captured and banded during three drives at Old Chevak. Cloacal and oral-pharyngeal samples were collected from 188 Emperor Geese (Table 18). Of those, 34 were adult females, 36 were adult males, 54 were female goslings, and 64 were male goslings.

AI Results: None of the 188 Emperor Geese pooled or cloacal samples tested positive for avian influenza at Old Chevak.

Table 18. Birds captured and both cloacal and oral-pharyngeal swabs collected from molting Emperor Geese at Yukon Delta National Wildlife Refuge, July 2007.

Location	Total birds captured	AI samples		AI Paired samples		Total AI samples
		Female	Male	CL	OP	
Old Chevak	188	88	100	1	187	188

Other Accomplishments: Feathers were collected for stable isotope analysis.

Kigigak Island:

Emperor Geese were sampled on Kigigak Island, a high-density nesting location on YDNWR.

Capture Methods: Adult Emperor Geese were captured in three ways: by placing a mist net over the top of females on nests, by flushing nesting females into a mist net, or by flushing the female off the nest, placing a string-activated trap on the nest, and triggering the trap once the female returned to the nest.

Results: A total of 50 Emperor Geese was captured and banded at Kigigak Island on the YDNWR. Cloacal and oral-pharyngeal samples were collected from 50 Emperor Geese (Table 19). All were adult females.

AI Results: None of the 50 Emperor Geese pooled or cloacal samples tested positive for avian influenza at Kigigak Island.

Table 19. Birds captured and both cloacal and oral-pharyngeal swabs collected from molting Emperor Geese at Yukon Delta National Wildlife Refuge, June 2007.

Location	Total birds captured	AI samples		AI Paired samples		Total AI samples
		Female	Male	CL	OP	
Kigigak Island	50	50	0	50	50	50

Other Accomplishments: Morphometric measurements and body mass were recorded for all captured individuals.

Baird Inlet:

Emperor Geese were sampled at Baird Inlet which is located about 0.5 km south of the village of Newtok. Habitat consists of low coastal tundra, sedges, and grasses.

Capture Methods: Adult Emperor Geese were captured by flushing the female off the nest, placing a string-activated trap on the nest, and triggering the trap once the female returned to the nest.

Results: A total of 44 Emperor Geese was captured at Baird Inlet on the YDNWR. Cloacal and oral-pharyngeal samples were collected from 44 Emperor Geese (Table 20). All were adult females.

AI Results: None of the 44 Emperor Geese pooled or cloacal samples tested positive for avian influenza at Baird Inlet.

Table 20. Birds captured and both cloacal and oral-pharyngeal swabs collected from molting Emperor Geese at Yukon Delta National Wildlife Refuge, June 2007.

Location	Total birds captured	AI samples		AI Paired samples		Total AI samples
		Female	Male	CL	OP	
Baird Inlet	44	44	0	44	44	44

Other Accomplishments: Morphometric measurements and body mass were recorded for all captured individuals.

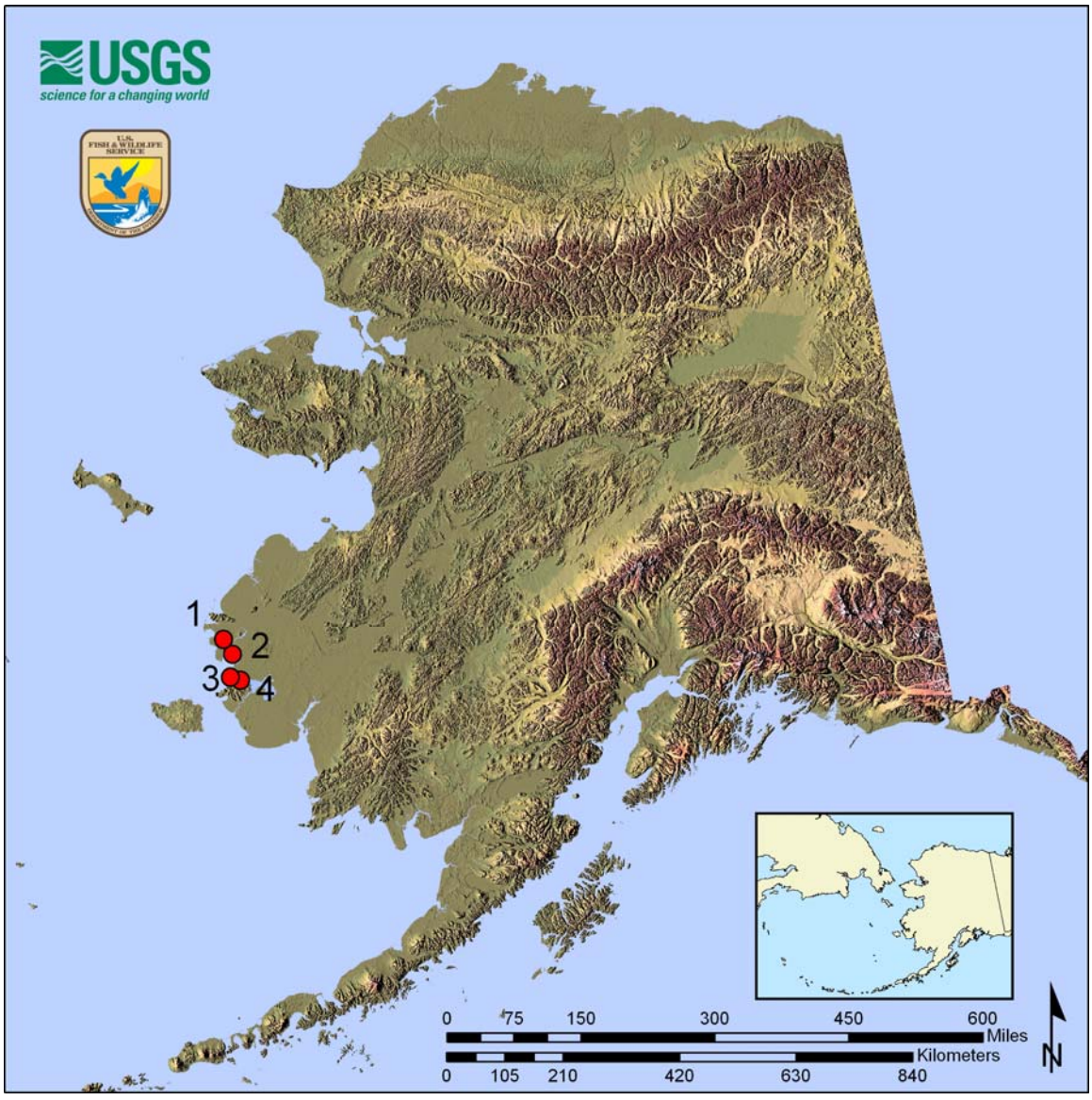
Table 21. Avian influenza analytical results for Emperor Geese collected June through August, 2007: pooled and cloacal only samples.

Location	Total samples	Total AI Pooled positive	Total AI Cloacal positive	Prevalence
Manokinak River	68	0	0	0
Old Chevak	188	0	0	0
Kigigak Island	50	0	0	0
Baird Inlet	44	0	0	0
Total	350	0	0	0

Table 22. Comparative avian Influenza results for Emperor Geese collected June through August, 2007: pooled results and cloacal swab results.

Pooled results	Clocal swab results	Totals
Negative	Negative	350
Positive	Positive	0
Negative	Positive	0
Positive	Negative	0
Total samples tested		350

Figure 5. Live sampling locations for Emperor Geese in Alaska, 2007. For specific location names see key following map.



Site #	Geographic Location	Specific Location	Total samples
1	Yukon Delta NWR	Manokinak River	68
2	Yukon Delta NWR	Old Chevak	188
3	Yukon Delta NWR	Kigigak Island	50
4	Yukon Delta NWR	Baird Inlet	44
	Total		**350**

Taxon: Spectacled Eider (*Somateria fischeri*)

Justification: The vast majority of Spectacled Eiders breed in east Asia and return to the Bering Sea each fall to over-winter.

Ranking score: 12

Background: Spectacled Eiders breed in three geographically distinct areas: the Yukon-Kuskokwim Delta, the Alaskan Arctic Coastal Plain, and the Siberian Arctic (Petersen et al. 2000). Birds from all three breeding populations winter in large mixed flocks in the Bering Sea (Petersen et al. 1999). Conditions observed for wintering flocks in some years are highly conducive for fecal/oral transmission of viruses with large concentrations of birds packed into small leads in the sea ice (Petersen et al. 1999).

Over 150 birds were sampled from Kigigak Island and Barrow. Of these, 171 were live bird samples (Fig. 6) and two were hunter-killed samples (see Spring Subsistence chapter). Each location is discussed separately and final tables with analytical results are presented at the end of this section.

Kigigak Island:

Spectacled Eiders were captured, banded and released at Kigigak Island, located along the outer fringe of YDNWR, near the mouth of Baird Inlet. The island is bordered by the Ninglick River and the Bering Sea.

Results: One hundred eighty-five Spectacled Eiders were captured and banded at Kigigak Island. Cloacal and oral-pharyngeal samples were collected from 170 Spectacled Eiders (Table 23). Of those, 50 were adult females, 62 juvenile females and 58 juvenile males.

AI Results: None of the 170 Spectacled Eiders pooled or cloacal samples tested positive for avian influenza at Kigigak Island. None of the samples were H5 or N1 positive.

Table 23. Birds captured and both cloacal and oral-pharyngeal swabs collected from Spectacled Eiders at Yukon Delta National Wildlife Refuge, June through July 2007.

Location	Total birds captured	AI samples		AI Paired samples		Total AI samples
		Female	Male	CL	OP	
Kigigak Island	185	112	58	170	170	170

Other Accomplishments: Genetic samples were also collected and morphometrics and productivity data recorded. All birds were banded or band numbers recorded; data will be used in a mark/recapture study to estimate annual survival for Spectacled Eiders in this region.

Barrow: One Spectacled Eider was opportunistically sampled and released at Barrow. Banding did not occur at this site.

Results: One Spectacled Eider was sampled at Barrow. Only a cloacal swab sample was taken (Table 24). The bird was an adult female.

AI Results: Neither the pooled or cloacal sample tested positive for avian influenza in the Barrow bird.

Table 24. Bird captured and cloacal swab collected from injured Spectacled Eider at Barrow, June 2007.

Location	Total birds captured	AI samples		AI Paired samples		Total AI samples
		Female	Male	CL	OP	
Barrow	1	1	0	1	0	1

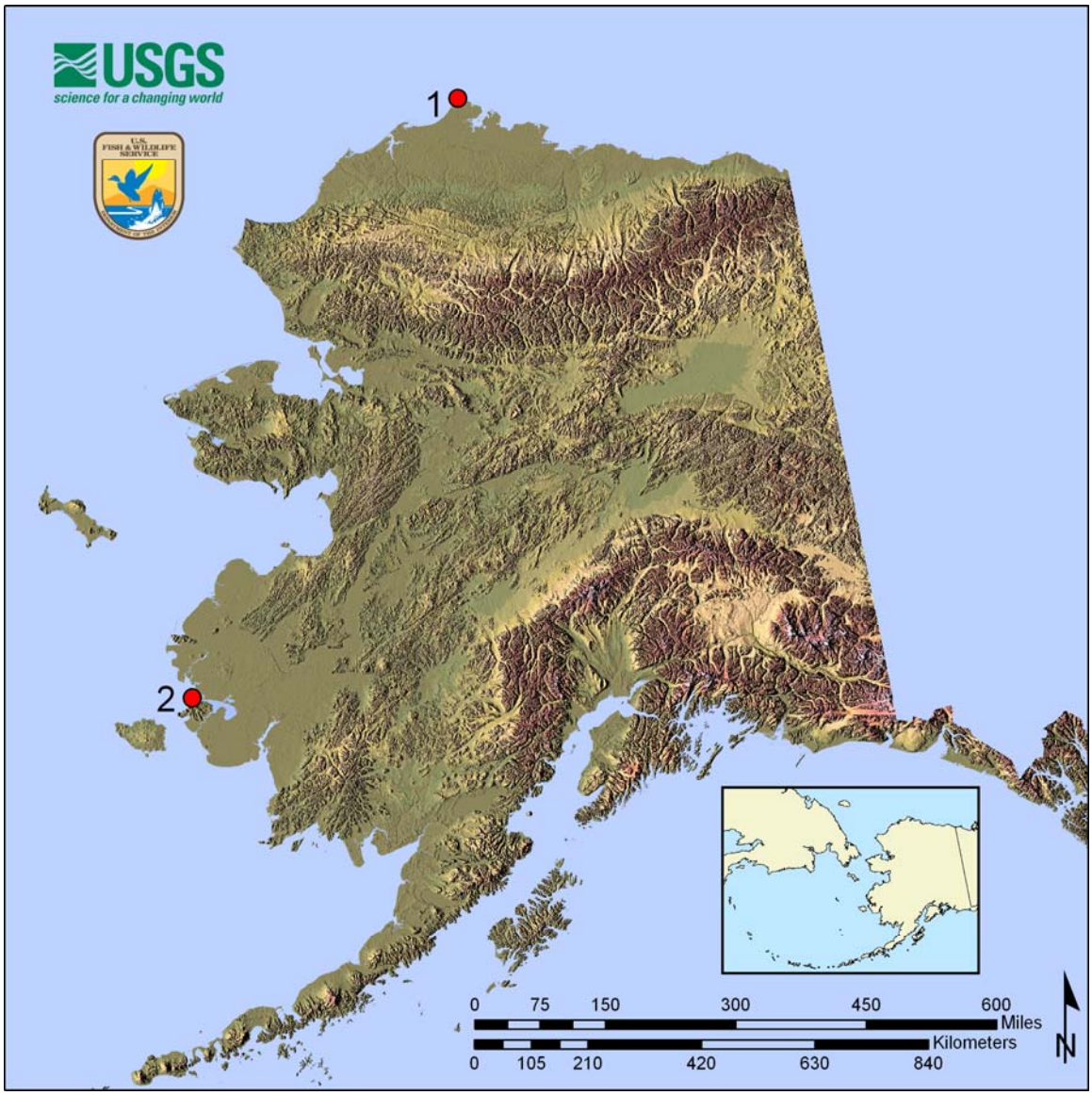
Table 25. Avian influenza analytical results for Spectacled Eiders collected June through July, 2007: pooled and cloacal only samples.

Location	Total samples	Total AI Pooled positive	Total AI Cloacal positive	Prevalence
Yukon Delta NWR	170	0	0	0
North Slope	1	0	0	0
Total	171	0	0	0

Table 26. Comparative avian influenza results for Spectacled Eiders collected June through July, 2007: pooled results and cloacal swab results.

Pooled results	Clocal swab results	Totals
Negative	Negative	170
Positive	Positive	0
Negative	Positive	0
Positive	Negative	0
No result	Negative	1
Total samples tested		171

Figure 6. Live sampling locations for Spectacled Eiders in Alaska, 2007. For specific location names see key following map.



Site #	Geographic Location	Specific Location	Total samples
1	North Slope	Barrow	1
2	Yukon Delta NWR	Kigigak Island	170
	Total		**171**

Taxon: Black Brant (*Branta bernicla nigricans*)

Justification: Black Brant that breed and winter in northeastern Asia have both direct and indirect links with Alaska.

Ranking score: 12.0

Background: Several thousand Black Brant breed and molt along the arctic coast of Russia. The Russian population winters in North America, Japan, Korea, and northeastern China, near recent outbreaks of the Asian H5N1 virus (e.g., Hong Kong). Mixing of flocks likely occurs between these populations, and potentially with birds wintering in northern Europe. Also, molt migrants from Russia may come to the arctic coast of Alaska (King and Hodges 1979) and conversely molters from Alaska may migrate to Russia (e.g., Wrangel Island; Ward et al. 1993). Finally, Brant marked in Alaska have been observed staging and wintering in Japan (Derksen et al. 1996), indicating that there is interchange between birds from Alaska and those that winter closest to infected areas.

Brant nest in high concentrations (colonies) and during brood rearing, molting, and staging, they concentrate in flocks. The YKD is the major breeding area for Black Brant, hosting approximately 80% of the world population. The Teshekpuk Lake area is the most important molting area for brant, smaller numbers molt on the YKD. During the fall staging period at Izembek Lagoon nearly the entire world population of Black Brant comes together.

Over 1,300 birds were sampled from Baird Inlet, Kigigak Island, Hazen Bay, and the North Slope using a 4-stage sampling design. The 4-stage sampling design is broken into arrival/early nesting, molting, brood rearing, and fall staging. Of those, 879 were live bird samples (Fig. 7) and 514 were hunter killed (see Spring Subsistence and Fall Harvest chapter). Each sampling stage and its location will be discussed separately and final tables present the analytical results at the end of this section.

Early Nesting
Early nesting sampling was conducted in two areas of the YKD in June 2007.

Yukon Delta NWR:

Black Brant were captured, banded, and released from two of the four major nesting colonies: Baird Inlet and Kigigak Island. Baird Inlet is a 35-mile-long bay in the Yukon-Kuskokwim Delta. It borders Nelson Island and is drained primarily by the Ninglick and

Kolavinarak rivers. The island is surrounded by large mudflats at low tide and nearly all ponds on the island are tidal. Kigigak Island is located along the outer fringe of Yukon-Kuskokwim Delta, near the mouth of Baird Inlet. Spring and fall storm tides regularly inundate the island, except for upland areas, which are flooded only during severe storm tides. Habitat is the same for all capture locations, consisting of low coastal tundra, sedges, and grasses.

Capture Methods: Females were captured on nests late in incubation using nest traps. All birds received a metal band and plastic tarsal band.

Results: One hundred forty Black Brant were captured at Baird Inlet and Kigigak Island. Cloacal and oral-pharyngeal samples were collected from 140 Black Brant (Table 27). All were adult females.

AI results: None of the 140 Black Brant pooled or cloacal samples tested positive for avian influenza in the YKD nesting birds. The samples were not positive for H5 or N1.

Table 27. Birds captured and both cloacal and oral-pharyngeal swabs collected from nesting Black Brant at Yukon Delta National Wildlife Refuge, June 2007.

Location	Total birds captured	AI samples		AI Paired samples		Total AI samples
		Female	Male	CL	OP	
Baird Inlet	70	70	0	70	70	70
Kigigak Island	70	70	0	70	70	70
Total	140	140	0	140	140	140

Other Accomplishments: A total of 3,024 goslings were web tagged at both locations to examine gosling growth. Nest data including initiation dates and clutch sizes were collected and nest were monitored to estimate survival.

Molting

Molting birds were captured, sampled, and released from two areas: Hazen Bay which is just north of Baird Inlet on the YKD and the Teshekpuk Lake area which is on the North Slope

Hazen Bay and North Slope:

Failed and non-breeding birds from a variety of breeding colonies concentrate in the vicinity of Teshekpuk Lake on the North Slope for molt. Large flocks of birds are regularly found dispersed across a series of four large lakes. At Hazen Bay in the Yukon-Kuskokwim Delta molting birds congregate in a single or several closely related flocks.

Capture Methods: In the vicinity of Teshekpuk Lake Black Brant were sampled from dispersed flocks across a series of six large lakes. On the YKD molting brant were sampled from a single molting flock of ~ 2,000 birds found on the south edge of Hazen

Bay. At both locations planes and ground personnel were used to drive birds into corral traps. Most birds were marked with a metal band and a plastic tarsal band.

Results: A total of 1,800 Black Brant was captured and banded at Hazen Bay and Teshekpuk Lake. Cloacal and oral-pharyngeal samples were collected from 427 Black Brant (Table 28). Of those, 212 were adult females, 212 adult males, and three were unidentified for both age and sex.

AI Results: None of the 427 Black Brant pooled or cloacal samples tested positive for avian influenza.

Table 28. Birds captured and both cloacal and oral-pharyngeal swabs collected from molting Black Brant at Yukon Delta National Wildlife Refuge and North Slope, July 2007.

Location	Total birds captured	Female	Male	UNK	AI Paired samples CL	OP	Total AI samples
Hazen Bay	287	119	117	3	239	239	239
Teshekpuk Lake	1513	93	95	0	188	188	188
Total	1800	212	212	3	427	427	427

Other Accomplishments: Field crews assessed body condition in relation to stage of molt, the proportion of breeders and non-breeders, and molt phenology between molting Black Brant on the YKD and the North Slope. Birds were weighed, measured (including 1st primary as an indicator of molt stage), aged, and breeding status of females was noted (i.e., presence or absence of a brood patch). This data will be used to compare molt ecology between the YKD and the North Slope.

Brood-Rearing

Goslings were sampled from the major brood-rearing colonies on the Yukon-Kuskokwim Delta.

Kigigak Island and Baird Inlet:

Goslings were captured, banded, and released from brood-rearing colonies. Kigigak Island is located along the outer fringe of Yukon-Kuskokwim Delta, near the mouth of Baird Inlet. Baird Inlet is a 35-mile-long bay in the Yukon-Kuskokwim Delta. It borders Nelson Island and is drained primarily by the Ninglick and Kolavinarak rivers. Habitat for both areas consists of low coastal tundra, sedges, and grasses.

Capture Methods: Planes and ground personnel were used to drive birds into corral traps. Most birds were marked with a metal band and a plastic tarsal band.

Results: A total of 312 Black Brant was captured and banded at Kigigak Island and Baird inlet. Cloacal and oral-pharyngeal samples were collected from 312 Black Brant adults and goslings (Table 29). Of those, 131 were juvenile females, 112 were juvenile males, 26 were adult females, 36 were adult males, 4 were females with age unknown, and 3 were unidentified for both sex and age. One successful drive was conducted at Kigigak Island and two at Baird Inlet.

AI results: None of the 312 Black Brant pooled or cloacal samples tested positive for avian influenza. One cloacal swab sample from Kigigak Island was invalid.

Table 29. Birds captured and both cloacal and oral-pharyngeal swabs collected from molting Black Brant at Yukon Delta National Wildlife Refuge, July 2007.

Location	Total birds captured	Female	Male	UNK	AI Paired samples CL	OP	Total AI samples
Baird Inlet	62	29	32	1	62	62	62
Kigigak Island	250	132	116	2	250	250	250
Total	312	161	148	3	312	312	312

Fall Staging

The fall staging samples were from fall harvest birds sampled at Izembek NWR (see Fall Harvest chapter). None of the pooled or cloacal samples tested positive for avian influenza.

Tim Bowman USFWS

Table 30. Avian influenza analytical results for Black Brant collected June through August, 2007: pooled cloacal and oral-pharyngeal samples.

Location	Sampling Stages	Total samples	Total AI Pooled positive	Prevalence
Yukon Delta NWR	Nesting	140	0	0
North Slope	Molting	188	0	0
Yukon Delta NWR	Molting	239	0	0
Yukon Delta NWR	Brood-Rearing	312	0	0
Total		879	0	0

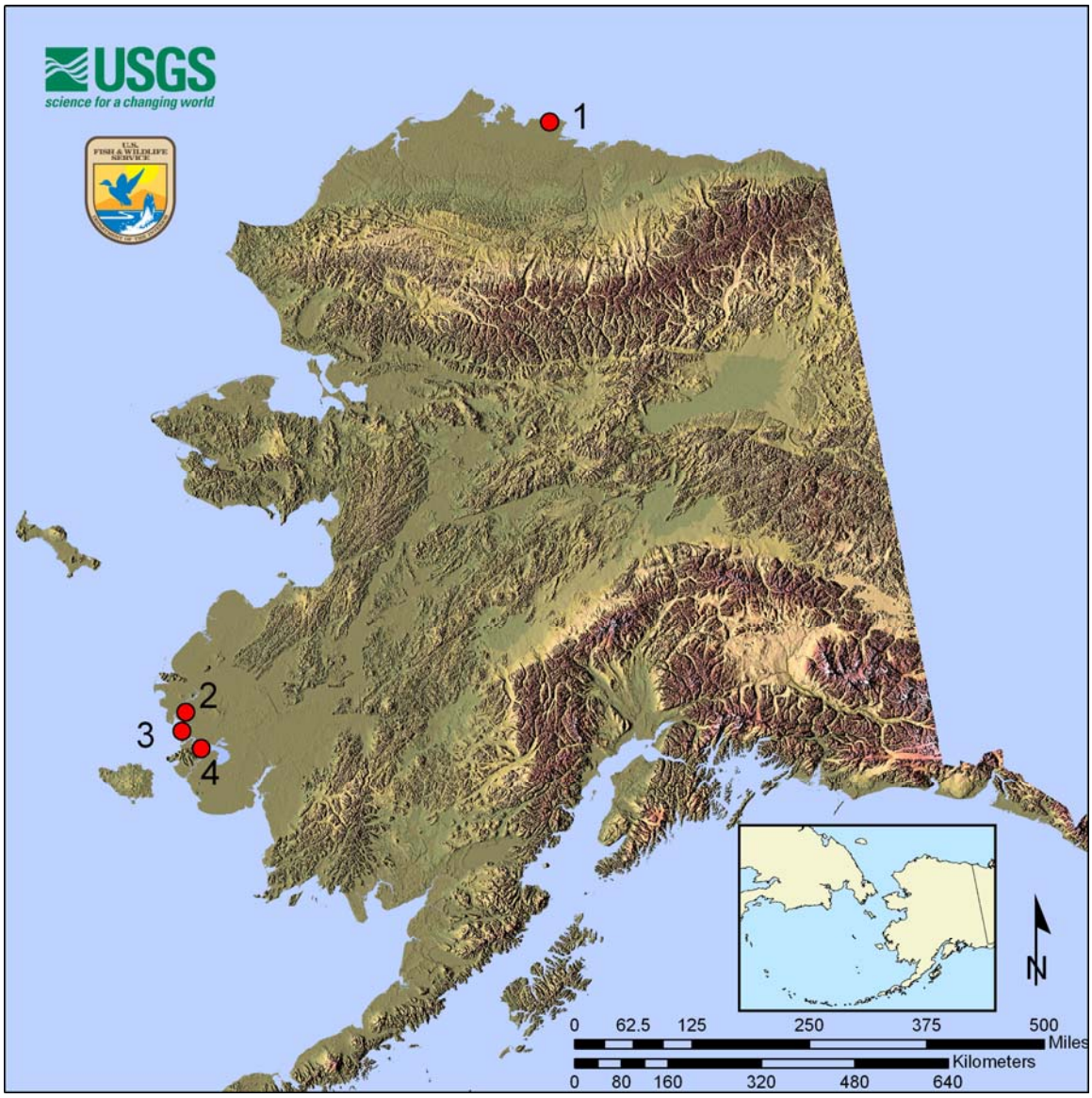
Table 31. Avian influenza analytical results for Black Brant collected June through August, 2007: cloacal only samples.

Location	Sampling Stages	Total samples	Total AI Cloacal positive	Prevalence
Yukon Delta NWR	Nesting	140	0	0
North Slope	Molting	188	0	0
Yukon Delta NWR	Molting	239	0	0
Yukon Delta NWR	Brood-Rearing	311	0	0
Yukon Delta NWR	Brood-Rearing	1	no result	0
Total		879	0	0

Table 32. Comparative avian influenza results for Black Brant collected June through August, 2007: pooled results and cloacal swab results.

Pooled results	Clocal swab results	Totals
Negative	Negative	878
Positive	Positive	0
Negative	Positive	0
Positive	Negative	0
Negative	No result	1
Total samples tested		879

Figure 7. Live sampling locations for Black Brant in Alaska, 2007. For specific location names see key following map.



Site #	Geographic Location	Specific Location	Total samples
1	North Slope	Teshekpuk Lake	188
2	Yukon Delta NWR	Hazen Bay	239
3	Yukon Delta NWR	Kigigak Island	320
4	Yukon Delta NWR	Baird Inlet	132
	Total		**879**

Taxon: Lesser Sandhill Crane (*Grus canadensis canadensis*)

Justification: A significant proportion of the mid-continent population of Lesser Sandhill Cranes migrates through Alaska to and from breeding grounds in eastern Chukotka, Russia. Sandhill cranes are attracted to agricultural areas with domestic poultry.

Ranking score: 11.5

Background: Lesser Sandhill Cranes in Alaska are affiliated with two different populations, the Pacific Flyway Population (PFP) and the Mid-continent Population (MCP), based on segregation during the breeding, migration and wintering periods (Tacha et al. 1994). MCP cranes breed from Hudson Bay west across Canada and interior Alaska to the YKD. The probability of Lesser Sandhill Cranes being exposed to Asian H5N1 is greater than for many other species of birds because a substantial portion of MCP cranes breeds in Asia and they commingle with Asian species of cranes (Johnsgard 1983) which migrate through areas infected with Asian H5N1. Also, cranes use a variety of natural and agricultural habitats for foraging and roosting, making them more likely than some species to contact Asia H5N1 through domestic poultry and infected sites.

One hundred thirty-one Lesser Sandhill Cranes were sampled at Creamers Field Migratory Waterfowl Refuge, Yukon Delta NWR, and Seward Peninsula. Seventy-four were live bird samples (Fig. 8) and 57 were hunter samples (see Spring Subsistence and Fall Harvest chapter).

Creamer's Field Migratory Waterfowl Refuge (Fairbanks):

Creamer's Field is a state game refuge located in Fairbanks. The Alaska Department of Fish and Game manages the Refuge in a combination of natural wetlands and cultivated grain to both enhance wildlife viewing and attract cranes away from the Fairbanks airport. An ongoing crane banding and marking project facilitates AI sampling.

Erik Hill, Anchorage Daily News

Capture Methods: Lesser Sandhill Cranes were captured with rocket nets at baited sites on barley fields. Captured cranes were weighed, measured, aged, and banded. Sex of cranes cannot be determined in the field, so a blood sample was drawn for later testing.

Results: Seventy-four Lesser Sandhill Cranes were sampled at Creamer's Field. Cloacal and oral-pharyngeal samples were collected from 74 Lesser Sandhill Cranes (Table 33). All were adults.

AI Results: None of the 74 Lesser Sandhill Cranes pooled samples tested positive for avian influenza.

Table 33. Birds captured and both cloacal and oral-pharyngeal swabs collected from Lesser Sandhill Cranes at Creamer's Field Migratory Waterfowl Refuge, July through August, 2007.

Location	Total birds captured	AI samples		AI Paired samples		Total AI samples
		Female	Male	CL	OP	
Creamers Field	74	UNK	UNK	74	74	74

Other Accomplishments: All captured birds were banded and color marked for migration and winter distribution resighting efforts.

Table 34. Avian influenza analytical results for Lesser Sandhill Cranes collected July through August, 2007: pooled and cloacal only samples.

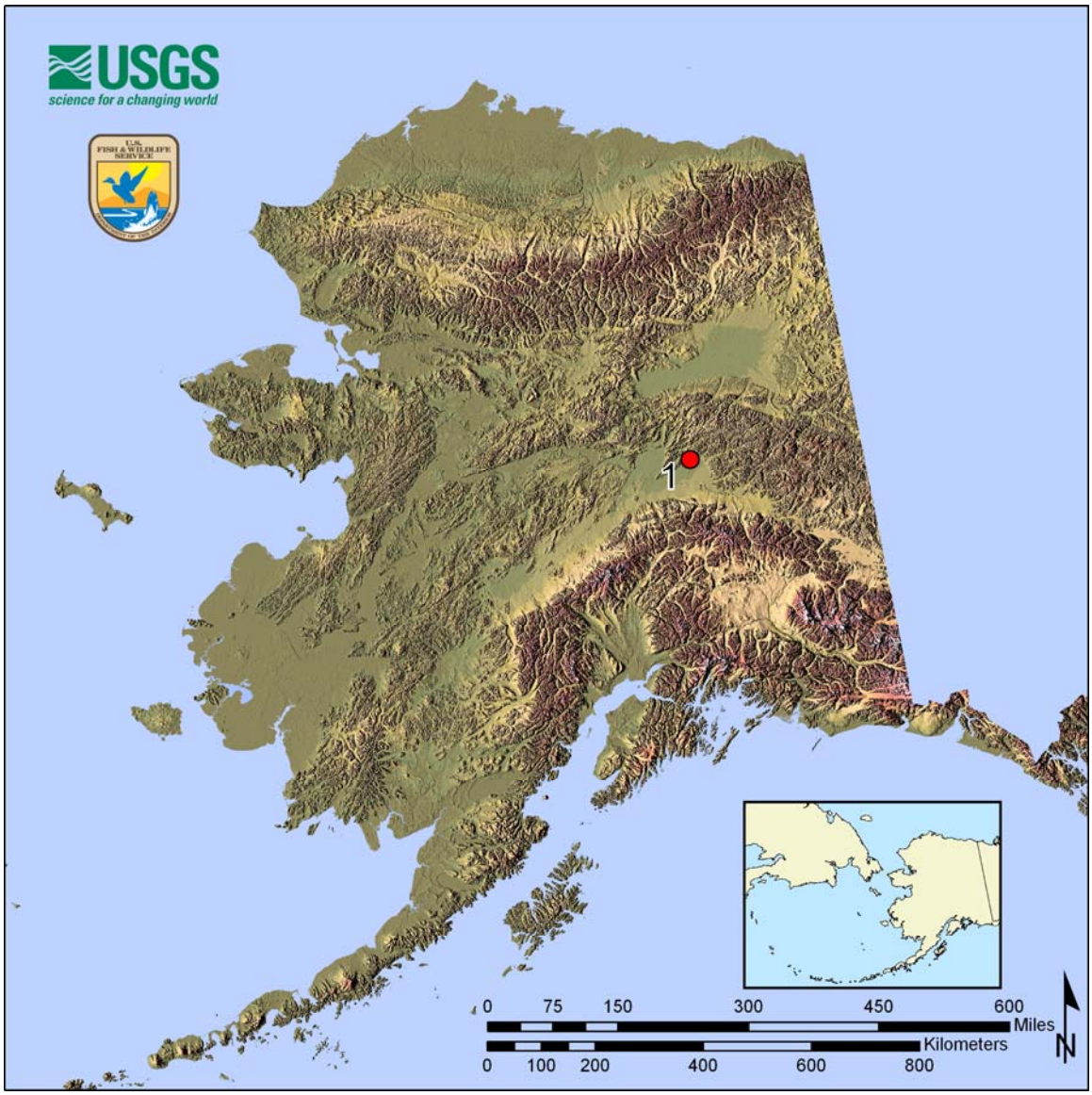
Location	Total samples	Total AI Pooled positive	Total AI Cloacal positive	Prevalence
Creamers Field	74	0	0	0

Table 35. Comparative avian influenza results for Lesser Sandhill Cranes collected July through August, 2007: pooled results and cloacal swab results.

Pooled results	Clocal swab results	Totals
Negative	Negative	74
Positive	Positive	0
Negative	Positive	0
Positive	Negative	0
Total samples tested		74

USFWS

Figure 8. Live sampling locations for Lesser Sandhill Cranes in Alaska, 2007. For specific location names see key following map.



Site #	Geographic Location	Specific Location	Total samples
1	Interior	Creamer's Field	74

Taxon: Tundra Swan (*Cygnus columbianus*)

Justification: A segment of the breeding population of Tundra Swans is believed to breed in eastern Asia and winter in North America.

Ranking score: 11

Background: Tundra Swans are polytypic, with three recognized subspecies: the nominate form *Cygnus columbianus columbianus* in North America, *C. c. bewickii* in western Eurasia and *C. c. jankowskii* in eastern Asia. The nominate form is thought to breed as far west as eastern Chukotka. In Alaska, birds breeding on the North Slope migrate eastward during autumn and winter in the Atlantic Flyway (Limpert et al. 1991, Limpert and Earnst 1994), whereas birds breeding in western Alaska migrate down the Pacific Flyway (Ely et al. 1998).

Over 300 birds from the Alaska Peninsula, Kotzebue Sound, and Yukon Delta NWR were sampled. Of those, 339 were from live birds (Fig. 9) and 53 were from spring subsistence harvest birds (see spring subsistence and fall harvest chapter). Each location is discussed separately and final tables present analytical results at the end of this section.

Southern Alaska Peninsula:

Molting Tundra Swans were captured, sampled, and released on lakes adjacent to the Caribou River, near Nelson Lagoon, on the lower Alaska Peninsula on 16-19 July 2007. Unlike swans from Izembek NWR, Caribou River swans are migratory (Dau and Sarvis 2002), and mix on wintering areas in the Pacific Flyway with swans from other breeding populations.

Capture Methods: A six-person crew and pilot located molting flocks of Tundra Swans in the Caribou River area. Swans were held in place on the lake with a small Zodiac boat and captured from the perimeter of the flock using a dip net from a smaller inflatable raft. Captured swans were restrained with electrical tape wrapped around their legs and heads tucked under their wings. Swans were transported to shore for processing by a separate banding crew. On shore, birds were further restrained using swan “vests”.

Results: Tundra Swans were captured from two areas on the lower Alaska Peninsula. The majority of molting swans were captured on the Caribou River. Cloacal and oral-pharyngeal samples were collected from 63 Tundra swans (Table 36). The adult birds were comprised of 55 females and 6 males. The sex was undetermined for 2 of the adult swans.

AI Results: None of the 63 Tundra Swans pooled or cloacal samples tested positive for avian influenza at the southern Alaska Peninsula.

Table 36. Birds captured and both cloacal and oral-pharyngeal swabs collected from molting Tundra Swans at Izembek National Wildlife Refuge on the southern Alaska Peninsula, July 2007.

Location	Total birds captured	Female	Male	UNK	AI Paired samples CL	OP	Total AI samples
Caribou River	54	46	6	2	54	54	54
Morzhovoi Lake	9	9	0	0	9	9	9
Total	63	55	6	2	63	63	63

Northern Alaska Peninsula:

Molting Tundra swans were captured, sampled and released on two ponds on the Northern Alaska Peninsula, within 80 miles of the refuge office in King Salmon from 16–17 July 2007.

Capture Methods: Flightless Tundra Swans were captured using aircraft and an inflatable outboard powered boat. The aircraft kept the swans grouped together on the lake while the boat collected swans one at a time using a dip-net and delivering them to crew on shore. All captured birds were banded with an aluminum leg band, and a plastic neck collar.

Results: Fifty birds were captured, and banded at Lake 180 and Blue Mountain Lake. Cloacal and oral-pharyngeal samples were collected from 50 Tundra Swans (Table 37). Of those, 33 were adult females, 14 were adult males, and three adults, sex unidentified.

AI Results: None of the 50 Tundra Swans pooled or cloacal samples tested positive for avian influenza in the northern Alaska Peninsulas birds.

Table 37. Birds captured and both cloacal and oral-pharyngeal swabs collected from flightless Tundra Swans on the northern Alaska Peninsula, July 2007.

Location	Total birds captured	Female	Male	UNK	AI Paired samples CL	OP	Total AI samples
Lake 180	37	28	6	3	37	37	37
Blue Mountain Lake	13	5	8	0	13	13	13
Total	50	33	14	3	50	50	50

Other Accomplishments: In addition to sampling for AI, swans were marked with aluminum leg bands and plastic neck collars. Body measurements were taken from most swans. Feathers were collected for genetics and isotope analysis. These additional data will contribute to research determining migratory pathways, timing of migration, and winter destination of Tundra Swans from different breeding areas in western Alaska.

Kotzebue Sound:

Molting Tundra Swans were captured, sampled and released at three locations around Kotzebue Sound.

Results: One hundred twenty-eight Tundra Swans were captured from 3 locations around Kotzebue Sound. Cloacal and oral-pharyngeal samples were collected from 128 swans (Table 38). Of those, 82 were adult females and 46 were adult males. All but one swan were leg-banded; and 90 were marked with neck collars.

AI Results: None of the 128 Tundra Swans pooled or cloacal samples tested positive for avian influenza in Kotzebue Sound.

Table 38. Birds captured and both cloacal and oral-pharyngeal swabs collected from Tundra Swans around Kotzebue Sound, July 2007.

Location	Total birds captured	AI samples		AI Paired samples		Total AI samples
		Female	Male	CL	OP	
Buckland River	47	32	15	47	47	47
Evok Lake	50	31	19	50	50	50
Noatak Delta	31	19	12	31	31	31
Total	128	82	46	128	128	128

Other Accomplishments: Body measurements were taken on all captured birds and analysis is being coordinated with other swan capture crews from the YDNWR, Izembek NWR, Alaska Peninsula NWR, and USGS.

Yukon-Kuskokwim Delta:

Flightless swans were captured at two sites on the Yukon-Kuskokwim Delta northeast of Bethel. One capture site was located north of the Pikmikalik River and the other capture site was located north of the Israthorak River.

Capture Methods: Tundra Swans were captured on two lakes using a float plane and an inflatable outboard powered boat. All captured birds were banded with aluminum leg band, and a plastic neck collar.

Results: Ninety-eight Tundra Swans were captured and collared on 2 lakes in YDNWR northeast of Bethel. Cloacal and oral-pharyngeal samples were collected from 98 Tundra Swans (Table 39). Of those, 59 were adult females and 39 were adult males.

AI Results: None of the 98 Tundra Swans pooled or cloacal samples tested positive for avian influenza in the Yukon Delta NWR birds.

Table 39. Birds captured and both cloacal and oral-pharyngeal swabs collected from Tundra Swans on Yukon Delta National Wildlife Refuge, July 2007.

Location	Total birds captured	AI samples		AI Paired samples		Total AI samples
		Female	Male	CL	OP	
Israthorak River	40	20	20	39	40	40
Pikmikalik River	58	39	19	58	58	58
Total	98	59	39	97	98	98

Other Accomplishments: All birds were weighed and measured, feather samples were obtained for isotopic analysis and blood samples were collected for lead analysis. In addition, head – profile photographs were taken.

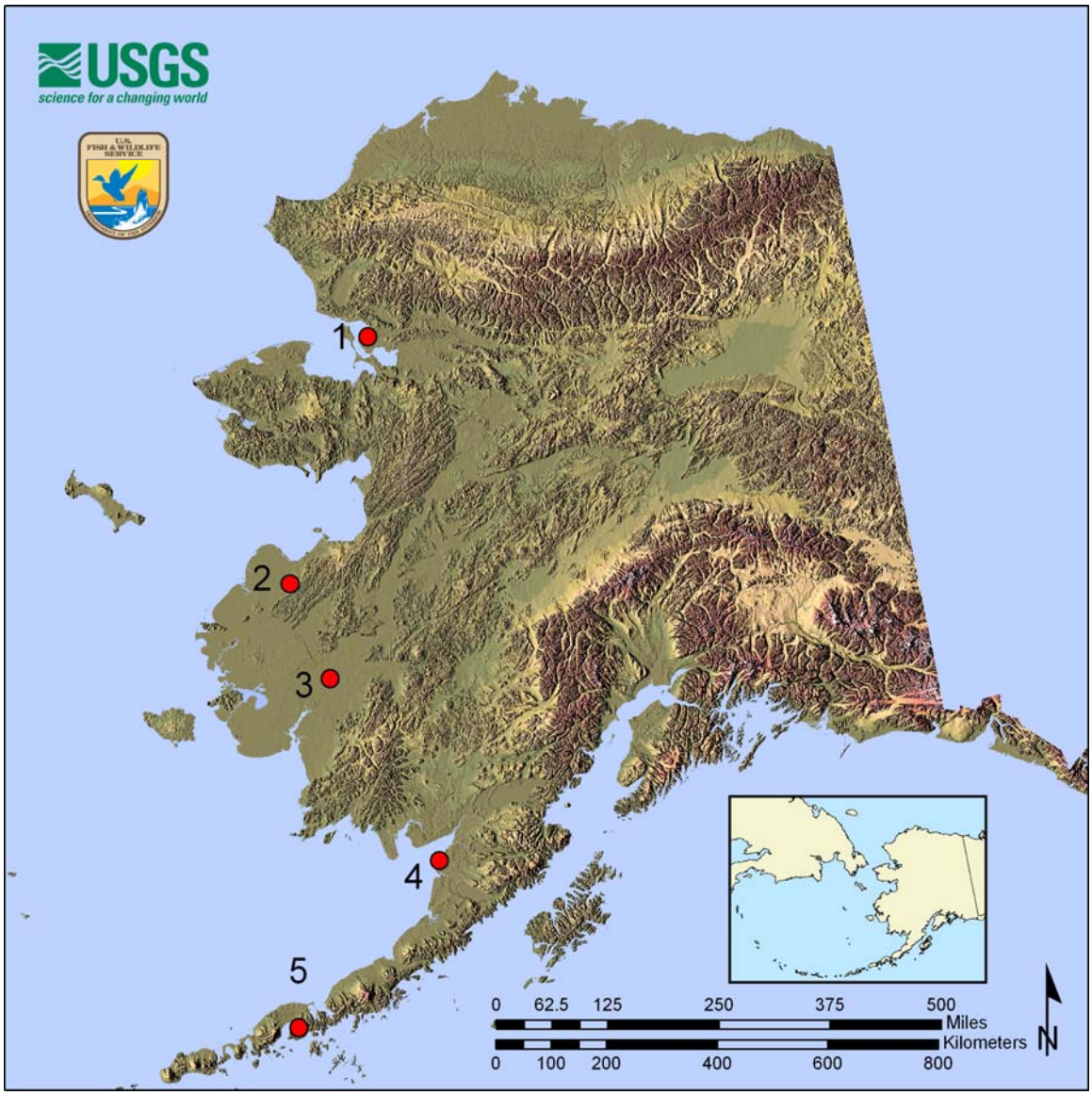
Table 40. Pooled avian influenza analytical results for Tundra Swans collected in July, 2007: pooled and cloacal only samples.

Location	Total samples	Total AI Pooled positive	Total AI Cloacal positive	Prevalence
Southern Alaska Peninsula	63	0		0
Northern Alaska Peninsula	50	0		0
Kotzebue Sound	128	0		0
Yukon Delta NWR	97	0		0
Yukon Delta NWR	1	0	no sample	
Total	339	0		0

Table 41. Comparative avian influenza results for Tundra Swans collected July, 2007: pooled results and cloacal swab results.

Pooled results	Clocal swab results	Totals
Negative	Negative	338
Positive	Positive	0
Negative	Positive	0
Positive	Negative	0
Negative	No results	1
Total samples tested		339

Figure 9. Live sampling locations for Tundra Swans in Alaska, 2007. For specific location names see key following map.



Site #	Geographic Location	Specific Location	Total samples
1	Kotzebue Sound	Buckland River, Evok Lake, Noatak Delta	128
2	Yukon Delta NWR	Israthorak	40
3	Yukon Delta NWR	Pikmikalik	58
4	Alaska Peninsula	King Salmon area	50
5	Alaska Peninsula	Caribou River area	63
	Total		**339**

Taxon: Long-tailed Ducks (*Clangula hyemalis*)

Justification: A large proportion of the Alaskan breeding Long-tailed Ducks winters along the east coast of Asia. Approximately 15% of females marked in Alaska with satellite transmitters wintered as far south as Japan, North Korea, Sakhalin Island, and Russia, near areas where Asian H5N1 has been identified.

Ranking score: 10

Background: Long-tailed Ducks breeding in Alaska are dispersed at very low densities throughout the coastal tundra from the Alaska Peninsula and Bristol Bay to the Arctic Coastal Plain. There is exchange between Alaskan breeding females and Asian molting and wintering areas based on satellite telemetry data.

Capture Methods: No live capture project focused on Long-tailed Ducks because they nest at very low densities, nests are difficult to find, and there are no known molting concentrations associated with one of the primary nesting areas. Long-tailed Ducks were sampled via spring subsistence (see Spring Subsistence chapter).

Results: Nine opportunistic live samples were obtained on the Arctic NWR, Kotzebue Sound, and North Slope (Table 42). Of those, three were adult females, 3 females were undetermined for age, 1 male was undermined for age, and 2 were undetermined for sex and age.

AI Results: None of the Long-tailed Ducks pooled or cloacal samples tested positive for avian influenza in the live birds.

Table 42. Birds captured opportunistically and both cloacal and oral-pharyngeal swabs collected from Long-tailed Ducks in Alaska, July and August 2007.

Location	Total birds captured	Female	Male	UNK	AI Paired samples CL	AI Paired samples OP	Total AI samples
Barrow	2	2	0	1	2	2	2
Canning River Delta	1	1	0	0	1	1	1
Cape Espenberg	6	3	1	2	6	6	6
Total	9	6	1	2	9	9	9

Table 43. Avian influenza analytical results for Long-tailed Ducks collected opportunistically July and August, 2007: pooled and cloacal only samples.

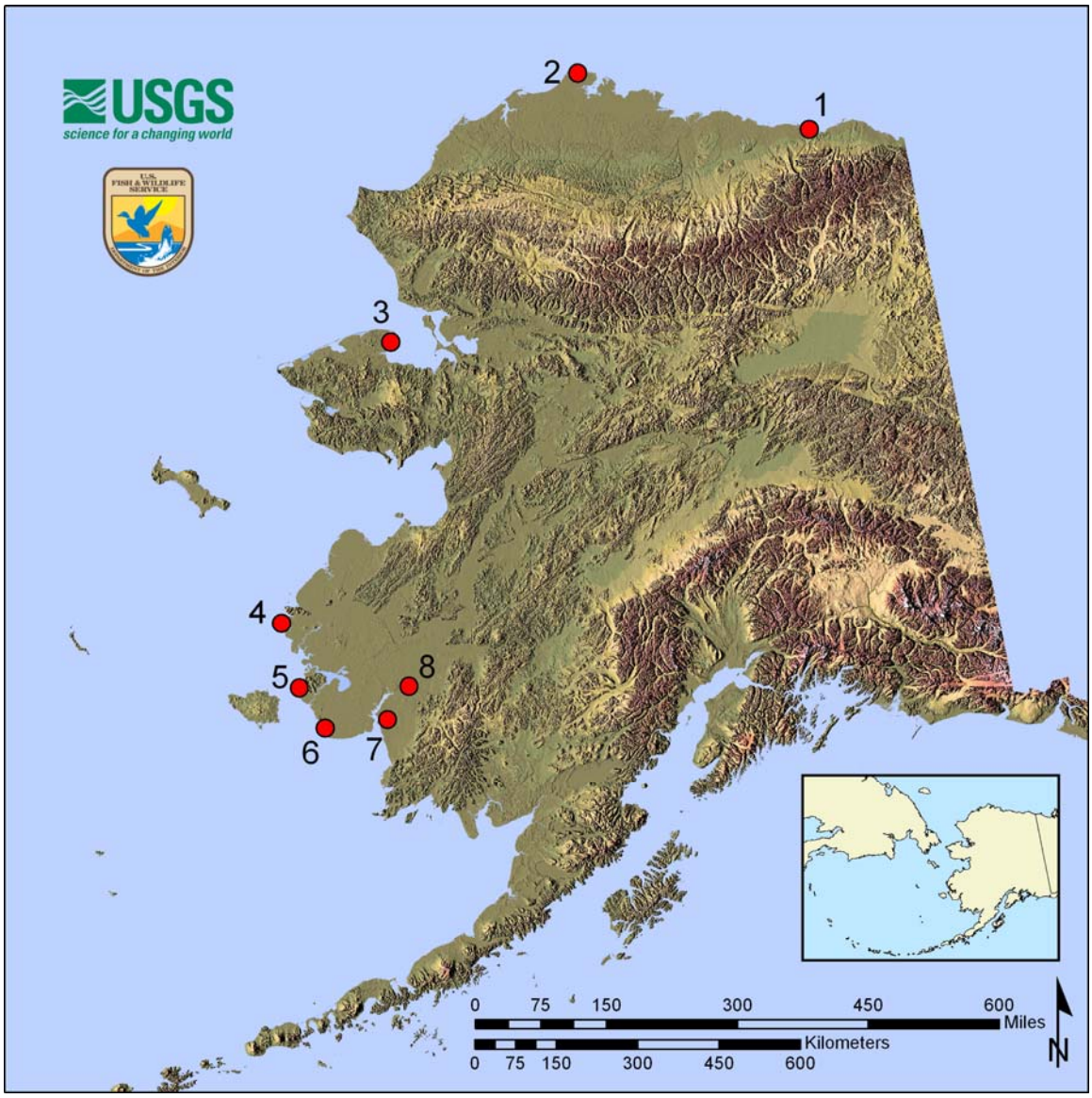
Location	Total samples	Total AI Pooled positive	Total AI Cloacal positive	Prevalence
North Slope	1	0	0	0
North Slope	1	0	no result	0
Arctic NWR	1	0	0	0
Kotzebue Sound	6	0	0	0
Total	9	0	0	0

Table 44. Comparative avian influenza results for Long-tailed Ducks collected opportunistically July and August, 2007: pooled results and cloacal swab results.

Pooled results	Clocal swab results	Totals
Negative	Negative	8
Positive	Positive	0
Negative	Positive	0
Positive	Negative	0
Negative	No result	1
Total samples tested		9

Jeff Wasley, USGS ASC

Figure 10. Live sampling locations for Long-tailed Ducks in Alaska, 2007. For specific location names see key following map.



Site #	Geographic Location	Specific Location	Total samples
1	Arctic NWR	Canning River Delta	1
2	North Slope	Barrow	2
3	Kotzebue Sound	Cape Espenberg	6
4	Yukon Delta NWR	Hooper Bay	5
5	Yukon Delta NWR	Toksook Bay	2
6	Yukon Delta NWR	Kipnuk	2
7	Yukon Delta NWR	Kwethluk	1
8	Yukon Delta NWR	Eek	2
	Total		21

Taxon: Pacific Common Eider (*Somateria mollissima v-nigrum*)

Justification: Over 95% of the 80,000 Pacific Common Eider population that nests on the North Slope of Alaska and northwestern Canada winters in northeast Asia. It is likely that a portion of the 20,000 Common Eiders that nest in the Aleutian Islands winters in northeast Asia along the Kamchatka Peninsula, Russia.

Ranking score: 10

Background: Pacific Common Eiders nest in coastal regions from eastern Russia, northwestern Canada, and in Alaska from the eastern North Slope to the far western Aleutian Islands (Dement'ev and Gladkov 1967, Kear 2005). In winter, birds are generally in small (100s), dense flocks and restricted to coastal waters. Eiders may be found in large (10,000s), dense flocks when staging during spring migration (Goudie et al. 2000) which may facilitate transmission of disease amongst individuals by concentrating birds into relatively small areas. Common Eiders nest colonially, and birds concentrated in these dense areas may facilitate transmission of HP H5N1. Birds were sampled from multiple locations and each is discussed separately and final tables present the analytical results at the end of this section.

Ninety-three birds were sampled from the Aleutian Islands, Kotzebue Sound, and the Yukon Delta NWR. Of those, 77 were live bird samples (Fig. 11) and 16 were hunter killed (see Spring Subsistence chapter).

Aleutian Islands:

Nesting Pacific Common Eiders were captured and sampled from Adak Island located in the western Aleutian Island chain. Adak Island is 2,090 km (1,300 miles) southwest of Anchorage and 390 km (242 miles) east of Russia. Seven to 8 people searched 5 islands over 4 days but found only 4 active nests. The distances between the islands varied from 35–55 km and are separated by deep waters. Birds are generally on nests from late May to early July but nesting chronology in 2007 was extremely late.

Capture Methods: Sampling efforts were staged from the USFWS research vessel M/V *Tiglax*. A skiff transported field crews to colony areas on each island. Birds were located in the dense vegetation by lining 5–8 people at 3–5 m intervals at the edge of areas where birds have been found in previous years. A sub-sample of Pacific Common Eiders was captured from their nests using dip nets. Cloacal and, if possible, oral-pharyngeal swab samples were collected.

Results: A total of 2 Pacific Common Eiders was sampled at Adak Island (Table 45). Both were adult females.

AI Results: None of the 2 Pacific Common Eiders pooled or cloacal samples tested positive for avian influenza.

Table 45. Birds captured and both cloacal and oral-pharyngeal swabs collected from nesting Pacific Common Eiders in the Aleutian Islands, June 2007.

Location	Total birds captured	AI samples		AI Paired samples		Total AI samples
		Female	Male	CL	OP	
Adak Island	2	2	0	2	0	2

Yukon Delta NWR:

The YDNWR provides some of the most productive subarctic goose habitat including coastal nesting ground for migrating Pacific Common Eiders. Samples were collected from nesting birds on Kigigak Island. Kigigak Island is located along the outer fringe of YDNWR near the mouth of Baird Inlet. The island is bordered by the Ninglick River and the Bering Sea. Habitat consists of low coastal tundra, sedges, and grasses. Spring and fall storm tides regularly inundate the island, except for upland areas, which are flooded only during severe storm tides.

Capture Methods: Adult Pacific Common Eiders were captured in three ways: by placing a mist net over the top of females on nests, by flushing nesting females into a mist net, or by flushing the female off the nest, placing a string-activated trap on the nest, and triggering the trap once the female returned to the nest.

Results: A total of 50 Pacific Common Eiders was sampled at Kigigak Island on the YDNWR (Table 46). All were adult females.

AI Results: None of the 50 Pacific Common Eiders pooled or cloacal samples tested positive for avian influenza

Table 46. Birds captured and both cloacal and oral-pharyngeal swabs collected from nesting Pacific Common Eiders at Yukon Delta National Wildlife Refuge, June 2007.

Location	Total birds captured	AI samples		AI Paired samples		Total AI samples
		Female	Male	CL	OP	
Kigigak Island	50	50	0	50	50	50

Other Accomplishments: Genetic and isotope samples were also collected and morphometrics and productivity data recorded. All birds were banded and data will be used in a mark/recapture study to estimate annual survival of Pacific Common Eiders in this region.

Kotzebue Sound:

Nesting Pacific Common Eiders were captured and sampled from Cape Espenberg located at the northern-most tip of the Seward Peninsula. The area is composed of a series of oblong ponds and marshes bordered to the north and south by sand-dune beach ridges. Eiders primarily nest in the low-lying marshes of Cape Espenberg, along lake and pond shores.

Capture Methods: Adult Pacific Common Eiders were captured on their nest using bow nets or mist nests placed on top of the nest. Field crew searched the perimeter of all ponds and surrounding areas in the interior of Cape Espenberg for Pacific Common Eiders nests. The area searched was approximately 13 km^2. A total of 54 nests was located, 44 of which were active.

Results: A total of 25 Pacific Common Eiders was sampled and released at Cape Espenberg on the Seward Peninsula (Table 47). Of those, 24 were adult females and 1 was a male, sex undetermined.

AI Results: None of the 25 Pacific Common Eiders pooled or cloacal samples tested positive for avian influenza.

Table 47. Birds captured and both cloacal and oral-pharyngeal swabs collected from nesting Pacific Common Eiders on the Seward Peninsula, June 2007.

Location	Total birds captured	AI samples		AI Paired samples		Total AI samples
		Female	Male	CL	OP	
Cape Espenberg	25	24	1	25	25	25

Other Accomplishments: All captured birds were fitted with satellite transmitters and were marked with a metal band. Blood and feather samples were also collected for genetic, contaminant and isotopic analysis. As of 18 October 2007, females fitted with transmitters at Cape Espenberg remained close to the breeding area. However, we anticipate females will move south as the sea ice extends into Kotzebue Sound. In contrast to the females, the single male underwent a long molt-migration to western Canada within a few weeks of capture.

Table 48. Avian influenza analytical results for Pacific Common Eiders collected May through July, 2007: pooled and cloacal only samples.

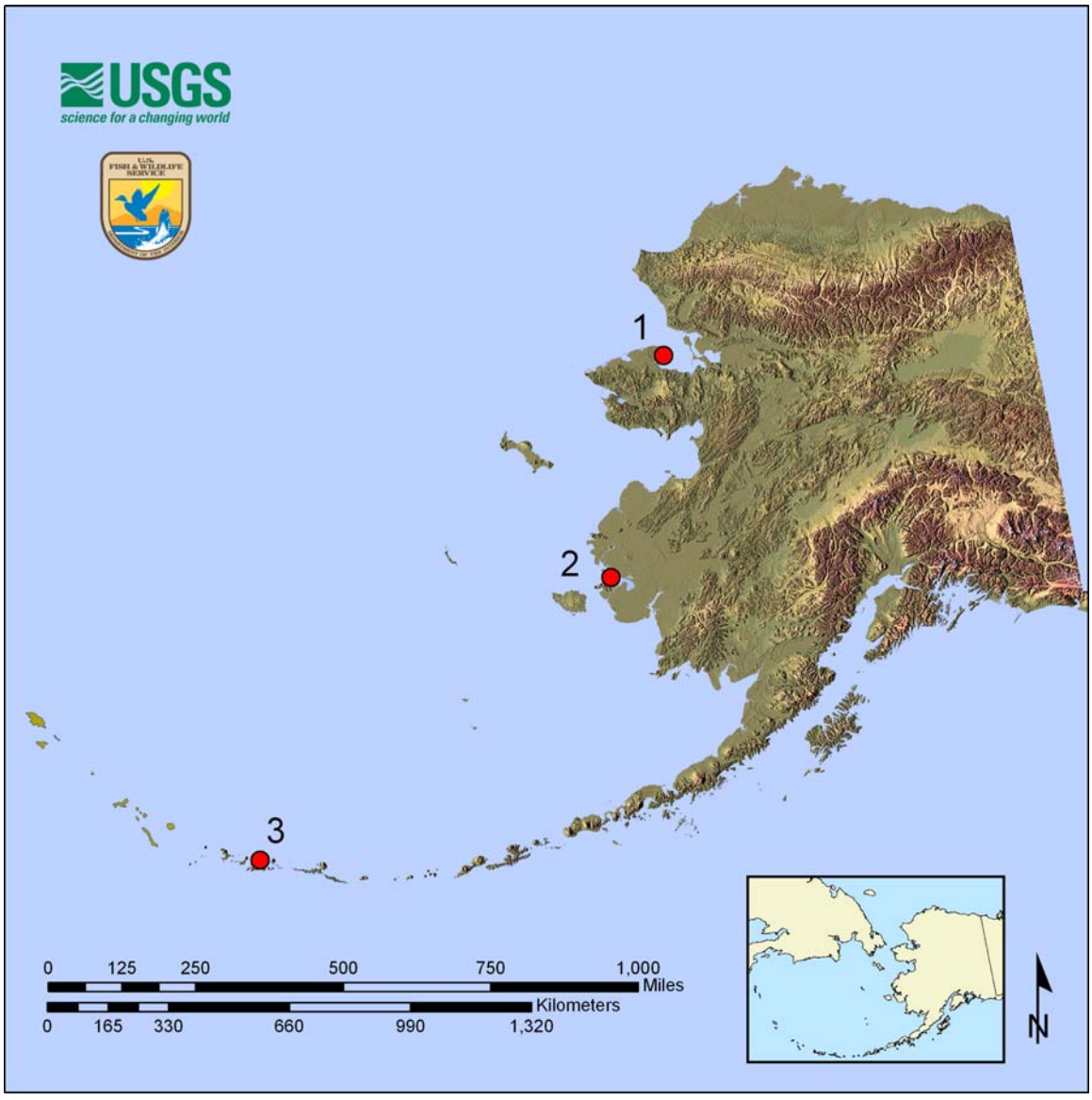
Location	Total samples	Total AI Pooled positive	Total AI Cloacal positive	Prevalence
Aleutian Islands	2	0	0	0
Yukon Delta NWR	50	0	0	0
Kotzebue Sound	25	0	0	0
Total	77	0	0	0

Table 49. Comparative avian influenza results for Pacific Common Eiders collected May through July, 2007: pooled results and cloacal swab results.

Pooled results	Clocal swab results	Totals
Negative	Negative	77
Positive	Positive	0
Negative	Positive	0
Positive	Negative	0
Total samples tested		77

Tim Bowman, USFWS

Figure 11. Live sampling locations for Pacific Common Eiders in Alaska, 2007. For specific location names see key following map.



Site #	Geographic Location	Specific Location	Total samples
1	Seward Peninsula	Cape Espenberg	25
2	Yukon Delta NWR	Kigigak Island	50
3	Aleutian Islands	Adak Island	2
	Total		**77**

Taxon: King Eider (*Somateria spectabilis*)

Justification: A major segment of the Pacific population of King Eiders breeds not only in coastal Alaska, but also across arctic Russia from the Chukotka Peninsula west to the Taimyr Peninsula. Nesting habitat is nearly identical to Steller's and Spectacled eiders.

Ranking score: 10

Background: The King Eider nests in high-latitude coastal tundra throughout Russia, Alaska, and Canada. During the non-breeding season, birds rarely come on shore but instead forage in coastal marine waters throughout the Pacific Ocean generally no farther south than the Kamchatka Peninsula of Russia, Aleutian Islands, and Prince William Sound of Alaska (Suydam 2000). The King Eider is one of the first waterfowl species to appear in the Arctic each spring, often migrating in flocks of > 10,000 individuals (Suydam 2000). The core spring staging area in Alaska appears to be ice-free waters between Cape Lisburne and Point Barrow of northeast Alaska.

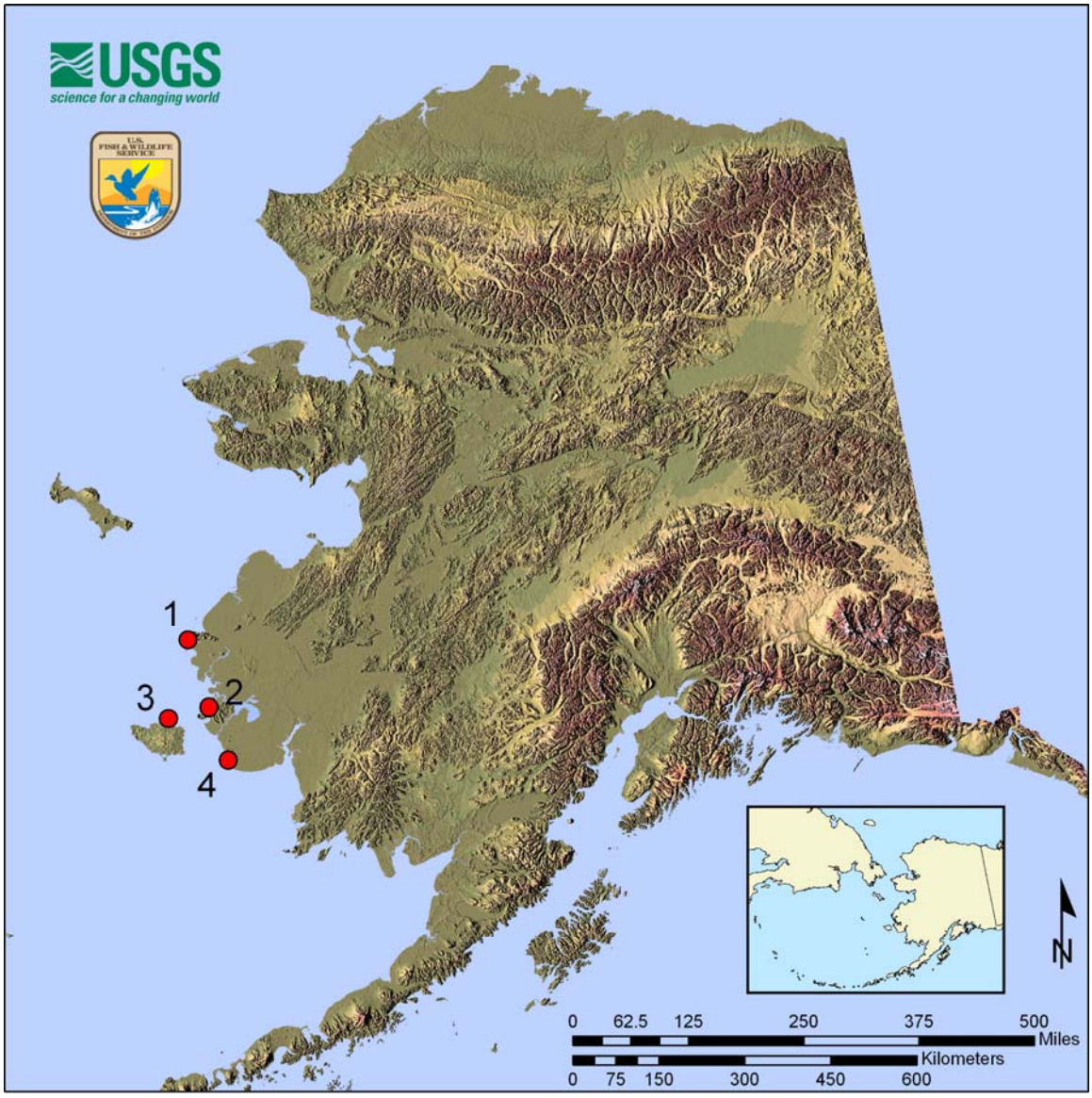
Methods: No live capture project focused on King Eiders, but samples were obtained via spring subsistence sampling (Figure 12).

Results: One hundred two King Eider samples were collected and analyzed through hunter harvest sampling (see Spring Subsistence chapter).

AI Results: None of the 102 King Eider pooled or cloacal samples tested positive for avian influenza.

Laura L. Whitehouse, USFWS

Figure12. Sampling locations for King Eiders in Alaska, 2007. For specific location names see key following map. A total of 102 samples were collected through spring subsistence harvested birds. Note: No live sampling of this species occurred.



Site #	Geographic Location	Specific Location
1	Yukon Delta NWR	Hoopr Bay
2	Yukon Delta NWR	Toksook Bay
3	Yukon Delta NWR	Mekoryuk
4	Yukon Delta NWR	Kipnuk

Taxon: Dunlin (*Calidris alpina arcticola*)

Justification: The *arcticola* subspecies of Dunlin is a high priority taxon because the entire population—numbering in the hundreds of thousands—nests on the North Slope of Alaska and spends the non-breeding season in south and east Asia where the Asian H5N1 virus is prevalent. The population's use of inland waterways and estuaries further increases the likelihood that birds come into contact with virus infected poultry and waterfowl.

Ranking score: 17

Background: Dunlin of the *arcticola* subspecies spend the winter in significant numbers in east Asia as far south as southern China (Wetlands International–Oceania 2004). *Arcticola* Dunlin banded on the North Slope of Alaska have been resighted in Russia, Japan, Taiwan, and parts of China (Y. Shigeta, R. Gill, and R. Lanctot, unpubl. data). While on the wintering grounds, Dunlin occupy primarily estuarine habitats. Movement to and from the breeding and non-breeding grounds entails prolonged stays in coastal east Asia. March through April *arcticola* Dunlin migrate to their breeding grounds in northern Alaska arriving in early June (Warnock and Gill 1996). During the post-breeding season (July–August), *arcticola* Dunlin stopover at littoral areas on the North Slope for up to a month (Andres 1994) before migrating directly either to east Asia (Norton 1971) or to the Yukon-Kuskokwim Delta (YKD) in western Alaska (R. Gill, unpubl.data). Once on the YKD, *arcticola* Dunlin mix with large numbers of the *pacifica* race of Dunlin before moving to Asia in September or October (Gill and Handel 1981, Warnock and Gill 1996).

Over 650 birds were sampled from the Arctic National Wildlife Refuge, the North Slope, and Yukon-Kuskokwim Delta, using a 2-stage sampling design. The 2-stage sampling design is broken into breeding and post-breeding populations (or sampling). Of those, 698 were live bird samples (Fig. 13) and 2 were hunter killed (see Spring Subsistence chapter). Each location is discussed separately and final tables present the analytical results at the end of this section.

Breeding

The total population of *arcticola* is estimated at 750,000 birds (Brown et al. 2001), although a more realistic number may be closer to 200,000–300,000 (Wetlands International–Oceania 2004). The only place in Alaska where *arcticola* Dunlin are known to occur in isolation of the *pacifica* subspecies is the

North Slope. Breeding a*rcticola* Dunlin are found in good numbers throughout the National Petroleum Reserve – Alaska (NPR-A) and east to the western edge of the Arctic National Wildlife Refuge. High densities have been reported at Barrow and Prudhoe Bay (Troy and Wickliffe 1990, R. Lanctot, unpubl. data); nest densities in these areas average between 12 and 15 nests/km^2. Additional areas within the NPR-A also have high densities based on surveys conducted in the late 1990s and early 2000s (J. Bart, unpubl. data). Somewhere in the vicinity of Point Hope, it is suspected that the breeding areas of the *arcticola* and *pacifica* subspecies overlap (R. Gill, pers. comm.), although genetic and morphological studies have not been conducted to confirm this hypothesis.

Arctic NWR:

Breeding Dunlin were captured, sampled, and released at the Canning River Delta on the NW coast of the Refuge. Since 2002, a collaborative study investigating the impact of human development on nesting birds and shorebird breeding ecology has taken place on the Canning River Delta. One opportunistic sample was collected from Yukon Delta NWR.

Capture Methods: Birds were primarily captured with bow nets while incubating, but a few were captured with mist nets. All captured birds were banded with a metal band and color bands.

Results: A total of 12 breeding Dunlin was captured and banded on the Canning River Delta. One opportunistic sample was collected from Yukon Delta NWR. Cloacal and oral-pharyngeal samples were collected from 13 Dunlin (Table 50). Of those, 3 were adult females, 1 was an adult male, 8 adults of whose sex was undetermined, and 1 was undetermined for sex and age.

AI Results: None of the 13 Dunlin pooled or cloacal samples tested positive for avian influenza.

Table 50**.** Birds captured and both cloacal and oral-pharyngeal swabs collected from breeding Dunlin at Arctic National Wildlife Refuge and Yukon Delta National Wildlife Refuge, June through July 2007.

Location	Total birds captured	Female	Male	UNK	AI Paired samples CL	OP	Total AI samples
Canning River Delta	12	3	1	8	12	12	12
Tutakoke	1			1	1	1	1
Total	13	3	1	9	13	13	13

Other Accomplishments: Biometric measurements, wing photographs, feather samples and blood samples were also collected. A student from Fudan University in China will use collected Dunlin feathers as controls in stable isotope analyses to determine what subspecies migrate through Chongming Dongtan Nature

Reserve near Shanghai, China. The photographs of Dunlin wings will be used to develop methods for determining age using wing feather patterns. Blood samples will be used in a population genetic analysis to determine how the *arcticola* subspecies of dunlin distribute themselves in China and on the North Slope. Color banded were placed on birds to look at movement and tenure at staging areas and to better document wintering areas of birds that are breeding or staging on the Arctic Refuge.

North Slope:

Breeding Dunlin were captured, sampled and released in the vicinity of Barrow and the Teshekpuk Lake Special Area in the northeast corner of the NPR-A.

Capture Methods: Due to the remoteness of the NPR-A area, a helicopter was used to transfer crews to 40 sites where nests were located and samples collected from incubating birds. Crews also captured birds in Barrow at six established breeding plots, as well as other parts of the tundra surrounding Barrow using 4-wheelers on the road system. Dunlin were captured using mist nets during pre-nesting and bow nets during nesting. All captured individuals had a metal band and a unique set of color bands placed on their legs.

Results: A total of 170 breeding Dunlin was captured and banded on the North Slope. Cloacal and oral-pharyngeal samples were collected from 170 Dunlin (Table 51). Of those, 66 were adult females, 70 were adult males, 33 adult undetermined for sex, and 1 undetermined for age and sex. The number of samples collected from Barrow exceeded expectations, but low capture rates in NPR-A were attributed to difficulty in locating nest for capturing birds, reduced sampling period and difficult logistics in such a large and remote area.

AI Results: None of the 170 Dunlin samples tested positive for avian influenza.

Table 51. Birds captured and both cloacal and oral-pharyngeal swabs collected from breeding Dunlin on the North Slope, June and July 2007.

Location	Total birds captured	Female	Male	UNK	AI Paired samples CL	OP	Total AI samples
Barrow.	127	55	58	14	127	127	127
Teshekpuk Lake Special Area	43	11	12	20	43	43	43
Total	170	66	70	34	170	170	170

Other Accomplishments: Feathers were collected for stable isotope studies and blood samples were collected for genetic studies. All captured birds were banded which may help document migration pathways. Some of the Dunlin banded

during this study has been resighted in Taiwan. Many of the radioed equipped birds have subsequently been heard at other post-breeding locations.

Post-breeding
Thousands of *arcticola* Dunlin stopover along the North Slope coast after breeding (Andres 1994). They were the most common shorebird on the Colville River Delta during fall surveys in 1987 and 1988, with an average of 13.9 birds/km of shoreline and an average density of 71.9 birds/km^2 (Andres 1994). Surveys in the same area in 2005 also indicated Dunlin were present in large numbers during late August (1,075 birds/km^2 on 21 August survey); these birds were primarily adults with 3:1 adult to juvenile age ratio (Johnson et al. 2005). Significant numbers of Dunlin also frequent coastal sites near Elson Lagoon at Barrow and the Canning River Delta (Martin and Moitoret 1981, Taylor et al. in press). After leaving the North Slope, most *arcticola* Dunlin migrate to the outer YKD to stage in August and September where they mix with *pacifica* Dunlin and form huge aggregations, numbering in the tens of thousands (Gill and Handel 1981, 1990). Large aggregations are present from Hooper Bay south to the Kuskokwim River (Gill and Handel 1990; R. Gill and B. McCaffery unpubl. data). Dunlin leave the YKD for Asia in September or early October.

Yukon-Kuskokwim Delta and North Slope:

Post-breeding Dunlin were captured, sampled and released in two sampling locations: the North Slope, and the Yukon-Kuskokwim Delta. Post-breeding Dunlin can be found in these areas from August through October.

Capture Methods: Fall migrant Dunlin were sampled in August, and September on interidal, nearshore ponds, offshore sandbars, and river banks on YKD, and North Slope. A variety of methods was used to capture birds at these locations, including mist nets, walk-in traps, triggered bow traps, and elastically launched "whoosh" nets. Most captured birds were banded being released.

Results: A total of 515 Dunlin was captured, banded and sampled at the North Slope and the Yukon-Kuskokwim Delta. Cloacal and oral-pharyngeal samples were collected from 515 post-breeding Dunlin (Table 52). Of those, 232 were adult, sex undetermined, 282 were juvenile, sex undetermined and one chick, sex undetermined.

AI Results: None of the 515 post-breeding Dunlin pooled or cloacal samples tested positive for avian influenza.

Table 52. Birds captured and both cloacal and oral-pharyngeal swabs collected from post-breeding Dunlin at North Slope and the Yukon-Kuskokwim Delta, August through September, 2007.

Location	Total birds captured	Female	Male	UNK	AI Paired samples CL	AI Paired samples OP	Total AI samples
Canning River Delta	22	0	0	22	22	22	22
Tutakoke	493	0	0	493	493	492	493
Total	515	0	0	515	514	515	515

Other Accomplishments: Feathers were collected for stable isotope studies. Blood samples were collected for genetic study. All captured birds were banded to help document migration pathways. Radio transmitters were attached to North Slope birds.

Table 53. Avian influenza analytical results for Dunlin collected June through September, 2007: pooled cloacal and oral-pharyngeal samples.

Location	Sampling Stages	Total samples	Total AI Pooled positive	Prevalence
Arctic NWR	Breeding and Post-breeding	34	0	0
North Slope	Breeding	170	0	0
Yukon Delta NWR	Breeding	1	0	0
Yukon Delta NWR	Post-breeding	493	0	0
Total		698	0	0

Table 54. Avian influenza analytical results for Dunlin collected June through September, 2007: cloacal only samples.

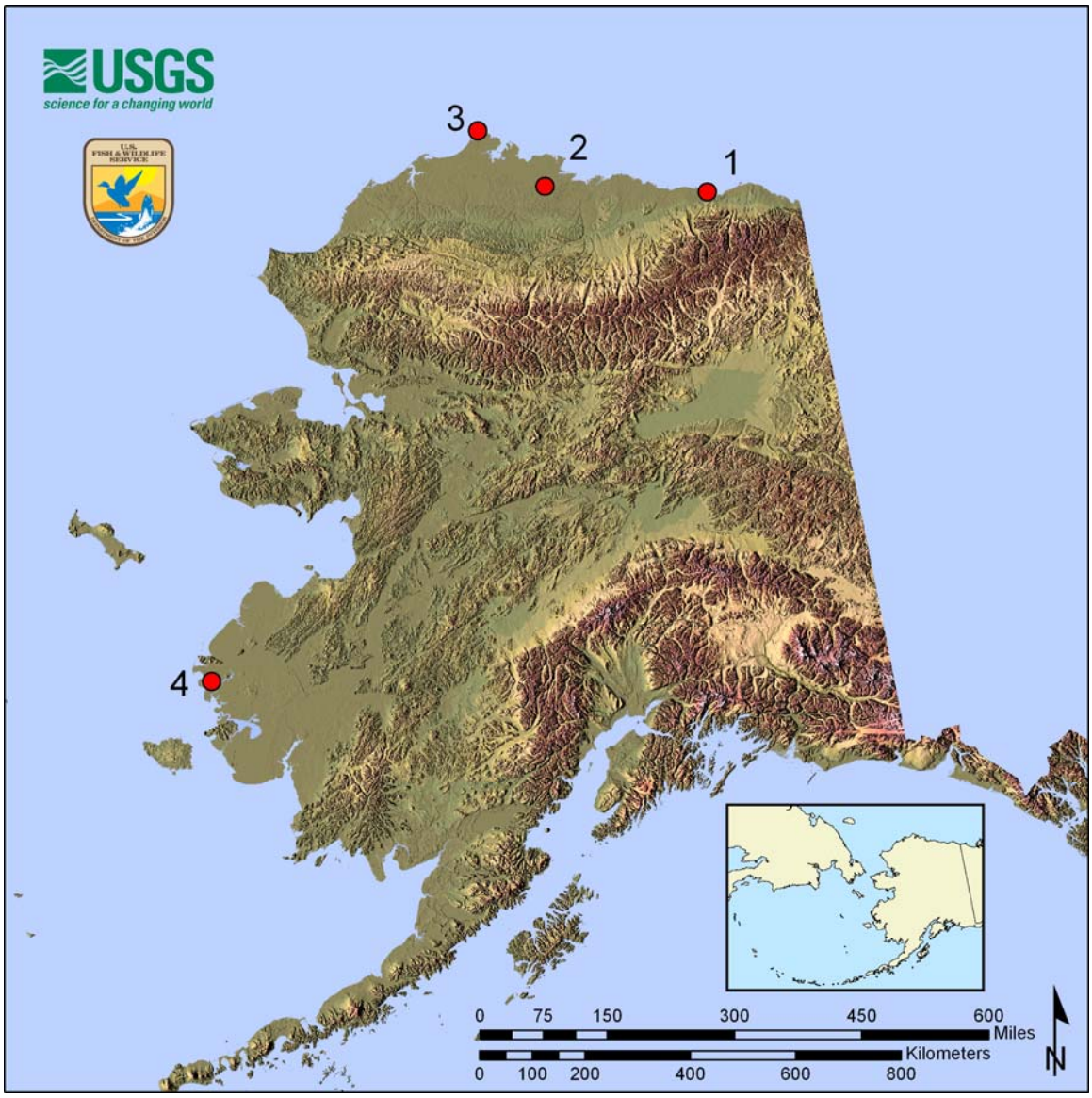
Location	Sampling Stages	Total samples	Total AI Cloacal positive	Prevalence
Arctic NWR	Breeding and Post-breeding	34	0	0
North Slope	Breeding	170	0	0
Yukon Delta NWR	Breeding	1	0	0
Yukon Delta NWR	Post-breeding	493	0	0
Total		698	0	0

Table 55. Comparative avian influenza results for Dunlin collected June through September, 2007: pooled results and cloacal swab results.

Pooled results	Clocal swab results	Totals
Negative	Negative	698
Positive	Positive	0
Negative	Positive	0
Positive	Negative	0
Total samples tested		698

Robert E. Gill, Jr., USGS ASC

Figure 13. Live sampling locations for Dunlin in Alaska 2007. For specific location names see key following map.



Site #	Geographic Location	Location	Total samples
1	Arctic NWR	Canning River Delta	34
2	North Slope	Teshekpuk Lake Special Area	43
3	North Slope	Barrow	127
4	Yukon Delta NWR	Tutakoke	494
			698

Taxon: Sharp-tailed Sandpiper (*Calidris acuminata*)

Justification: A major segment of the annual cohort of juvenile Sharp-tailed Sandpipers migrates to western Alaska each autumn following contact with adults on the breeding grounds that in turn staged in east Asia during northward migration.

Ranking score: 14.5

Background: The Sharp-tailed Sandpiper nests in northeastern Siberia and spends the non-breeding season in Australasia (Higgins and Davies 1996). Its population was estimated at 160,000 individuals (Bamford et al. 2006). During passage, birds are found regularly in east Asia at sewage ponds and pasturelands but are equally common on intertidal areas. In Alaska, the species is mostly found on coastal salt meadows and on non-vegetated substrates along tidally influenced rivers. The core staging area in Alaska appears to be the central YKD.

A total of 52 birds was sampled from Tutakoke on the Yukon Delta NWR. All were live bird samples (Fig 14). See discussed below and final tables present the analytical results at the end of this section.

Tutakoke:

Fall migrant Sharp-tailed Sandpipers were sampled in August and September on mudflats, and nearshore ponds, in the vicinity of the Tutakoke River field camp. Tutakoke is located along the outer fringe of YDNWR, near the mouth of the Tutakoke River.

Capture Methods: Mist nets and walk-in traps were used to capture birds at Tutakoke. Most trapping was conducted within ten km of the camp. Birds were banded before being released.

Results: A total of 52 Sharp-tailed Sandpipers was captured, banded, and sampled at Tutakoke. Cloacal and oral-pharyngeal samples were collected (Table 56). All samples were from adults, sex undetermined.

AI Results: None of the 52 Sharp-tailed Sandpipers pooled or cloacal samples tested positive for avian influenza.

Table 56. Birds captured and both cloacal and oral-pharyngeal swabs collected from fall migrant Sharp-tailed Sandpipers at Yukon Delta National Wildlife Refuge, August and September 2007.

Location	Total birds captured	Female	Male	UNK	AI Paired samples CL	AI Paired samples OP	Total AI samples
Tutakoke	52	0	0	52	52	52	52

Table 57. Avian influenza analytical results for fall migrant Sharp-tailed Sandpipers collected August and September, 2007: pooled and cloacal only samples.

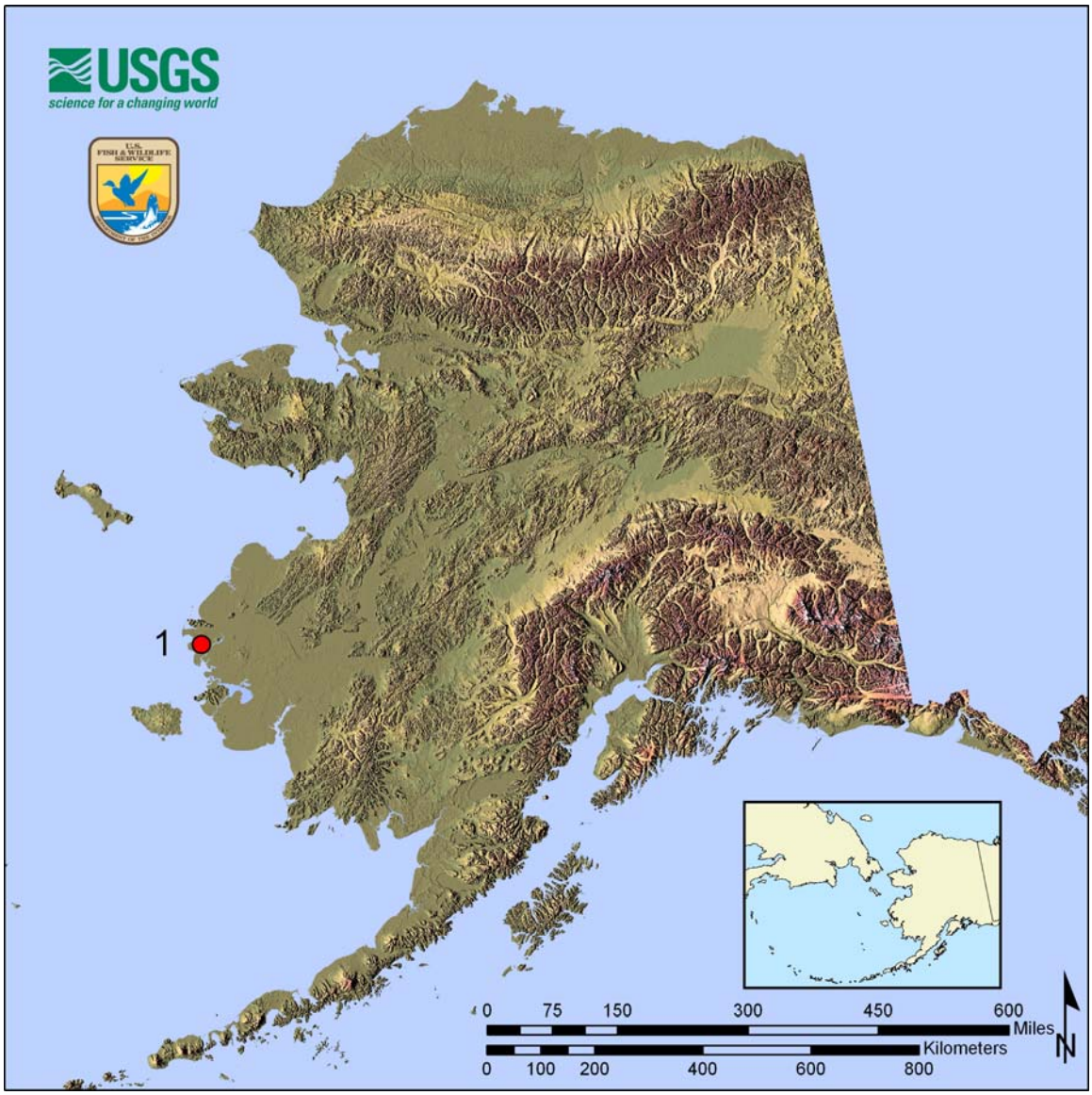
Location	Total samples	Total AI Pooled positive	Total AI Cloacal positive	Prevalence
Yukon Delta NWR	52	0	0	0

Table 58. Comparative avian influenza results for fall migrant Sharp-tailed Sandpipers collected August through September, 2007: pooled results and cloacal swab results.

Pooled results	Clocal swab results	Totals
Negative	Negative	52
Positive	Positive	0
Negative	Positive	0
Positive	Negative	0
Total samples tested		52

Robert E. Gill, Jr., USGS ASC

Figure14. Live sampling locations for Sharp-tailed Sandpipers in Alaska, 2007. For specific location names see key following map.



Site #	Geographic Location	Specific Location	Total samples
1	Yukon Delta NWR	Tutakoke	52

Taxon: Bar-tailed Godwit (*Limosa lapponica*)

Justification: The Bar-tailed Godwit is a high priority species because migrant godwits arriving in Alaska to breed each spring are just days removed from their staging sites along the coast of eastern Asia. The entire population of this species migrates through east Asia and has contact with a known hot spot.

Ranking score: 14

Background: The entire Alaska-breeding race of the Bar-tailed Godwit (*L. l. baueri*) migrates through the east Asian/Australasian flyway (McCaffery and Gill 2001). Each September, tens of thousands depart from their staging grounds in western Alaska on a non-stop, over-water flight of up to 11,000 km to reach their non-breeding range in New Zealand and Australia (Gill et al. 2005). In early April, migrant flocks apparently fly directly from the non-breeding grounds to staging sites in China and the Koreas along the coast of the Yellow Sea (Battley 1997, Wilson and Barter 1998). While spending several weeks in this area, Bar-tailed Godwits feed and roost with many other species of waterbirds that have spent the non-breeding season throughout southeast Asia, Australia, and New Zealand (Barter 2002). Once they have acquired enough fat for their non-stop flight to the breeding grounds, *L. l. baueri* then head north directly to western and northern Alaska (McCaffery and Gill 2001).

Four birds were sampled from Yukon Delta NWR. Of those, 1 sample was from a live bird (Fig. 15) and 3 were hunter killed (see Spring Subsistence chapter). See discussed below and final tables present the analytical results at the end of this section.

Tutakoke:

A Bar-tailed Godwits was captured, sampled and release. Tutakoke is located along the outer fringe of YDNWR near the mouth of the Tutakoke River.

Results: One Bar-tailed Godwit was captured and released at Tutakoke**.** A cloacal and oral-pharyngeal sample was collected (Table 59). The bird was a juvenile, sex undetermined.

AI Results: Neither the pooled or cloacal sample was positive for avian influenza.

Table 59. Bird captured and both cloacal and oral-pharyngeal swab collected from Bar-tailed Godwit at Yukon Delta National Wildlife Refuge, September 2007.

Location	Total birds captured	Female	Male	UNK	AI Paired samples CL	AI Paired samples OP	Total AI samples
Tutakoke.	1	0	0	1	1	1	1

Table 60. Avian influenza analytical results for Bar-tailed Godwit collected September, 2007: pooled and cloacal only samples.

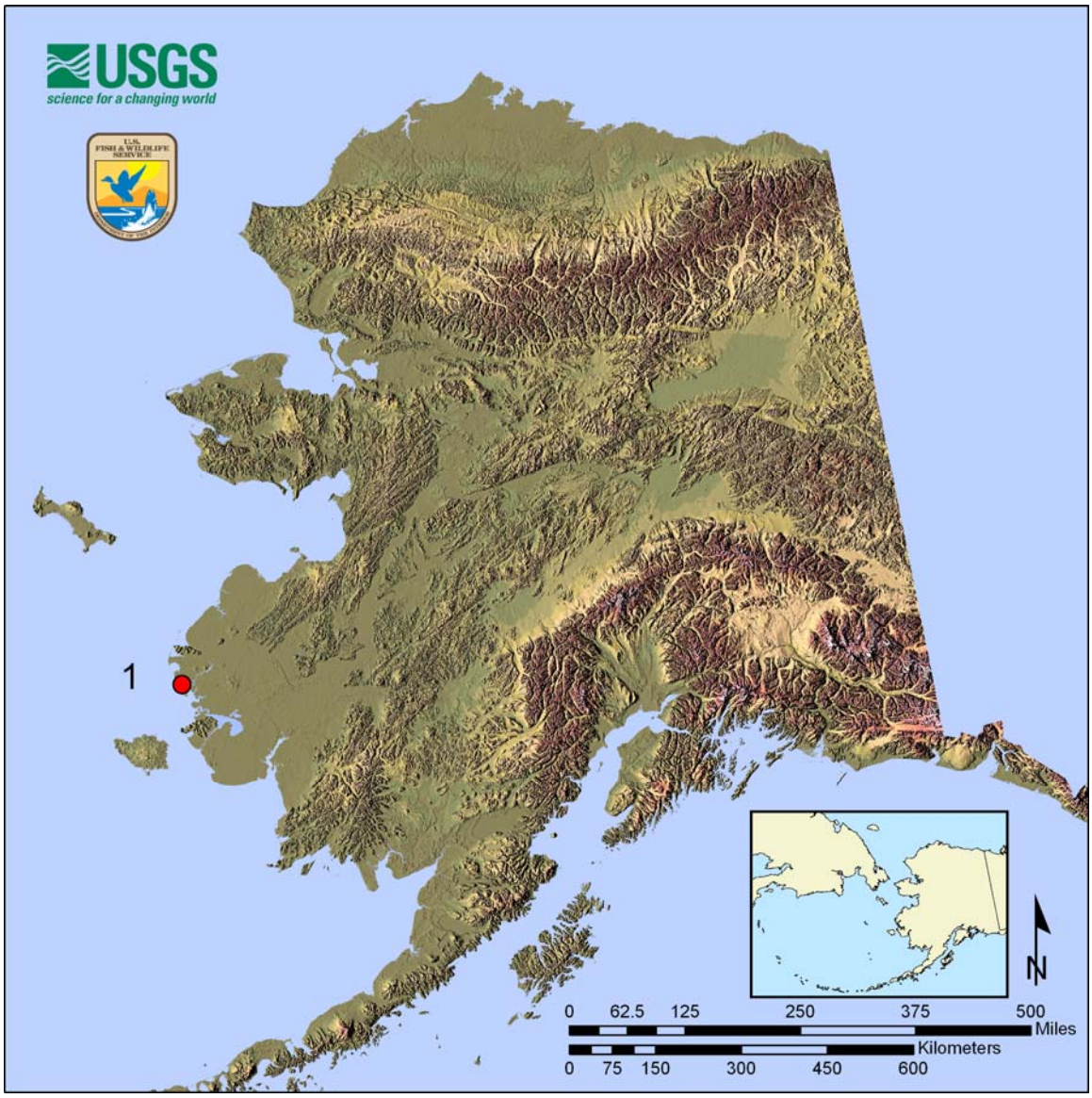
Location	Total samples	Total AI Pooled positive	Total AI Cloacal positive	Prevalence
Yukon Delta NWR	1	0	0	0

Table 61. Comparative avian influenza results for Bar-tailed Godwit collected September, 2007: pooled results and cloacal swab results.

Pooled results	Clocal swab results	Totals
Negative	Negative	1
Positive	Positive	0
Negative	Positive	0
Positive	Negative	0
Total samples tested		1

Daniel Ruthrauff, USGS ASC

Figure 15. Live sampling locations for Bar-tailed Godwit in Alaska, 2007. For specific location names see key following map.



Site #	Geographic Location	Specific Location	Total samples
1	Yukon Delta NWR	Tutakoke	1

Taxon: Ruddy Turnstone (*Arenaria i. interpres*)

Justification: A large proportion of the population of Ruddy Turnstones that occurs in Alaska is distributed during the non-breeding season in parts of Asia having recent outbreaks of Asian H5N1.

Ranking Score: 13

Background: Approximately 40,000 Ruddy Turnstones utilize sites within Alaska during the year (Alaska Shorebird Group 2000, unpubl. data). Half of these individuals breed in Chukotka, while half breed at upland tundra sites within the state (Brown et al. 2001). A portion of both breeding groups migrates to locations in eastern and southeastern Asia during the non-breeding season and stops in central east Asia (Bamford et al. 2006). Additionally, each fall Alaska hosts Ruddy Turnstones that breed in Chukotka but stage at sites in western Alaska en route to non-breeding locations in Asia (Thompson 1974). Thus, not only does a percentage of Alaskan-breeding Ruddy Turnstones spend the non-breeding season at sites near outbreaks of H5N1 in Asia, but a high proportion of Asian-breeding turnstones stage at sites in western Alaska.

Arctic NWR, the North Slope, and the Yukon Delta NWR:

A total of 12 samples was collected from various areas around the state including the Arctic NWR, the North Slope, and the Yukon Delta NWR (Fig. 16). See discussed below and final tables present the analytical results at the end of this section.

Capture Methods: No single project specifically targeted the capture and sampling of Ruddy Turnstones. Turnstones were captured in conjunction with other avian influenza projects across the state. Birds were captured using mist nets during pre-nesting and bow nets placed over nests.

Results: A total of 12 cloacal and oral-pharyngeal samples were collected from three camps (Table 62). Of those, five were adult females, three adult males, and four juvenile, sex undetermined.

AI Results: None of the 12 Ruddy Turnstones pooled or cloacal samples tested positive for avian influenza.

Table 62. Birds captured and both cloacal and oral-pharyngeal swabs collected from Ruddy Turnstones in Alaska, June, August, and September 2007.

Location	Total birds captured	Female	Male	UNK	AI Paired samples CL	OP	Total AI samples
Canning River Delta.	5	3	1	1	5	5	5
Teshekpuk Lake Special Area	4	2	2	0	4	4	4
Tutakoke	3	0	0	3	3	3	3
Total	12	5	3	4	12	12	12

Other Accomplishments: All captured individuals were banded with a metal band, weighed, and measured. In addition, fat index and the stage of molt was recorded. Blood samples were taken for genetic studies and the plasma will be used in hormone studies. Feathers were collected for stable isotope studies.

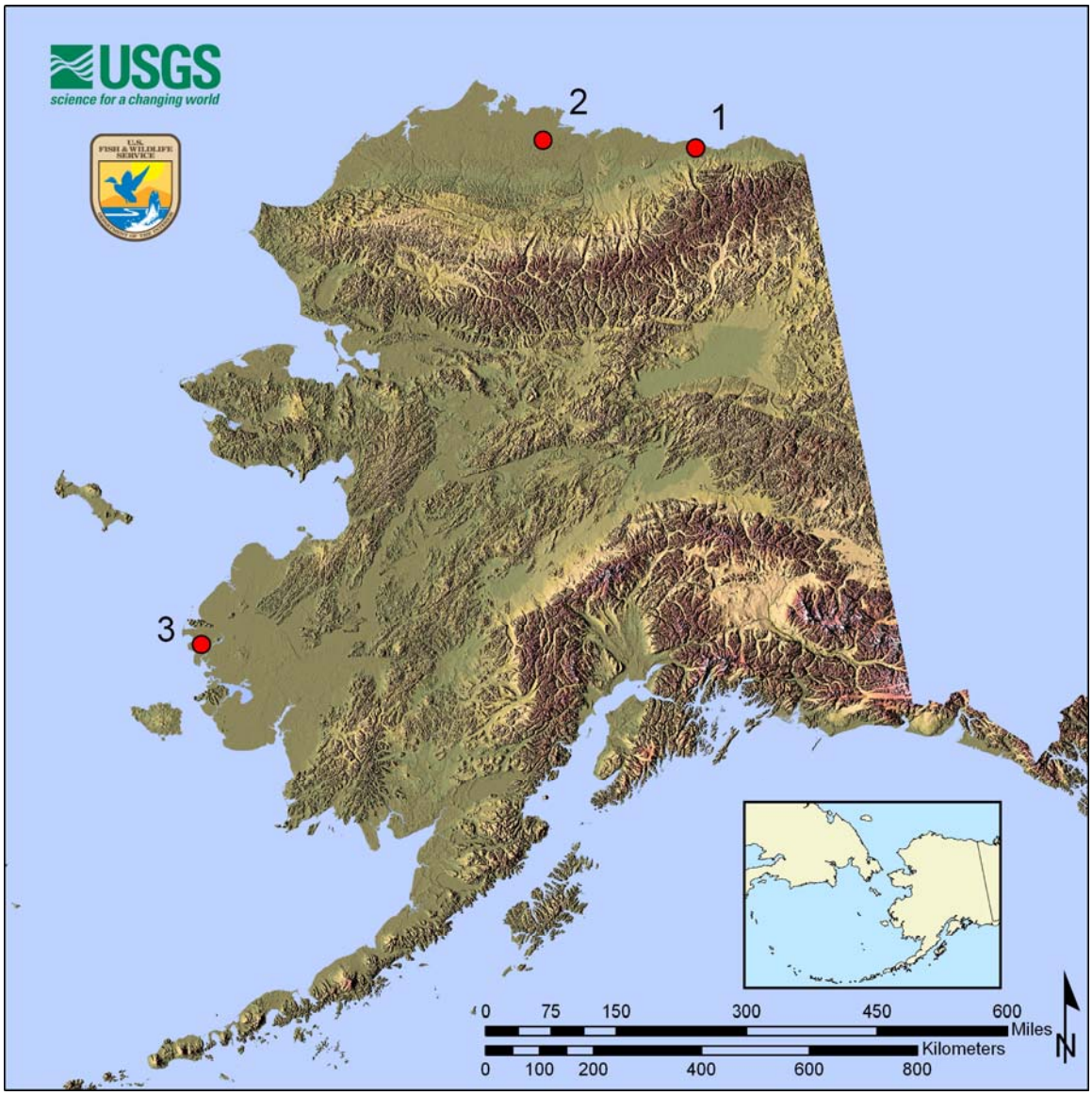
Table 63. Avian influenza analytical results for Ruddy Turnstones collected June, August, and September, 2007: pooled and cloacal only samples.

Location	Total samples	Total AI Pooled positive	Total AI Cloacal positive	Prevalence
Canning River Delta.	5	0	0	0
Teshekpuk Lake Special Area	4	0	0	0
Yukon Delta NWR	3	0	0	0
Total	12	0	0	0

Table 64. Comparative avian influenza results for Ruddy Turnstones collected July through August, 2007: pooled results and cloacal swab results.

Pooled results	Clocal swab results	Totals
Negative	Negative	12
Positive	Positive	0
Negative	Positive	0
Positive	Negative	0
Total samples tested		12

Figure 16. Live sampling locations for Ruddy Turnstones in Alaska, 2007. For specific location names see key following map.



Site #	Geographic Location	Specific Location	Total samples
1	North Slope	Canning River Delta	5
2	North Slope	Teshekpuk Lake Special Area	4
3	Yukon Delta NWR	Tutakoke	3
	Total		**12**

Taxon: Pectoral Sandpiper (*Calidris melanotos*)

Justification: Pectoral Sandpipers are among the high priority species because small numbers winter regularly in southeast Asia and Australasia (mainly Australia and New Zealand), and then migrate through eastern Asia (e.g., Philippines, Taiwan, and Japan) on route to their breeding areas in Siberia.

Ranking score: 13

Background: Roughly half of the world's population of 400,000 Pectoral Sandpipers (Brown et al. 2001) breeds in Siberia; the remainder breeds throughout western and northern Alaska east to Central Canada (Holmes and Pitelka 1998). Most of the Siberian breeding birds are thought to migrate eastward through Alaska to join the common migration route used by the North American breeding birds. In Alaska, birds are observed migrating through Cook Inlet in Anchorage and the YKD in mid-May, presumably on their way to Siberia. Pectoral Sandpipers that stop in Alaska to breed typically do so in mid-May to early June.

Over 150 birds were sampled from Yukon Delta (spring subsistence) and North Slope (breeding and post breeding). Of these, 142 were live bird samples (Fig. 17), and 29 hunter-killed samples (see Spring Subsistence chapter). Each sampling stage and its location will be discussed separately and final tables present analytical results at the end of this section.

Breeding

The highest breeding densities occur along the Arctic Coastal Plain of northern Alaska and east-central Siberia. Breeding Pectoral Sandpipers are found in good numbers throughout the NPR-A. Moderate densities of birds have been reported at Barrow, Teshekpuk Lake, and Prudhoe Bay (Troy and Wickliffe 1990, R. Lanctot, unpubl. data; J. Liebezeit, unpubl. data).

North Slope:

Breeding Pectoral Sandpipers were captured and sampled throughout the North Slope. Barrow, Teshekpuk Lake Special Area in the NPR-A, and the Canning River Delta are all located on the northern coastline of Alaska along the Beaufort Sea.

Capture Methods: At all three breeding sites birds were captured with bow nets while incubating and some were captured with mist nets. Helicopters were used to access remote sites in the NPR-A.

Results: A total of 112 breeding Pectoral Sandpipers was captured and banded. Cloacal and oral-pharyngeal samples were collected from breeding Pectoral Sandpipers (Table 65). Of those, 100 were adult females, 10 were adult males, and two were females, age undetermined.

AI Results: None of the 112 breeding Pectoral Sandpipers pooled or cloacal samples tested positive for avian influenza.

Table 65. Birds captured and both cloacal and oral-pharyngeal swabs collected from breeding Pectoral Sandpipers on the North Slope, June and July 2007.

Location	Total birds captured	Female	Male	UNK	AI Paired samples CL	OP	Total AI samples
Barrow	47	38	9	0	47	35	47
Canning River Delta	18	18	0	0	18	18	18
Teshekpuk Lake Special Area	47	44	1	2	47	47	47
Total	112	100	10	2	112	100	112

Other Accomplishments: Feathers were collected for stable isotope studies and blood samples were collected for genetic studies. All captured birds were banded.

Post-breeding
Male Pectoral Sandpipers depart their breeding areas quickly, while females and their offspring congregate in tundra habitats near the coast of the Arctic Ocean (Connors et al. 1979). Juveniles are present in western Alaska in small flocks from September to mid-October where they occur in coastal habitats.

North Slope:

Post-breeding Pectoral Sandpipers were sampled at the Canning River Delta located along the coastline of the Arctic National Wildlife Refuge.

Capture Methods: Post-breeding birds were captured with mist nets.

Results: A total of 30 post-breeding Pectoral Sandpipers was captured and banded at Canning River Delta. Cloacal and oral-pharyngeal samples were collected from post-breeding Pectoral Sandpipers (Table 66). All captured birds were banded with metal bands. Of those, 29 were juveniles, sex undeterminded and one adult, sex undetermined.

AI Results: None of the 30 post-breeding Pectoral Sandpipers pooled or cloacal samples tested positive for avian influenza.

Table 66. Birds captured and both cloacal and oral-pharyngeal swabs collected from post-breeding Pectoral Sandpipers on the North Slope, August 2007.

Location	Total birds captured	Female	Male	UNK	AI Paired samples CL	OP	Total AI samples
Canning River Delta	30	0	0	30	30	30	30

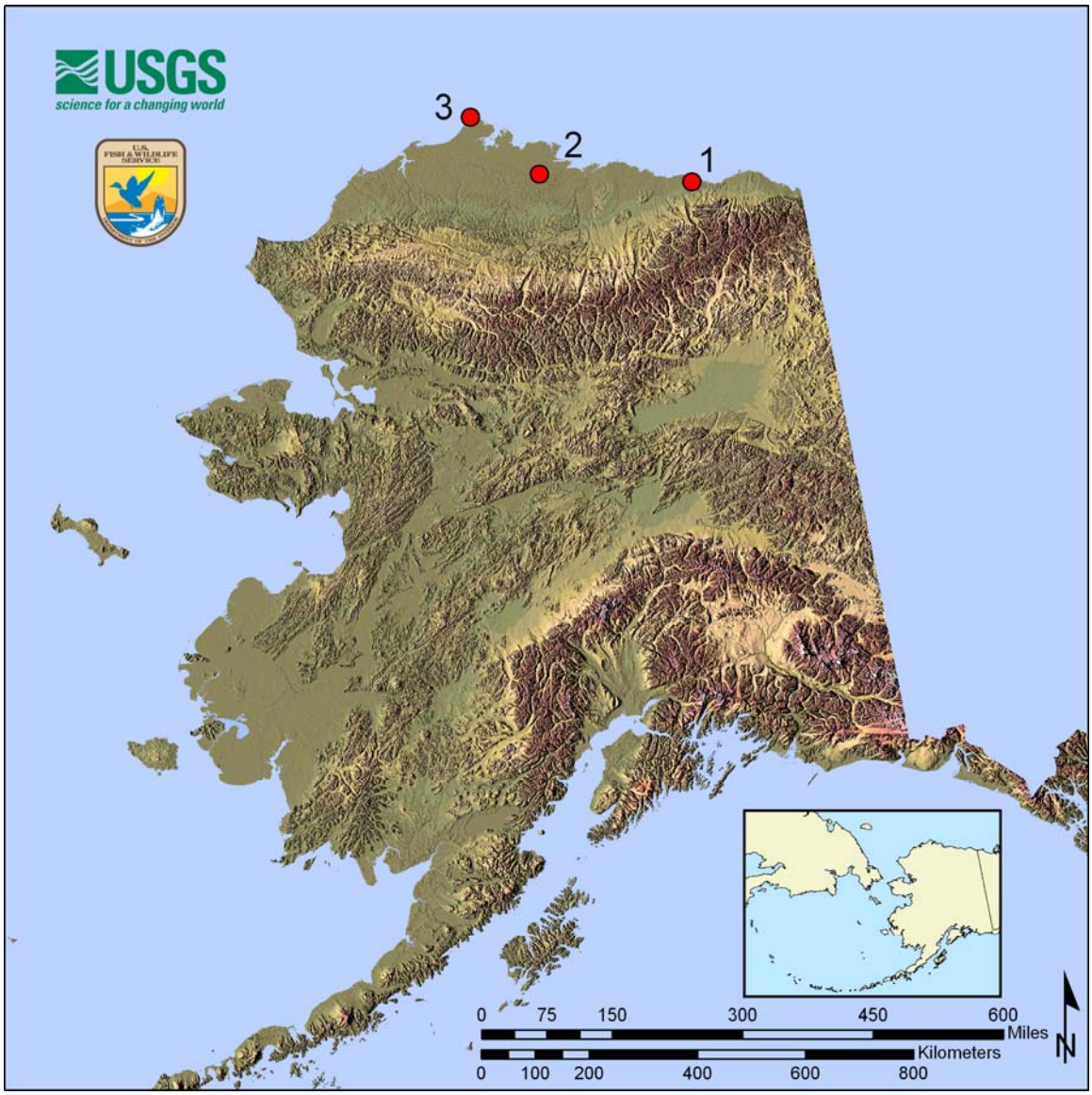
Table 67. Avian influenza analytical results for Pectoral Sandpipers collected June, July, and August, 2007: pooled and cloacal only samples.

Location	Sampling Stages	Total samples	Total AI Pooled positive	Total AI Cloacal positive	Prevalence
Barrow	Breeding	47	0	0	0
Canning River Delta.	Breeding and Post-breeding	48	0	0	0
Teshekpuk Lake Special Area	Breeding	47	0	0	0
Total		142	0	0	0

Table 68. Comparative avian influenza results for Pectoral Sandpipers collected June through August, 2007: pooled results and cloacal swab results.

Pooled results	Clocal swab results	Totals
Negative	Negative	142
Positive	Positive	0
Negative	Positive	0
Positive	Negative	0
Total samples tested		142

Figure 17. Live sampling locations for Pectoral Sandpipers in Alaska, 2007. For specific location names see key following map.



Site #	Geographic Location	Specific Location	Total samples
1	Arctic NWR	Canning River Delta	48
2	North Slope	Teshekpuk Lake Special Area	47
3	North Slope	Barrow	47
	Total		**142**

Taxon: Red Knot (*Calidris canutus rogersi & roselaari*)

Justification: Red Knots are a high priority species because those in Alaska either co-occur with birds coming from Australasia or are part of a population whose breeding range extends to Asia (Wrangel Island).

Ranking score: 12.5

Background: Three subspecies of Red Knots occur in the Australasian flyway. Those breeding on Wrangel Island and likely in northwestern Alaska are recognized as *C. c. roselaari* (Engelmoer and Roselaar 1998). The total population of *roselaari* is estimated at fewer than 50,000 birds (Alaska Shorebird Group 2000, unpublished). The only place in Alaska where they are known to occur in large numbers is on the outer YKD in May (Gill and Handel 1981, 1990). Movement of Red Knots to and from the breeding and non-breeding grounds entails prolonged stays in coastal east Asia, primarily on estuarine habitats.

Only 5 birds were sampled from Tutakoke. Of those, 4 were live bird samples (Fig. 18), and one was hunter killed sample (see Spring Subsistence chapter). The location is discussed below and a final tables present analytical results at the end of this section.

Tutakoke:

Red Knots were captured, sampled, and released at Tutakoke.

Capture Methods: In contrast to 2006, spring phenology in 2007 was much advanced, and a near complete lack of snow greeted researchers upon arrival in early May. As a result, Red Knots were not constrained in their movements and distributed themselves unpredictably across the landscape. Thus, capture proved extremely difficult. A variety of capture methods were employed, all with very limited success.

Results: A total of 4 Red Knots was captured and banded at Tutakoke. Cloacal and oral-pharyngeal samples were collected from Red Knots (Table 69). All four were undetermined for sex and age.

AI Results: None of the 4 Red Knot pooled or cloacal samples tested positive for avian influenza.

Other Accomplishments: All birds were measured, weighed, banded, and released. Blood and feather samples were collected for DNA and stable isotope analyses.

Table 69. Birds captured and both cloacal and oral-pharyngeal swabs collected from Red Knots at Tutakoke, May 2007.

Location	Total birds captured	Female	Male	UNK	AI Paired samples CL	AI Paired samples OP	Total AI samples
Tutakoke	4	0	0	4	4	4	4

Table 70. Avian influenza analytical results for Red Knots collected May, 2007: pooled and cloacal only samples.

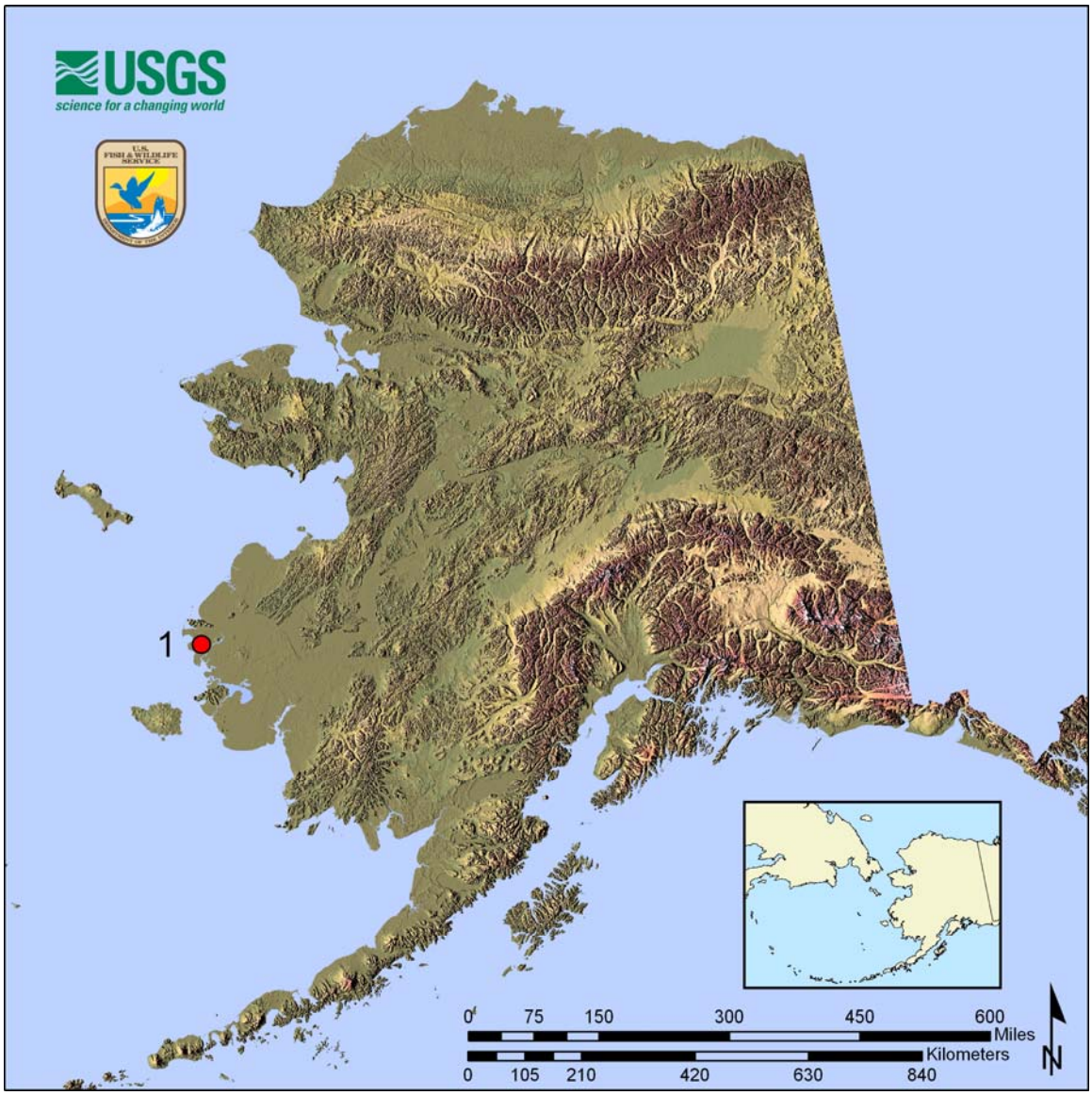
Location	Total samples	Total AI Pooled positive	Total AI Cloacal positive	Prevalence
Tutakoke	4	0	0	0

Table 71. Comparative avian influenza results for Red Knots collected July through August, 2007: pooled results and cloacal swab results.

Pooled results	Clocal swab results	Totals
Negative	Negative	4
Positive	Positive	0
Negative	Positive	0
Positive	Negative	0
Total samples tested		4

Robert E. Gill, Jr., USGS ASC

Figure 18. Live sampling locations for Red Knots in Alaska, 2007. For specific location names see key following map.



Site #	Geographic Location	Specific Location	Total samples
1	Yukon Delta NWR	Tutakoke	4

Taxon: Long-billed Dowitcher (*Limnodromus scolopaceus*)

Justification: Nearly all the Long-billed Dowitchers that breed in Asia migrate through Alaska *en route* to non-breeding areas in North and Central America. These birds mix during migration and breeding with other waterfowl and shorebird species from parts of Asia with recent outbreaks of Asian H5N1.

Ranking Score: 12

Background: The Long-billed Dowitcher breeds at high-latitude coastal wetlands in Alaska, Canada, and the Russian Far East (Takekawa and Warnock 2000). About one third of all Long-billed Dowitchers breed in Asia, with the majority of these Asian-breeding dowitchers passing through Alaska during both spring and fall migration (Alaska Shorebird Group 2000).

Over 50 birds were sampled on the YDNWR and the North Slope. Of those, 51 were live bird samples (Fig. 19), and 2 hunter-killed samples (see Spring Subsistence chapter). Each location is discussed separately and final tables present analytical results at the end of this section.

North Slope:

Long-billed Dowitcher were captured, sampled and released at two sites on the North Slope.

Capture Methods: Birds were captured with bow nets while incubating.

Results: A total of 42 Long-billed Dowitchers was sampled at two sites on the North Slope. Cloacal and oral-pharyngeal samples were collected (Table 72). Of those, 15 were adult females, 24 adult males, and three adult, sex unidentified.

AI Results: None of the 42 Long-billed Dowitchers pooled or cloacal samples tested positive for avian influenza.

Table 72. Birds captured and both cloacal and oral-pharyngeal swabs collected from Long-billed Dowitchers on the North Slope, June and July 2007.

Location	Total birds captured	Female	Male	UNK	AI Paired samples CL	OP	Total AI samples
Barrow	30	10	17	3	30	30	30
Teshekpuk Lake Special Area	12	5	7	0	12	12	12
Total	42	15	24	3	42	42	42

Other Accomplishments: All captured birds were banded with a metal band. Biometric measurements, feather samples and blood samples were also collected.

Yukon Delta NWR and Arctic NWR:

Long-billed Dowitchers were collected sampled and released at Tutakoke and Canning River Delta.

Capture Methods: Post-breeding birds were captured with a variety of methods including, mist nets, walk-in traps, triggered bow traps, and elastically launched "whoosh" nets.

Results: A total of 9 Long-billed Dowitchers was sampled at Tutakoke and Canning River Delta. Cloacal and oral-pharyngeal samples were collected (Table 73). All were juveniles, sex unidentified.

AI Results: None of the 9 Long-billed Dowitchers pooled or cloacal samples tested positive for avian influenza.

Table 73. Birds captured and both cloacal and oral-pharyngeal swabs collected from Long-billed Dowitchers on the Yukon Delta National Wildlife Refuge and Arctic National Wildlife Refuge, August and September 2007.

Location	Total birds captured	Female	Male	UNK	AI Paired samples CL	OP	Total AI samples
Tutakoke	8	0	0	8	8	8	8
Canning River Delta	1	0	0	1	1	1	1
Total	9	0	0	9	9	9	9

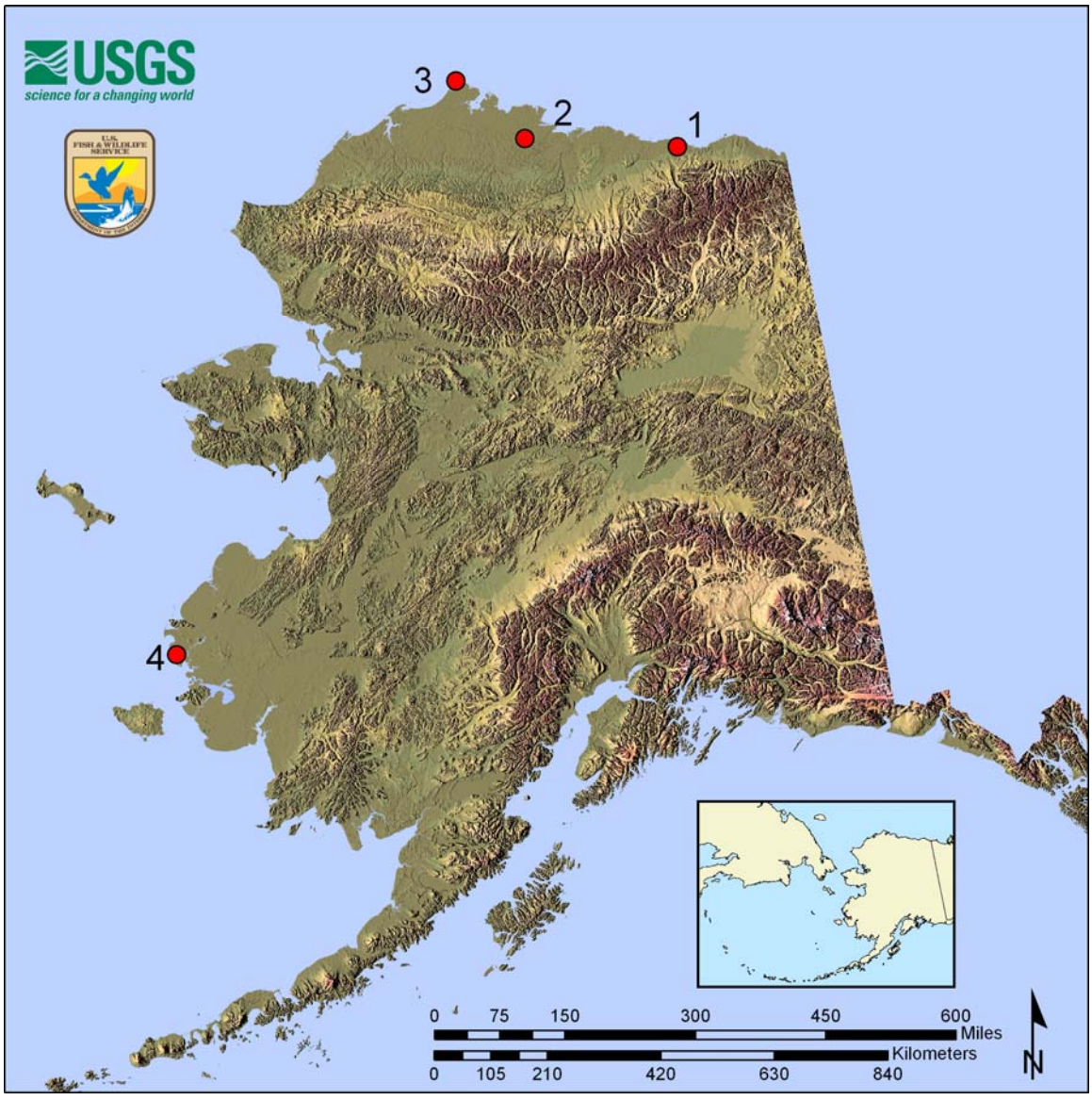
Table 74. Avian influenza analytical results for Long-billed Dowitchers collected June, through September, 2007: pooled and cloacal only samples.

Location	Sampling Stages	Total samples	Total AI Pooled positive	Total AI Cloacal positive	Prevalence
Barrow	Breeding	30	0	0	0
Teshekpuk Lake Special Area	Breeding	12	0	0	0
Tutakoke	Post-breeding	8	0	0	0
Canning River Delta.	Post-breeding	1			
Total		51	0	0	0

Table 75. Comparative avian influenza results for Long-billed Dowitchers collected June, through September, 2007: pooled results and cloacal swab results.

Pooled results	Clocal swab results	Totals
Negative	Negative	51
Positive	Positive	0
Negative	Positive	0
Positive	Negative	0
Total samples tested		51

Figure 19. Live sampling locations for Long-billed Dowitchers in Alaska, 2007. For specific location names see key following map.



Site #	Geographic Location	Specific Location	Total samples
1	Arctic NWR	Canning River Delta	1
2	North Slope	Teshekpuk Lake Special Area	12
3	North Slope	Barrow	30
4	Yukon Delta NWR	Tutakoke	8
	Total		**51**

Taxon: Rock Sandpiper (*Calidris ptilocnemis tschuktschorum*)

Justification: This high priority subspecies provides a major migratory link between Asia and North America; about 10,000 birds nest in western Siberia and migrate directly to Alaska in fall.

Ranking score: 11.5

Background: The *tschuktschorum* subspecies of the Rock Sandpiper (*Calidris ptilocnemis*) breeds in coastal mountains and uplands in eastern Russia (Chukotka Peninsula) and western Alaska (from northern Seward Peninsula south throughout Alaska Peninsula) (Gill et al. 2002). The current population is estimated at 50,000 birds with about 10,000 nesting in Russia. During post-breeding (Jul–Oct), the entire population migrates to coastal staging areas in western Alaska (YKD and Bristol Bay) where they molt and associate closely with a variety of other shorebirds, including two other subspecies of Rock Sandpiper.

Over 250 birds were sampled from Tutakoke on the YDNWR (Fig. 20). See the discussion below and final tables present the analytical results at the end of this section.

Tutakoke:

Rock Sandpipers were captured, sampled and released at Tutakoke, which is located along the outer fringe of YDNWR, near the mouth of the Tutakoke River. The area contains many shallow ponds, lakes, and a network of tidal sloughs.

Capture Methods: Post-breeding Rock Sandpipers were captured using mist nets, walk-in traps, and, rocket nets. All birds were measured, weighed, banded, and released.

Results: Two hundred sixty-five Rock Sandpipers were captured and banded at Tutakoke. Cloacal and oral-pharyngeal samples were collected (Table 76). Of those, 247 were adults, sex unidentified and 18 were juveniles, sex unidentified.

AI Results: None of the 265 Rock Sandpipers pooled or cloacal samples tested positive for avian influenza.

Table 76. Birds captured and both cloacal and oral-pharyngeal swabs collected from Rock Sandpipers at Tutakoke August and September, 2007.

Location	Total birds captured	Female	Male	UNK	AI Paired samples CL	AI Paired samples OP	Total AI samples
Tutakoke	265	0	0	265	265	265	265

Table 77. Avian influenza analytical results for Rock Sandpipers collected August and September, 2007: pooled and cloacal only samples.

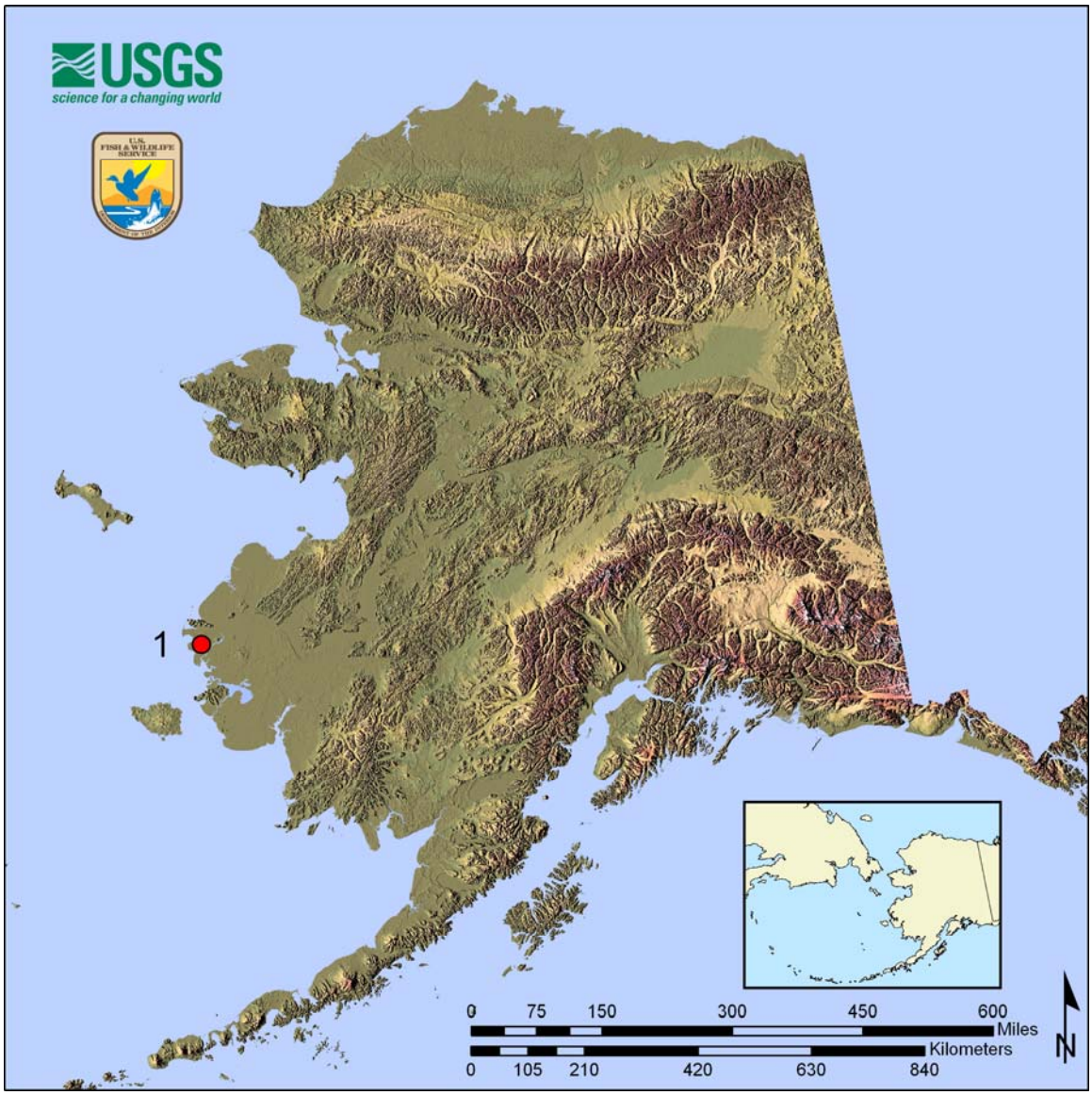
Location	Total samples	Total AI Pooled positive	Total AI Cloacal positive	Prevalence
Yukon Delta NWR	265	0	0	0

Table 78. Comparative avian influenza results for Rock Sandpipers collected August through September, 2007: pooled results and cloacal swab results.

Pooled results	Clocal swab results	Totals
Negative	Negative	265
Positive	Positive	0
Negative	Positive	0
Positive	Negative	0
Total samples tested		265

Donna Dewhurst, USFWS

Figure 20. Live sampling locations for Rock Sandpipers in Alaska, 2007. For specific location names see key following map.



Site #	Geographic Location	Specific Location	Total samples
1	Yukon Delta NWR	Tutakoke	265

Taxon: Pacific Golden-Plover (*Pluvialis fulva*)

Justification: Pacific Golden-Plovers could potentially carry Asian H5N1 to Alaska via three different routes: 1) birds that spend the non-breeding season in east central Asia—some in Asian H5N1 "hotspots"—migrate through Alaska in spring *en route* to Siberian breeding areas, 2) birds that nest (or hatch) in Siberia migrate directly to coastal stopover sites in Alaska in fall (adults and juveniles arrive in two different pulses), and 3) Alaska-breeding birds return to Alaska in spring after co-mingling on non-breeding areas with other *fulva* that have frequented Asian H5N1 "hotspots."

Ranking score: 11.5

Background: Pacific Golden-Plovers breed in tundra habitats from north central Siberia to western Alaska (Johnson and Connors 1996). One population (ca. 100,000 birds) nests in Siberia and spends the non-breeding season in east and southeast Asia, Australia, and Oceania (Bamford et al. 2006, Wetlands International 2002). During both north and south migrations, an unknown portion of this population passes through Alaska. Another population breeds in Alaska and spends the non-breeding season in Oceania (Johnson and Connors 1996), particularly in Hawaii (Johnson et al. 2004), where it associates with plovers that have recently arrived from Asia.

Yukon Delta NWR:

Three Pacific Golden-Plovers were sampled from Tutakoke located on the YDNWR (Fig. 21).

Capture Methods: Pacific Golden-Plovers were captured using mist nets, walk-in traps, and, rocket nets. All birds were measured, weighed, banded, and released.

Results: A total of 3 birds was sampled Tutakoke. Cloacal and oral-pharyngeal samples were collected (Table 79). All were juveniles, sex unidentified.

AI Results: None of the 3 Pacific Golden-Plover pooled or cloacal samples tested positive for avian influenza.

Table 79. Birds captured and both cloacal and oral-pharyngeal swabs collected from Pacific Golden-Plovers at Tutakoke September, 2007.

Location	Total birds captured	Female	Male	UNK	AI Paired samples CL	AI Paired samples OP	Total AI samples
Tutakoke	3	0	0	3	3	3	3

Table 80. Avian influenza analytical results for Pacific Golden-Plovers collected September, 2007: pooled and cloacal only samples.

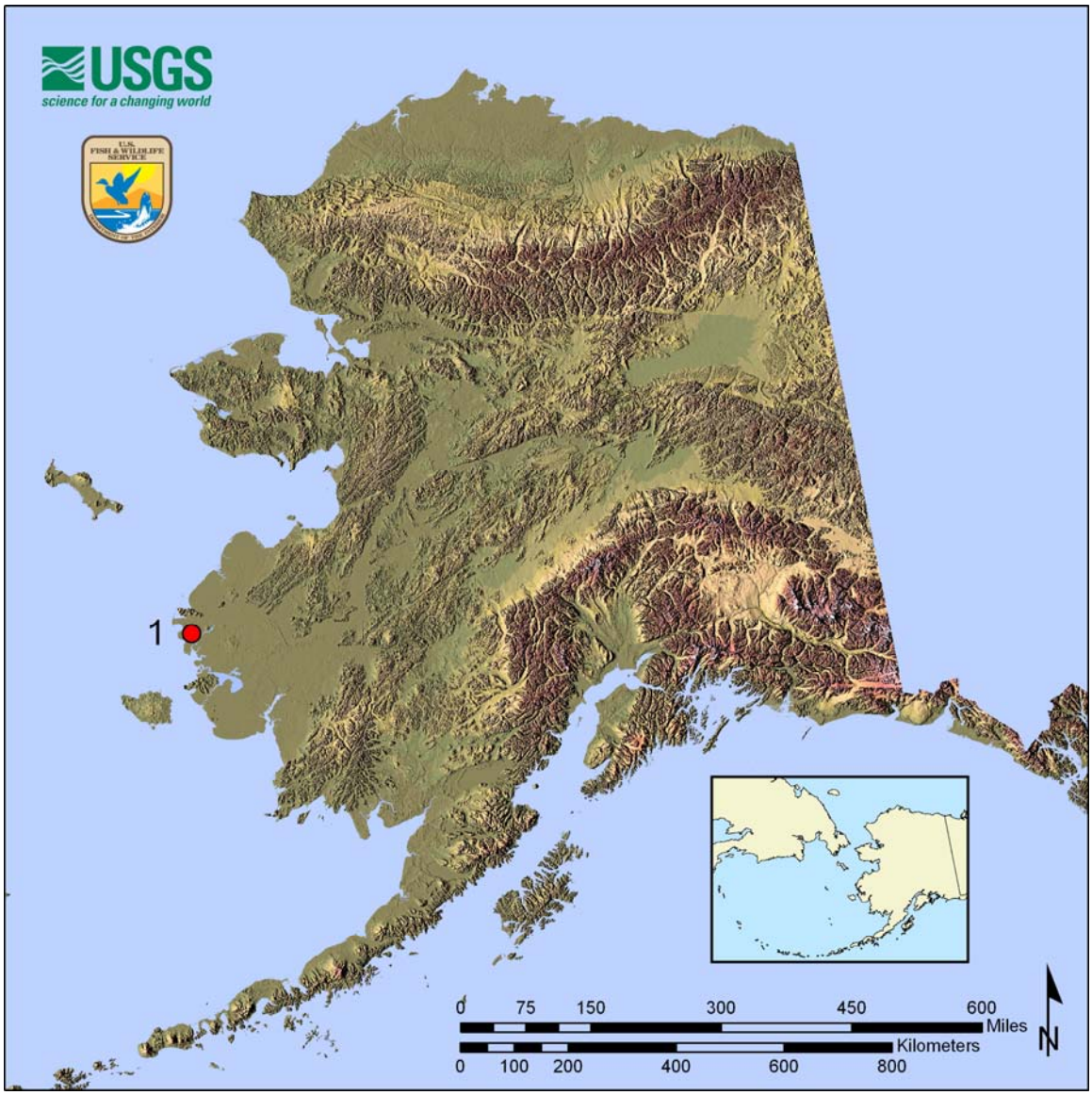
Location	Total samples	Total AI Pooled positive	Total AI Cloacal positive	Prevalence
Tutakoke	3	0	0	0

Table 81. Comparative avian influenza results for Pacific Golden-Plovers collected September, 2007: pooled results and cloacal swab results.

Pooled results	Clocal swab results	Totals
Negative	Negative	3

O.W. Johnson, Montana State Univ.

Figure 21. Live sampling locations for Pacific Golden Plovers in Alaska, 2007. For specific location names see key following map.



Site #	Geographic Location	Specific Location	Total samples
1	Yukon Delta NWR	Tutakoke	3

Taxon: Buff-breasted Sandpiper (*Tryngites subruficollis)*

Justification: Buff-breasted Sandpipers are a high priority species because a small portion of the population breeds in Asia on Wrangel Island and western Chukotka mainland and then migrates through Alaska to its non-breeding grounds in southern South America.

Ranking score: 10

Background: A small proportion of the world's population of 15,000 Buff-breasted Sandpipers (Brown et al. 2001) breeds on Wrangel Island and the western Chukotka mainland; the remainder breeds throughout northern Alaska east to Central Canada (Lanctot and Laredo 1994). Portions of the population migrate south along the Pacific and Atlantic coasts. The Chukotka breeding birds are thought to migrate eastward through Alaska to join the common migration route used by the North American breeding birds.

A total of 10 birds was sampled from three sites on the North Slope (Fig. 22). See discussion below.

North Slope:

Buff-breasted Sandpipers were captured, sampled, and released from three sites on the North Slope. Barrow, NPR-A, and Canning River Delta camps are all located on the northern coastline of Alaska along the Beaufort Sea.

Capture Methods: At all three sites birds were captured using walk-in, bow traps and with mist nets. A helicopter was used at the NPR-A site to transport people to sample sites where two-person crews located nests for capture and sampling.

Results: Ten Buff-breasted Sandpipers were captured and banded at Barrow, throughout the NPR-A, and Canning River Delta. Cloacal and oral-pharyngeal samples were collected (Table 82). Of those, 5 were adult females, 2 adult males, and three juveniles, sex unidentified.

AI Results: None of the 10 Buff-breasted Sandpipers pooled or cloacal samples tested positive for avian influenza.

Table 82. Birds captured and both cloacal and oral-pharyngeal swabs collected from Buff-breasted Sandpipers on the North Slope, June through August 2007.

Location	Total birds captured	Female	Male	UNK	AI Paired samples CL	OP	Total AI samples
Barrow	1	0	1	0	1	1	1
Teshekpuk Lake Special Area	4	4	0	0	4	4	4
Canning River Delta	5	1	1	3	5	5	5
Total	10	5	2	3	10	10	10

Other Accomplishments: All captured individuals were banded with a metal band weighed, and measured. In addition, fat index and the stage of molt were recorded. Blood samples were taken for genetic studies and feathers were collected for stable isotope studies.

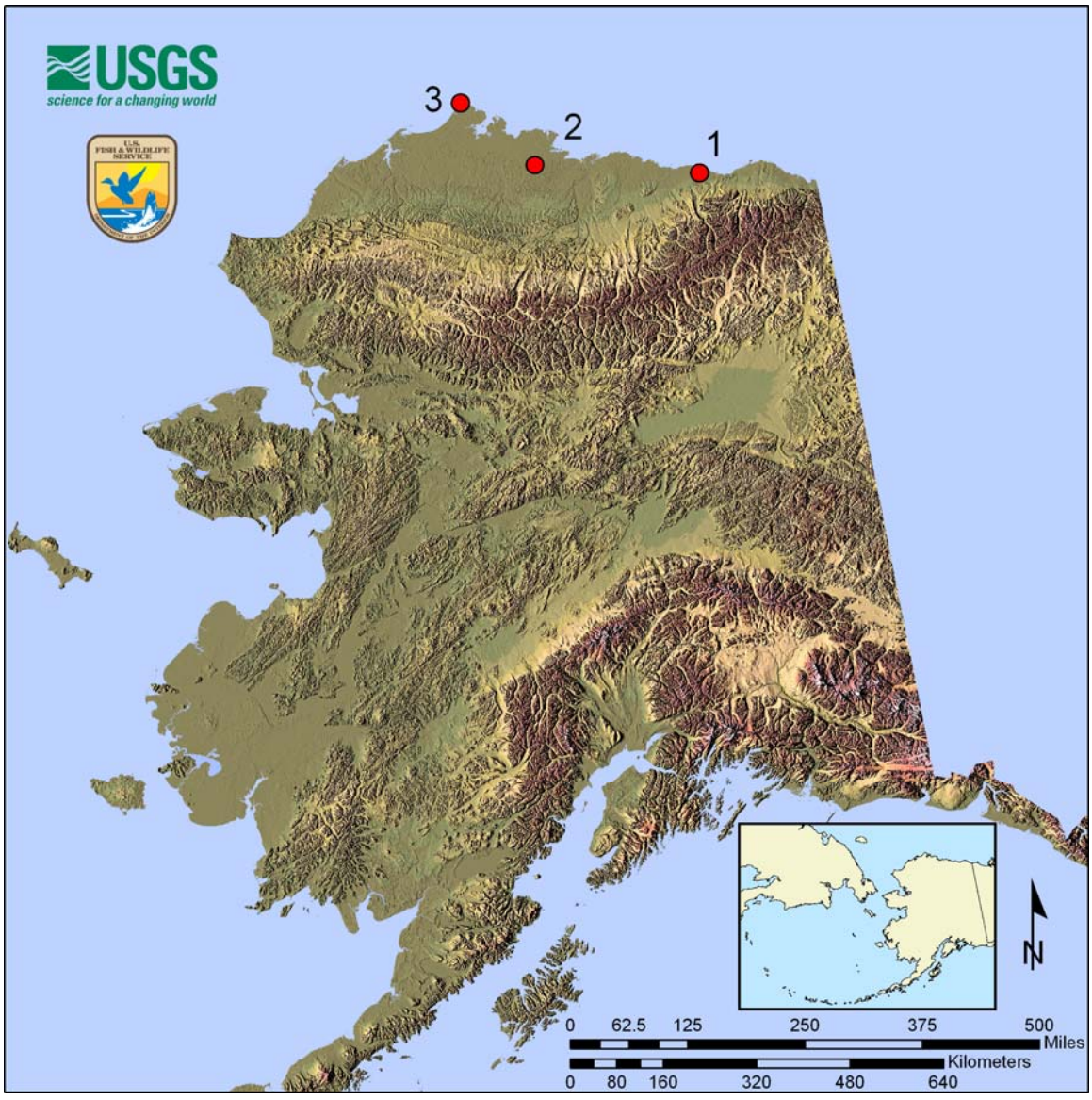
Table 83. Avian influenza analytical results for Buff-breasted Sandpipers collected June, through August, 2007: pooled and cloacal only samples.

Location	Total samples	Total AI Pooled positive	Total AI Cloacal positive	Prevalence
Barrow.	1	0	0	0
Teshekpuk Lake Special Area	4	0	0	0
Canning River Delta	5	0	0	0
Total	10	0	0	0

Table 84. Comparative avian influenza results for Buff-breasted Sandpipers collected June through August, 2007: pooled results and cloacal swab results.

Pooled results	Clocal swab results	Totals
Negative	Negative	10

Figure 22. Live sampling locations for Buff-breasted Sandpipers in Alaska, 2007. For specific location names see key following map.



Site #	Geographic Location	Specific Location	Total samples
1	Arctic NWR	Canning River Delta	5
2	North Slope	Teshekpuk Lake Special Area	4
3	North Slope	Barrow	1
	Total		**10**

Taxon: Glaucous Gull (*Larus hyperboreus*)

Justification: Glaucous Gulls are a high priority species because populations in western Alaska migrate to Australasia, winter along the coast and feed in land fills and scavenge dead birds.

Ranking score: 11.5

Background: The Glaucous Gull is often predatory, feeding on birds, small mammals, fish and invertebrates (Gilchrist 2001, Bowman et al. 2004). This species is circumpolar in distribution. In Alaska it breeds coastally from the central Bering Sea to the Beaufort Sea. In Russia Far East they breed in similar latitudes (Harrison 1983, Armstrong 1995, ASIS 2006). Satellite telemetry has shown that birds breeding in Barrow spend much of their winter in coastal Russia as far south as the Kamchatka Peninsula (Troy Ecological Research Associates 2004). About 100,000 birds nest in colonies and singly in Alaska (Gilchrist 2001, Bowman et al. 2004, USFWS 2006).

Fourteen birds were sampled from St. Lawrence Island, Eek and Toksook Bay. Of those, 10 were live birds (Fig. 23) and 4 were hunter killed (see Spring Subsistence chapter).

St. Lawrence Island:

Glaucous Gull were captured, sampled and released on island sites in Koozata Lagoon and Iveetok Lagoon. Koozata Lagoon is located on the south side of St. Lawrence Island and Iveetok Lagoon is located east of Savoonga along the northern edge of the Island. The sampling sites consisted of either a small, exposed rocky island with nesting colonies in close proximity to each other or a vegetated island which was only accessible during high tide. Capture sites were accessed by a boat or ATVs.

Capture Methods: Gull chicks were trapped while on nest.

Results: A total of 10 Glaucous Gulls was captured at St. Lawrence Island. Cloacal and oral-pharyngeal samples were collected (Table 85). All samples were juveniles and undetermined for sex.

AI Results: None of the 10 Glaucous Gulls pooled or cloacal samples tested positive for avian influenza.

Table 85. Birds captured and both cloacal and oral-pharyngeal swabs collected from Glaucous Gulls on St. Lawrence Island, July 2007.

Location	Total birds captured	Female	Male	UNK	AI Paired samples CL	AI Paired samples OP	Total AI samples
Koozata Lagoon	9	0	0	9	9	9	9
Iveetok Lagoon	1	0	0	1	1	1	1
Total	10	0	0	10	10	10	10

Table 86. Avian influenza analytical results for Glaucous Gulls collected July, 2007: pooled and cloacal only samples.

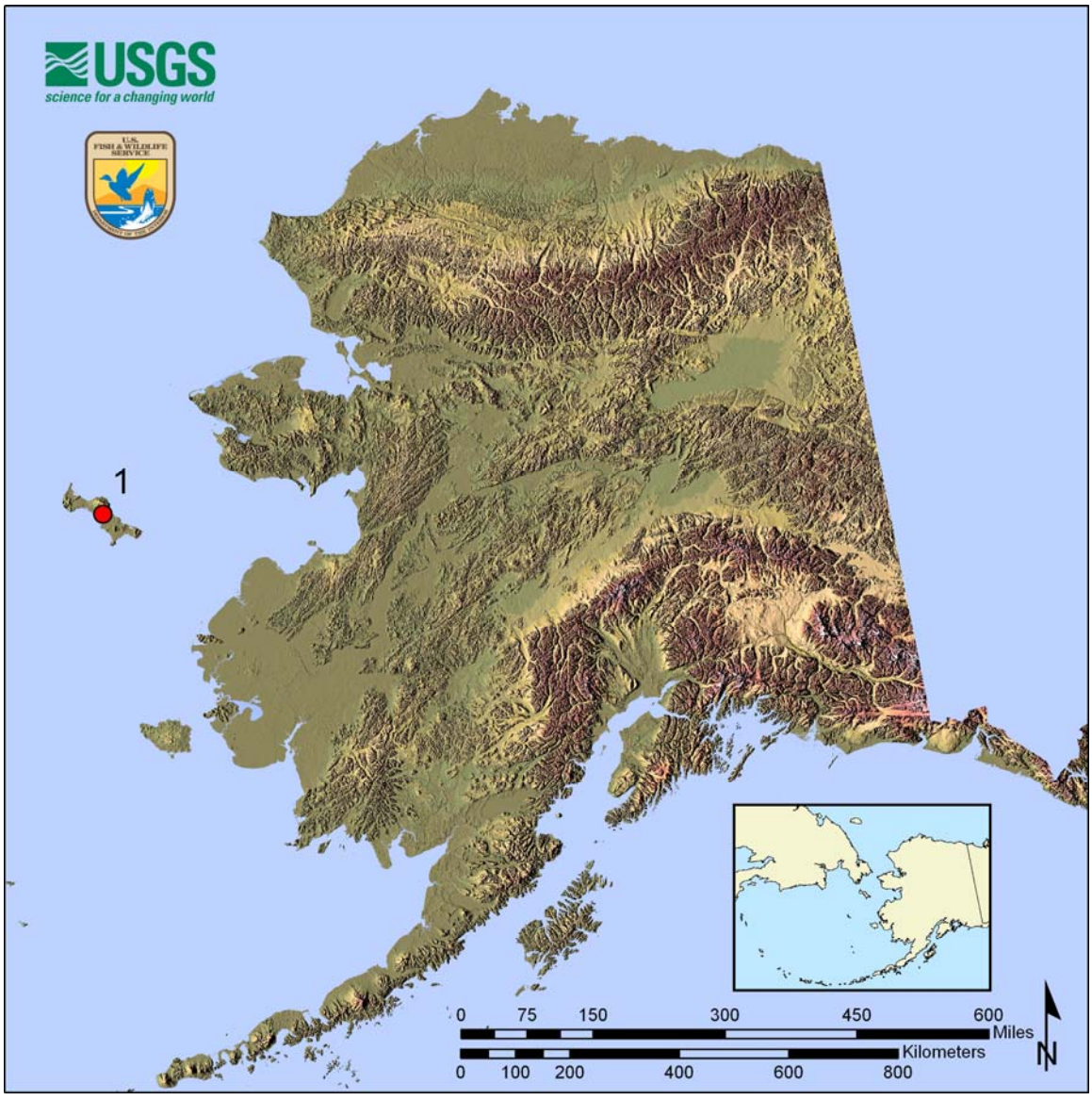
Location	Total samples	Total AI Pooled positive	Total AI Cloacal positive	Prevalence
St. Lawrence Is.	10	0	0	0

Table 87. Comparative avian influenza results for Glaucous Gulls collected July, 2007: pooled results and cloacal swab results.

Pooled results	Clocal swab results	Totals
Negative	Negative	10

Ted Swem, USFWS

Figure 23. Live sampling locations for Glaucous Gull in Alaska, 2007. For specific location names see key following map.



Site #	Geographic Location	Specific Location	Total samples
1	St. Lawrence Island	Savoonga	10

Eastern Yellow Wagtail (Motacilla tschutschenis)

Justification: The Eastern Yellow Wagtail overwinters in southeast Asia and Indonesia.

Ranking score: 17.5

Background: The Eastern Yellow Wagtail is a common breeder on the coastal uplands of western Alaska and the northern foothills of the Brooks Range where they co-occur with other Paleotropic migrants that rank high for surveillance of Asian H5N1. It overwinters in the epicenter of Asian H5N1 outbreaks in southeast Asia and Indonesia where it uses open areas with water, is often associated with agriculture and domestic animals, and congregates into flocks of thousands of birds at evening roosts.

Askinuk Mountains:

A total of 105 Eastern Yellow Wagtails was sampled from Kagankaguti Lake, located at eastern extent of the Askinuk Mountains (Fig. 24). See dicussion and a final tables present the analytical results at the end of this section.

Capture Methods: Eastern Yellow Wagtails were sampled at Kagankaguti Lake in the Askinuk Mountains, Yukon Delta NWR, where this species reaches its highest breeding densities in North America (Badyaev et al. 1998). Adults were captured on or near nests with mist nets or bow traps. All birds captured were aged, sexed, and banded.

Results: One hundred five Eastern Yellow Wagtails were captured and banded at Kagankaguti Lake. Only Cloacal samples were collected (Table 88). Of those, 71 were adult females and 34 were adult males.

AI Results: None of the 105 Eastern Yellow Wagtails pooled or cloacal samples tested positive for avian influenza.

Table 88. Birds captured and only cloacal swabs collected from Eastern Yellow Wagtails in the Yukon Delta National Wildlife Refuge, June 2007.

Location	Total birds captured	AI samples		AI Paired samples		Total AI samples
		Female	Male	CL	OP	
Kagankaguti Lake	105	71	34	105	0	105

Table 89. Avian influenza analytical results for Eastern Yellow Wagtails collected June, 2007: cloacal only samples.

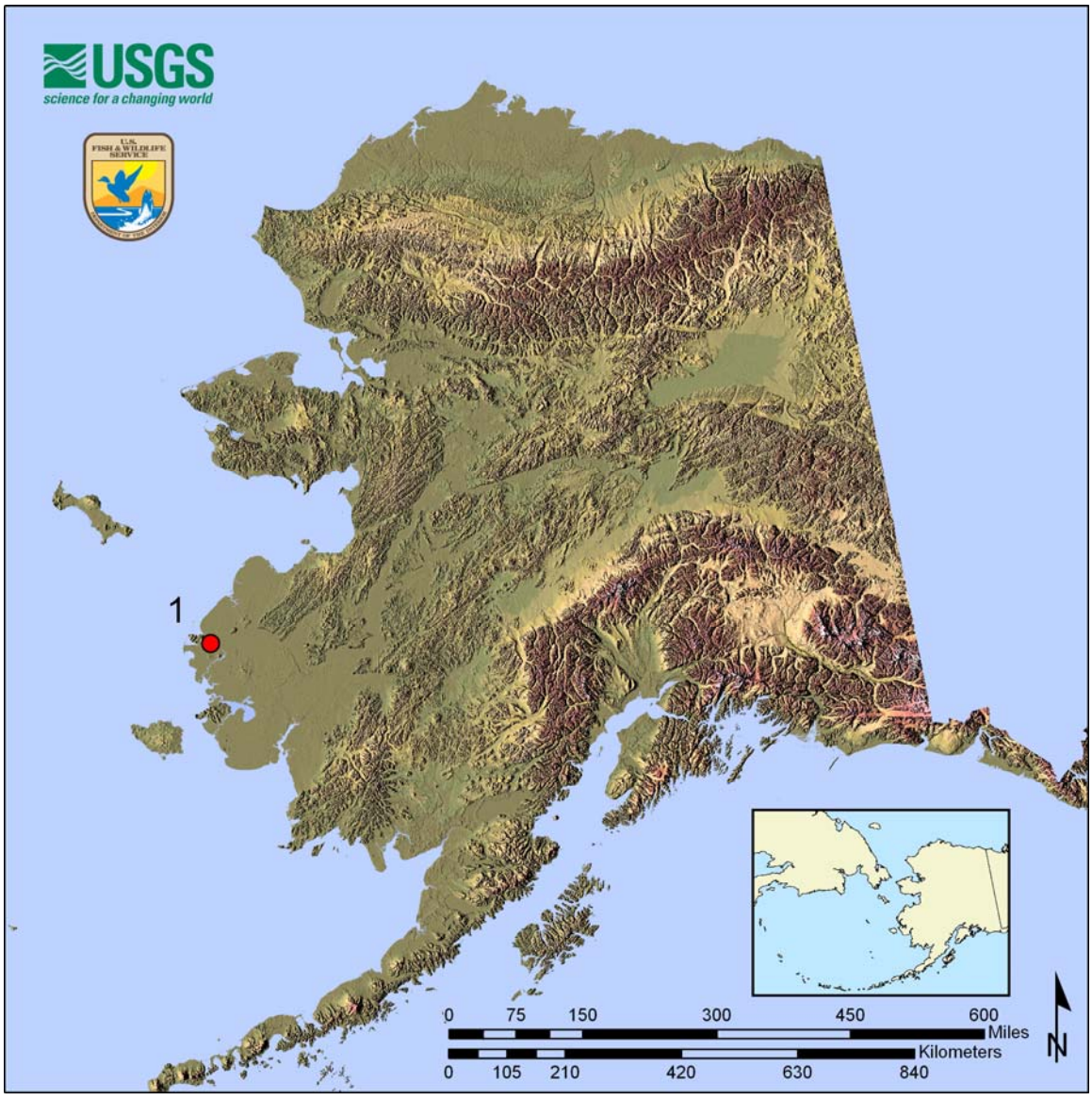
Location	Total samples	Total AI Cloacal positive	Prevalence
Kagankaguti Lake	105	0	0

Table 90. Comparative avian influenza results for Eastern Yellow Wagtails collected June, 2007: cloacal only swab results.

Clocal swab results	Totals
Negative	105

USGS

Figure 24. Live sampling locations for Eastern Yellow Wagtails in Alaska, 2007. For specific location names see key following map.



Site #	Geographic Location	Specific Location	Total samples
1	Yukon Delta NWR	Kagankaguti Lake	105

HUNTER HARVEST SAMPLING

Background: Surveillance of hunter harvested birds was one of three sampling strategies set forth in the Alaska Interagency Sampling protocol for HPAI in wild birds. In 2007, we employed a strategy similar to 2006 and included spring subsistence harvested birds and fall hunter harvested birds. The significant annual harvest of migratory birds in Alaska presents an important opportunity to conduct surveillance sampling for AI from spring through early winter. Alaska subsistence hunters take over 350,000 migratory birds annually, mostly in rural western and northern Alaska (Paige and Wolfe 1998). The overall proportion of subsistence bird harvest taken from spring to midsummer is about 55%, and as high as 76% in major bird harvest regions (Wolfe et al. 1990). This harvest includes birds arriving from wintering areas in Asia to breed in Alaska. The species composition of spring harvested birds is very diverse and includes shorebirds, seabirds, and waterfowl; the composition and timing of harvests are highly variable among regions. Subsistence hunting also occurs from late summer into winter; most significantly in regions south of Bristol Bay, representing birds returning from breeding and molting areas in Asia, as well as birds migrating to wintering areas in southern Alaska and the Pacific Coast.

The primary value of sampling birds harvested in fall is detection of AI in birds migrating south from Alaska through Canada, all four North American flyways, and Mexico. In addition, some species of sea ducks return from Asia to winter in Alaska. The species composition and timing of fall harvest over the season are affected by the phenology of migration which is influenced by weather (e.g., winds and temperature patterns), local habitat conditions, and hunter activity. Seasonal variation in harvest (and access to AI samples) can be significant, especially with species such as pintail that have differential migrations by age and sex classes (i.e., adult males begin migration in August, females and young follow).

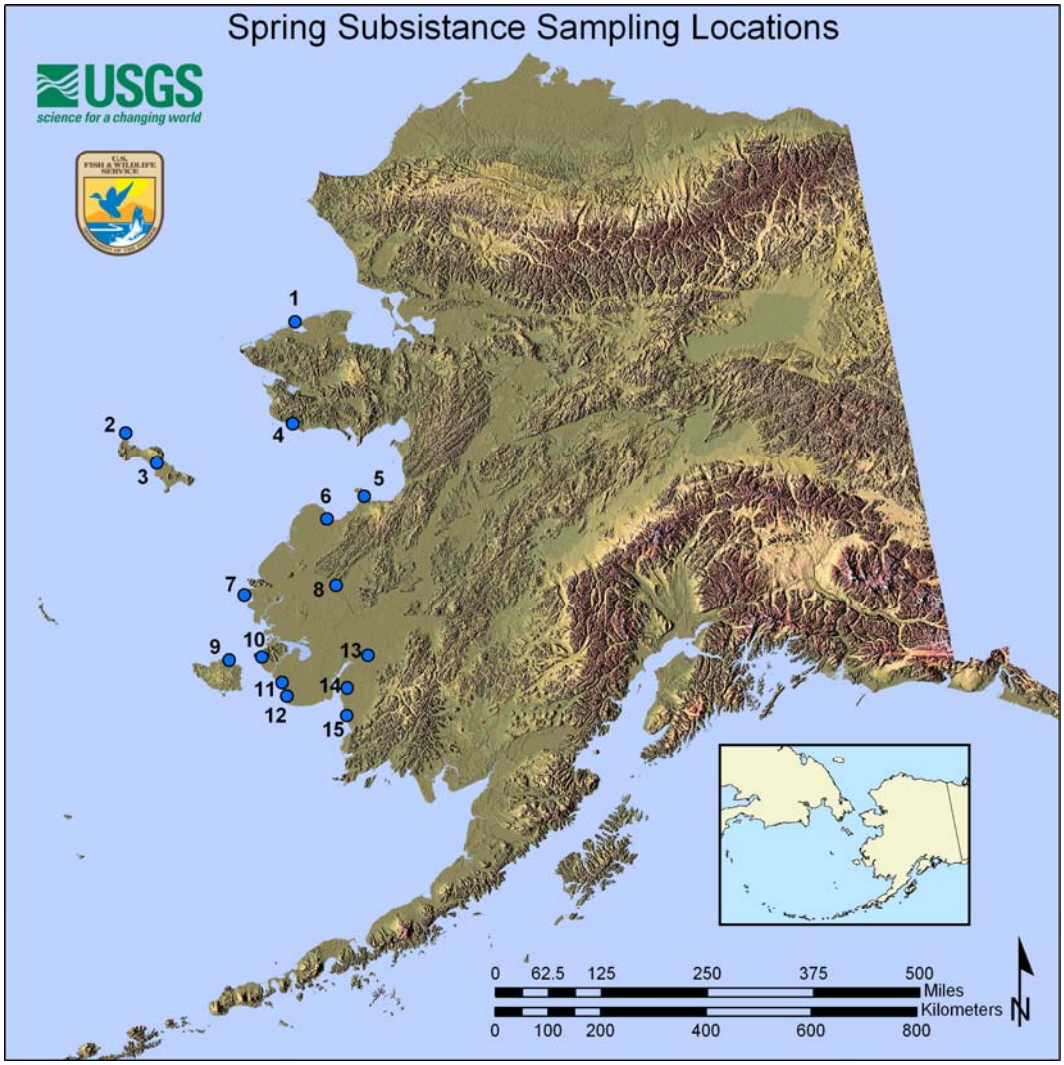
Spring Subsistence Sampling

Methods:

Spring Subsistence Sampling—Sampling locations (Fig. 25) for the spring subsistence harvest were chosen based on migratory routes and timing of priority species, past subsistence harvest information, and the ability to obtain samples from Native subsistence users. The YKD was the primary focus for obtaining samples from subsistence harvested birds because of the species composition and volume of the harvest. The Yukon Kuskokwim Health Corporation (YKHC) coordinated the sampling effort at ten villages (Chefornak, Eek, Hooper Bay, Kipnuk, Kotlik, Kwethluk, Mekoryuk, Pilot Station, Toksook Bay, Quinhagak), with each village contributing up to 300 samples of harvested birds. The USFWS contracted with Kawerak, Inc. to collect samples in three locations on the Seward Peninsula (Nome, Stebbins, and Shishmaref) and two locations on St. Lawrence Island (Gambell and Savoonga), with each location providing up to 150 spring harvested birds. In all locations, subsistence users were

encouraged, through various outreach methods, to provide harvested birds to sample coordinators.

Figure 25. Spring subsistence sampling locations for H5N1 Avian Influenza in Alaska, 2007. For specific locations see key following map.



Site #	Village	Site #	Village
1	Shishmaref	9	Mekoryuk
2	Gambell	10	Toksook Bay
3	Savoonga	11	Chefornak
4	Nome	12	Kipnuk
5	Stebbins	13	Kwethluk
6	Kotlik	14	Eek
7	Hooper Bay	15	Quinhagak
8	Pilot Station		

Species, age and sex were provided in most cases, as well as an estimate of how long the bird had been dead. Samples were stored in nitrogen vapor shippers and air freighted to Anchorage on a regular basis. The majority of target species sampled during spring subsistence harvest were from Lesser Snow Geese, Black Brant, and Emperor Geese. However, samples from numerous other species were also collected.

Results

Yukon-Kuskokwim Delta: A total of 2,121 samples was collected and analyzed from 40 different species, 14 of which were priority species. Six of the YKD samples tested positive for avian influenza (Table 91), but none were H5 or N1 positive.

Craig Ely, USGS ASC

Table 91. Avian influenza results for cloacal and oral-pharyngeal swabs obtained from spring subsistence harvested birds on the Yukon Delta National Wildlife Refuge, Alaska 2007. Priority species are bolded.

Species	Samples Taken	AI Positive		Prevalence	
		Pooled	CL Only		
ACGO: Cackling Goose (Aleutian)	36	0	0	0.0	0.0
AGWT: American Green-winged Teal	3	0	0	0.0	0.0
AMWI: American Wigeon	8	0	0	0.0	0.0
ARTE: Arctic Tern	1	0	0	0.0	0.0
BARG: Bar-tailed Godwit	3	0	0	0.0	0.0
BLBR: Black Brant	252	0	0	0.0	0.0
BLSC: Black Scoter	20	0	0	0.0	0.0
CACG: Cackling Goose	192	0	0	0.0	0.0
CAGO: Canada Goose	216	0	0	0.0	0.0
CANV: Canvasback	5	0	0	0.0	0.0
COEI: Common Eider	8	0	0	0.0	0.0
COGO: Common Goldeneye	2	0	0	0.0	0.0
COLO: Common Loon	9	0	0	0.0	0.0
COME: Common Merganser	3	0	0	0.0	0.0
COMU: Common Murre	4	0	0	0.0	0.0
DUNL: Dunlin	2	0	0	0.0	0.0
EMGO: Emperor Goose	128	**4**	**4**	0.03	0.03
GLGU: Glaucous Gull	4	0	0	0.0	0.0
GRSC: Greater Scaup	52	0	0	0.0	0.0
GWFG: Greater White-fronted Goose	601	0	0	0.0	0.0
HADU: Harlequin Duck	2	0	0	0.0	0.0
KIEI: King Eider	102	0	0	0.0	0.0
LALO: Lapland Longspur	5	0	0	0.0	0.0
LBDO: Long-billed Dowitcher	2	0	0	0.0	0.0
LSGO: Lesser Snow Goose	225	**1**	**1**	.004	.004
LTDU: Long-tailed Duck	12	0	0	0.0	0.0
MALL: Mallard	12	**1**	**1**	0.08	0.08
MEGU: Mew Gull	13	0	0	0.0	0.0
NOPI: Northern Pintail	15	0	0	0.0	0.0
NSHO: Northern Shoveler	5	0	0	0.0	0.0
PAJA: Parasitic Jaeger	1	0	0	0.0	0.0
PALO: Pacific Loon	2	0	0	0.0	0.0
PESA: Pectoral Sandpiper	29	0	0	0.0	0.0
REKN: Red Knot	1	0	0	0.0	0.0
SACR: Lesser Sandhill Crane	46	0	0	0.0	0.0
SAGU: Sabines Gull	1	0	0	0.0	0.0
SUSC: Surf Scoter	28	0	0	0.0	0.0
TUSW: Tundra Swan	52	0	0	0.0	0.0
UNGP: Unidentified Golden Plover	1	0	0	0.0	0.0
WWSC: White-winged Scoter	18	0	0	0.0	0.0
Total	**2121**	**6**	**6**		

Seward Peninsula: A total of 221 samples was collected and analyzed from 14 different species, 6 of which were priority species. None of the samples tested positive for avian influenza virus (Table 92).

Table 92. Avian influenza results for cloacal and oral-pharyngeal swabs obtained from spring subsistence harvested birds on the Seward Peninsula, Alaska 2007. Priority species are bolded.

Species	Samples Taken	AI Positive		Prevalence	
		Pooled	CL only	Pooled	CL only
AGWT: American Green-winged Teal	3	0	0	0.0	0.0
BLBR: Black Brant	132	0	0	0.0	0.0
CAGO: Canada Goose	10	0	0	0.0	0.0
EMGO: Emperor Goose	8	0	0	0.0	0.0
GWFG: Greater White-fronted Goose	35	0	0	0.0	0.0
MALL: Mallard	2	0	0	0.0	0.0
NOPI: Northern Pintail	13	0	0	0.0	0.0
NSHO: Northern Shoveler	1	0	0	0.0	0.0
RBME: Red-breasted Merganser	1	0	0	0.0	0.0
SACR: Sandhill Crane	8	0	0	0.0	0.0
SNGO: Snow Goose	3	0	0	0.0	0.0
SPEI: Spectacled Eider	2	0	0	0.0	0.0
UNGU: Unidentified Gull	2	0	0	0.0	0.0
UNLO: Unidentified Loon	1	0	0	0.0	0.0
Grand Total	**221**	**0**	**0**		

St. Lawrence Island: A total of 174 samples was collected and analyzed from 17 different species; 4 of which were priority species. One of the pooled and three of the clocal samples were positive for avian influenza (Table 93). None of the 4 samples were H5 or N1 positive.

Table 93. Avian influenza results for cloacal and oral-pharyngeal swabs obtained from spring subsistence harvested birds on St. Lawrence Island, Alaska 2007. Priority species are bolded.

Species	Grand Total	AI Positive		Prevalence	
		Pooled	CL only	Pooled	CL only
AGWT: American Green-winged Teal	2	0	0	0.0	0.0
BLBR: Black Brant	2	0	0	0.0	0.0
BLKI: Black-legged Kittiwake	4	0	0	0.0	0.0
CAGO: Canada Goose	10	0	0	0.0	0.0
COEI: Common Eider	8	0	0	0.0	0.0
COMU: Common Murre	1	0	0	0.0	0.0
CRAU: Crested Auklet	97	0	0	0.0	0.0
HADU: Harlequin Duck	4	1	2	0.25	0.5
LEAU: Least Auklet	1	0	0	0.0	0.0
NOPI: Northern Pintail	3	0	0	0.0	0.0
PAAU: Parakeet Auklet	2	0	0	0.0	0.0
TUSW: Tundra Swan	1	0	0	0.0	0.0
UNDU: Unidentified Duck	2	0	0	0.0	0.0
UNEI: Unidentified Eider	29	0	0	0.0	0.0
UNGU: Unidentified Gull	2	0	0	0.0	0.0
UNMU: Unidentified Murre	4	0	0	0.0	0.0
WWSC: White-winged Scoter	2	0	1	0.0	0.5
Grand Total	**174**	**1**	**3**		

Fall Harvest Sampling

Fall Harvest Sampling—Sampling locations (Fig. 26) were chosen to maximize contacts with hunters for access to adequate samples of harvested birds. Thus, sampling was focused on primary access points during peak periods of hunting at Izembek NWR, Cook Inlet state game refuges, and Mendenhall State Game Refuge in Juneau. Hunters were informed about AI sampling and asked for cooperation through agency media releases, local flyers, and brochures about the surveillance program. Hunters were contacted in the field by agency personnel. Cloacal and oral-pharyngeal samples and bird data were obtained from whole carcasses or field dressed birds deemed suitable for sampling. In some cases, field technicians were not skilled in age and sex determination of birds, or encountered very busy periods when supplemental data could not be obtained. A total of 420 fall harvest samples were collected from three geographic location, Cook Inlet, Izembek National Wildlife Refuge, and Southeast Alaska.

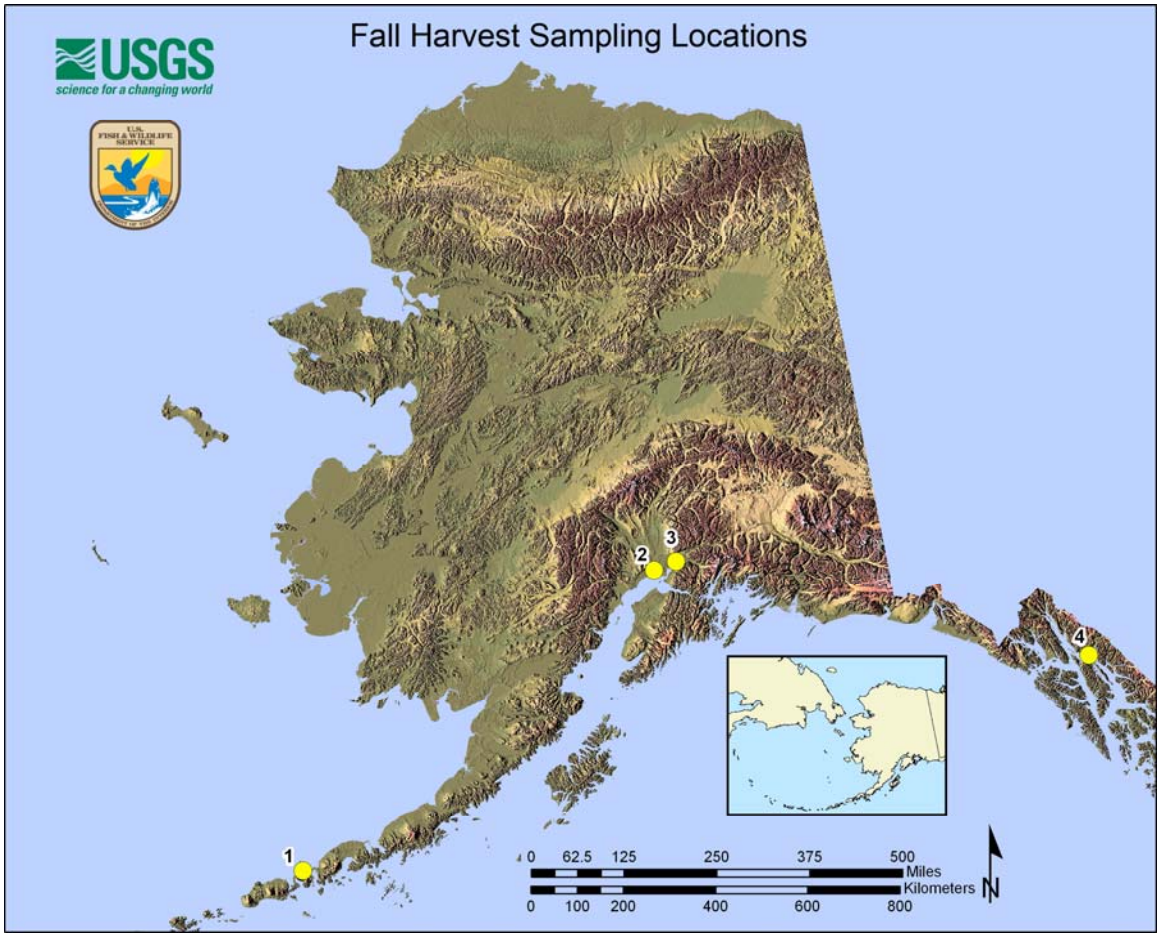
Results

Cook Inlet: At the opening of fall waterfowl season on September 1, AI sampling focused on Palmer Hay Flats and Susitna Flats state game refuges, both within 40 km of Anchorage. These areas are the most heavily hunted waterfowl areas in Alaska and hosted hundreds of hunters over a 3-day opening weekend. Historically, these two areas

annually produce about 15,000 ducks, including pintails early in the season and primarily mallards later.

Results: A total of 150 AI samples were obtained from the Cook Inlet refuges (Table 94). Ducks comprised 147 of the samples, including 59 Northern Pintails, the primary target species. The species composition of ducks in the early season is quite variable by year, and the 2007 harvest included a lower proportion of pintails than in some years. Four of the pooled samples and six of the cloacal samples tested positive for avian influenza for the Cook Inlet refuges birds. None of the samples were H5 or N1 positive.

Figure 26. Fall Harvest sampling locations in Alaska 2007. For specific location names see key following map.



Site #	Geographic Location	Specific Location
1	Alaska Peninsula	Izembek NWR
2	Cook Inlet	Palmer Hay Flats
3	Cook Inlet	Susitna Flats
4	Mendenhall Wetlands State Game Refuge	Mendenhall Wetlands

Table 94. Avian influenza results for cloacal and oral-pharyngeal swabs obtained from hunter-shot birds on Susitna Flats and Palmer Hay Flats State Game Refuges, September 2007. Priority species are bolded.

Species	Palmer Hay Flats	Susitna Flats	Grand Total	AI Positive		AI Prevalence	
				Pooled	CL only	Pooled	CL only
AGWT: American Green-winged Teal	1	7	8	0	0	0.0	0.0
AMWI: American Wigeon	1	19	20	0	0	0.0	0.0
GADW: Gadwall	2	2	4	0	0	0.0	0.0
GRSC: Greater Scaup		3	3	0	0	0.0	0.0
MALL: Mallard	27	18	45	2	3	0.04	0.06
NOPI: Northern Pintail	22	37	59	0	1	0.0	0.3
NSHO: Northern Shoveler	2	6	8	2	2	0.25	0.25
SACR: Lesser Sandhill Crane	0	3	3	0	0	0.0	0.0
Total	55	95	**150**	4	6		

Izembek NWR: A total of 128 Black Brant and 38 Northern Pintails was sampled at Cold Bay during September and October (Table 95). Of these, none of the Black Brant samples tested positive for AI. Three of the 38 Northern Pintail cloacal swabs tested positive for AI. None of the 3 samples were H5 or N1 positive. This represents a prevalence of 8% for avian influenza in the Northern Pintail samples that were analyzed from Izembek NWR fall hunter harvest samples. Of note, one of the Northern Pintails was banded in Tokyo Harbor, Japan.

Table 95. Avian influenza results for cloacal and oral-pharyngeal swabs obtained from hunter-shot birds on Izembeck National Wildlife Rrefuge, September 2007. Priority species are bolded.

Species	Samples Taken	AI Positive		AI Prevalence	
		Pooled	CL only	Pooled	CL only
BLBR: Black Brant	128	0	0	0	0
NOPI: Northern Pintail	38	0	3	0	0.08
Grand Total	**166**	0	**3**		

Mendenhall Wetlands: Mendenhall Flats, along Gastineau Channel, is one of the largest intertidal marshes in southeast Alaska and a staging area for fall migrant waterfowl. This area is mostly within Mendenhall Wetlands State Game Refuge inside the city of Juneau and is an important fall hunting area. Average annual harvest includes

about 4-5,000 ducks, some Canada Geese, and sea ducks that use the surrounding marine waters.

Results: A total of 104 samples was taken from harvested birds on the refuge (Table 96). Sampling was extended through the month of October because the migration of ducks is less concentrated compared to other areas in Alaska, and hunter activity is relatively lower and more protracted. Pintails comprised only a small proportion of the harvest, with Green-winged Teal and American Wigeon representing the primary dabbling ducks in early September.

Table 96. Avian influenza results for cloacal and oral-pharyngeal swabs collected from hunter-shot birds on Mendenhall Wetlands State Game Refuge, September and October 2007.

Species	Samples Taken	AI Positive		AI Prevalence	
		Pooled	CL only	Pooled	CL only
AGWT: American Green-winged Teal	27	1	1	0.04	0.04
AMWI: American Wigeon	43	0	1	0.0	0.23
MALL: Mallard	20	3	3	0.15	0.15
NOPI: Northern Pintail	5	0	0	0.0	0.0
NSHO: Northern Shoveler	9	0	0	0.0	0.0
Grand Total	**104**	**4**	**5**		

Craig Ely, USGS

Morbidity and Mortality

There were no morbidity or mortality events in Alaska in 2007. In total, 9 carcasses were sent to the NWHC for necropsy and HPAI testing. None of these birds were positive for avian influenza.

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Appendix A: PHOTO CREDITS

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