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

Results of 2010 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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Executive Summary

One of the primary objectives of the Department of the Interior (DOI) in the *National Strategy for Pandemic Influenza* is to conduct surveillance activities for the early detection of Highly Pathogenic Avian Influenza (HPAI) in North America by sampling and testing high priority migratory bird species. This report summarizes the 2010 HPAI surveillance 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 activities conducted in Alaska.

In 2005, a U.S. Interagency 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 birds that migrate directly between Asia and North America. One main geographic focus of this plan is Alaska as it represents a unique crossroads where migratory flyways from Asia and North America overlap. Since then, Koehler et al. (2008) reported a direct link in the genetic lineage of avian influenza viruses between Alaska and Asia. By analyzing the whole genome of low pathogenic avian influenza viruses isolated from Northern pintails in Alaska, researchers demonstrated intercontinental virus exchange in this species. Additional studies are underway to determine if other species demonstrate similar avian influenza virus patterns.

Using criteria in the U.S. Interagency Strategic Plan (for details on ranking criteria, species selection, and the final ranking scores visit [http://alaska.usgs.gov/science/biology/avian_influenza/monitoring.html]), 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. As the program has evolved and data analyzed from previous years (Ip et al. 2008; Koehler et al. 2008; Flint et al. 2009; Pearce et al. 2009; Pearce et al. 2010), a sampling strategy has been adapted to target species and geographic areas that provide the broadest, most appropriate state-wide coverage for HPAI surveillance. In 2008, six "species of concern" were added based on published reports of low pathogenic avian influenza viruses in Green-winged Teal, Greater White-fronted Goose, Mallard, Northern Shoveler, Common Murre, and Thick-billed Murre.

From 2006-2009, a total of 47,202 Alaska samples, were analyzed for HPAI: the results of these previous efforts can be found at http://alaska.usgs.gov/science/biology/avian_influenza/monitoring.html. In 2010, 9,725 samples were collected from 74 species of wild birds (Table iia): this total comprised 4,454 samples from hunter harvested birds, and 5,271 live bird samples. In some cases only cloacal (CL) or oral-pharyngeal (OP) samples were obtained from birds sampled (Table iib). Alaska did not have any large mortality events.

In 2010, a new method of preserving paired samples was implemented. Oral-pharyngeal and cloacal swabs were collected from each bird and preserved together in the field (field-pooled) in a single sample vial. In contrast, in previous sampling years the OP and CL swabs were preserved separately (individual sample vials) in the field and then combined in the lab once they reached the NWHC for testing. This process allowed for the CL swab to be analyzed

independently and provided results for both the lab-pooled samples and CL-only samples. This method allowed for CL only samples to be compared among all years. However, in 2010 analytical results represent field-pooled samples; no CL only results are available for 2010. Therefore, comparable results for CL only swabs are available for four of the five sampling seasons. In all years, collected samples were stored in liquid nitrogen vapor shippers or in -80 freezers until shipped to the NWHC for testing. Field-pooled samples were screened via RT-PCR for the presence of avian influenza viruses.

An additional change in methods for 2010 involved the number of samples tested via virus isolation (VI). In 2006, all samples that were submitted to NWHC were analyzed using VI techniques. From 2007- 2009, all the RT-PCR positive samples were further analyzed via VI and 30% of all the RT-PCR negative samples were also analyzed. In 2010, only the positive samples from the screening test were further tested using VI: All VI results are available through the NWHC and not presented in this report.

In 2010, avian influenza viruses were detected in 19 of the species collected, although none of the samples were positive for HPAI. Analytic results show 0.018% and 0.042% of the field-pooled (target and species of interest) samples tested positive for avian influenza virus, respectively.

Table iia: Summary of 2010 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: field pooled results represented analysis of a field combined oral-pharyngeal swab and a cloacal swab sample.

Species	**Samples Collected**			**AI Positive**	**Total Prevalence**
Target Species	Live	Harvest	Total	Field Pooled	Field Pooled
Steller's Eider	342	12	354	13	0.037
Northern Pintail	768	246	1,014	50	0.049
Lesser Snow Goose	186	519	705	24	0.034
Emperor Goose	163	50	213	2	0.009
Spectacled Eider	49	0	49	0	0
Black Brant	179	410	589	0	0
Lesser Sandhill Crane	0	99	99	0	0
Tundra Swan	516	116	632	3	0.005
Long-tailed Duck	3	3	6	0	0
Pacific Common Eider	59	38	97	1	0.010
King Eider	0	278	278	1	0.003
Dunlin	426	6	432	0	0
Sharp-tailed Sandpiper	3	11	14	0	0
Bar-tailed Godwit	19	0	19	0	0
Ruddy Turnstone	73	0	73	1	0.014
Pectoral Sandpiper	210	45	255	0	0
Red Knot	0	0	0	0	0
Long-billed Dowitcher	27	3	30	0	0
Rock Sandpiper	98	3	101	0	0
Pacific Golden-Plover	23	0	23	0	0
Buff-breasted Sandpiper	5	0	5	0	0
*Glaucous Gull	164	3	167	0	0
*Glaucous-winged Gull	288	7	295	1	0.003
Sub Total Target Species	**3,601**	**1,849**	**5,450**	96	0.018
Species of Interest					
Green-winged Teal	137	45	182	22	0.121
Greater White-fronted Goose	431	1,073	1,504	50	0.033
Mallard	94	84	178	12	0.067
*Herring Gull	62	0	62	0	0
Northern Shoveler	0	36	36	2	0.055
Common Murre	0	100	100	2	0.020
Thick-billed Murre	0	15	15	0	0
Sub Total Species of Interest	**724**	**1,353**	**2,077**	88	0.042
Total Non-target species	946	1252	2,198	21	0
Mortalities			0	NA	
Total	**5,271**	**4,454**	**9,725**	205	

*Majority of live gull sampling was conducted under scientific collection permits (e.g. lethal collection using a firearm)

Table iib: Summary of 2010 cloacal only and oral-pharyngeal only swabs collected from live and hunter harvested birds in Alaska. In some cases only cloacal or oral-pharyngeal samples were obtained from birds sampled. Target species are in bold font.

Species – Live and Hunter Harvest	**Samples Collected**	
	Cloacal only swab	**Oral-pharyngeal only swab**
American Green-winged Teal	1	0
Black Brant	5	8
Cackling Goose	1	57
Canada Goose	34	0
Common Murre	1	0
Glaucous Gull	1	1
Greater Scaup	0	1
Greater White-fronted Goose	45	12
Lesser Snow Goose	12	4
Northern Pintail	3	0
Pacific Loon	0	1
Pectoral Sandpiper	0	13
Semipalmated Sandpiper	0	1
Steller's Eider	3	0
Tundra Swan	1	0
Grand Total	**107**	**98**

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 2010 interagency sampling effort of migratory birds. We appreciate the efforts of 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 would like thank Zac Najacht and Cathy Acker at the National Wildlife Health Center for their help with tracking samples and their results. We thank Beth Pattinson and Michelle St. Peters for their amazing skills with logistics and planning; John Terenzi for his help with creating the species sampling location maps, and Jennifer Wiley for her assistance in the laboratory. Finally, this year's sampling effort and completion of the report would not have been so thorough without the combined efforts of Yvette Gillies and Jennifer Wiley.

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

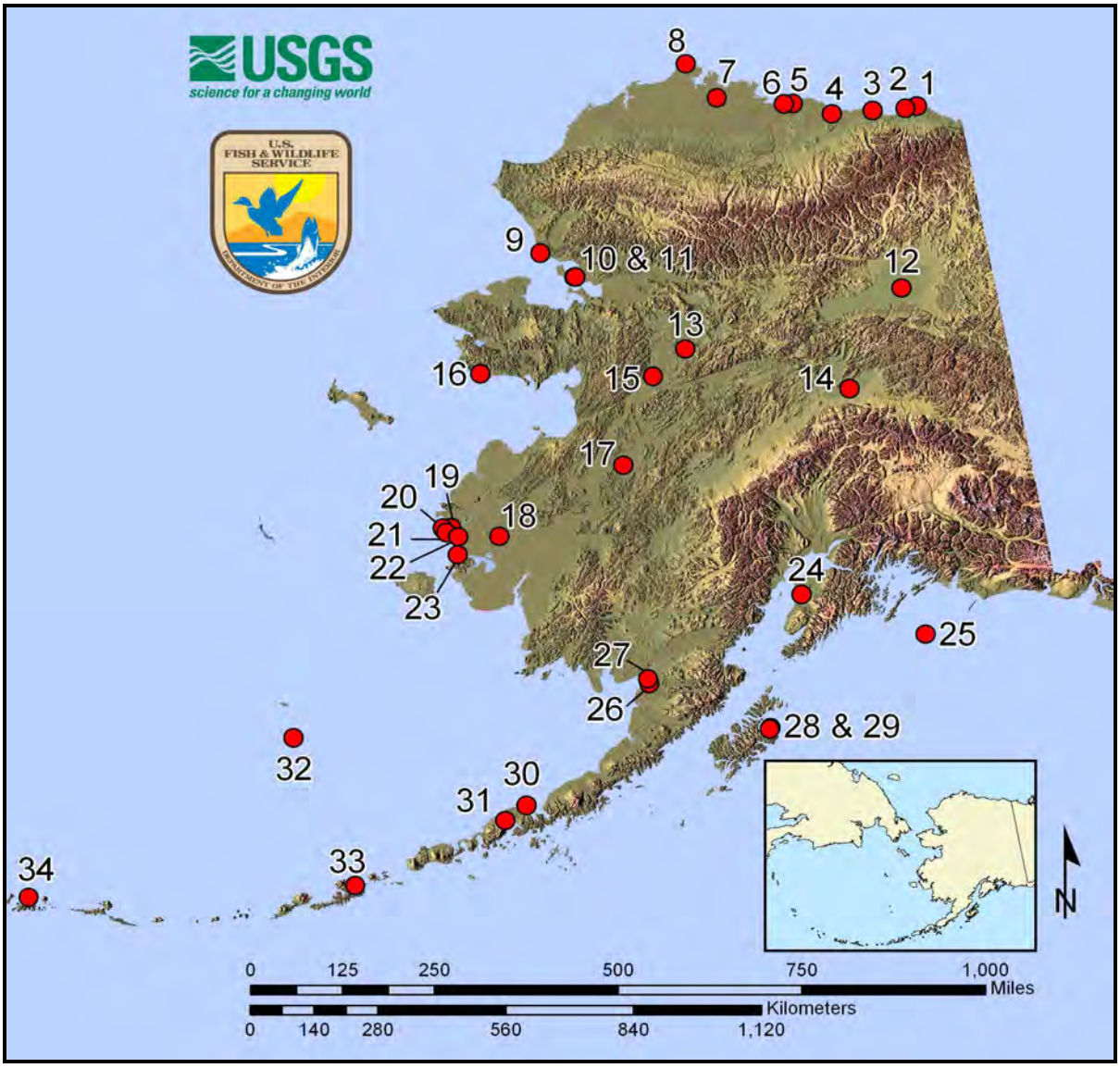
INTRODUCTION

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). Over 60 countries have experienced H5N1 outbreaks, and the virus is now endemic in several Asian countries (http://www.who.int/csr/disease/avian_influenza/en/). 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 Strait 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). Since then, Koehler et al. (2008) have reported a direct link in the genetic lineage of avian influenza viruses between Alaska and Asia. By analyzing the whole genome of low pathogenic avian influenza viruses isolated from Northern pintails in Alaska, these researchers demonstrated inter-continental virus exchange in this species. From 38 isolates, they reported that 44% had at least one gene segment that was more closely related to Asian than North American strains of low pathogenic avian influenza. Conversely, several Asian isolates more closely resembled North American pintail isolates than other Asian viruses. This study and more recent genetic research focused on pintails and shorebirds (Pearce et al. 2009; Flint et al. 2009; Pearce et al. 2010), provides evidence that intercontinental transfer of influenza viruses occur and that Alaska is a plausible route of H5N1 introduction into North America, should the virus arrive via migratory birds.

Here, we report the 2010 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, pg. 2) and hunter harvest samples were collected in regions that traditionally participate in spring subsistence (Fig. 23, pg. 91) and fall harvest (Fig. 24, pg. 97). 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.

Figure 1. Live bird sampling locations for H5N1 Avian Influenza in Alaska, 2010. For information on species samples and specific locations see key following map.



Site #	Species	General location	Specific location
1	Long-billed Dowitcher	Arctic NWR	Jago River Delta
1	Pectoral Sandpiper	Arctic NWR	Jago River Delta
2	Pectoral Sandpiper	Arctic NWR	Okpilak River Delta
3	Dunlin	Arctic NWR	Canning River Delta
3	Long-billed Dowitcher	Arctic NWR	Canning River Delta
3	Pectoral Sandpiper	Arctic NWR	Canning River Delta
3	Ruddy Turnstone	Arctic NWR	Canning River Delta
4	Buff-breasted Sandpiper	North Slope	Prudhoe Bay
4	Dunlin	North Slope	Prudhoe Bay
4	Long-billed Dowitcher	North Slope	Prudhoe Bay

Site #	Species	General location	Specific location
4	Pectoral Sandpiper	North Slope	Prudhoe Bay
4	Ruddy Turnstone	North Slope	Prudhoe Bay
4	Glaucous Gull	North Slope	Prudhoe Bay Landfill
5	Lesser Snow Goose	North Slope	Kalubik Creek
6	Bar-tailed Godwit	Northslope	Colville River
6	Tundra Swan	North Slope	Colville River Delta, Miluveach River, Kalubik Creek, Kachemach River, Oliktok Point
7	Dunlin	Arctic NWR	Ikpikpuk
7	Long-billed Dowitcher	North Slope	Ikpikpuk
7	Pectoral Sandpiper	North Slope	Ikpikpuk
7	Bar-tailed Godwit	Northslope	Ikpikpuk
8	Dunlin	North Slope	Barrow
8	Glaucous Gull	North Slope	Barrow
8	Long-billed Dowitcher	North Slope	Barrow
8	Pectoral Sandpiper	North Slope	Barrow
9	Dunlin	Northwest Alaska	Cape Krusenstern
10	Glaucous Gull	Northwest Arctic	Kobuk Delta
11	Tundra Swan	Kotzebue Sound	Buckland River, Kobuk Delta, Noatak Delta
12	Northern Pintail	Interior	Twelvemile Lake
13	Northern Pintail	Koyukuk NWR	Koyukuk NWR , Willow Lake
14	Northern Pintail	Interior	Minto Flats State Game Refuge, Minto Lakes
15	Glaucous Gull	Yukon-Koyukuk	Galena
16	Pacific Golden-Plover	Seward Peninsula	Nome
17	Northern Pintail	Innoko NWR	Innoko NWR, Kaiyuh Flats
17	Glaucous Gull	Yukon-Koyukuk	Innoko NWR Iditarod River
18	Northern Pintail	Yukon Delta NWR	Kgun Lake
19	Emperor Goose	Yukon Delta NWR	Old Chevak
19	Tundra Swan	Yukon Delta NWR	Old Chevak
20	Black Brant	Yukon Delta NWR	Punaorat Point
20	Sharp-tailed Sandpiper	Yukon Delta NWR	Punaorat Point
20	Dunlin	Yukon Delta NWR	Punoarat Point
20	Rock Sandpiper	Yukon Delta NWR	Punoarat Point
20	Ruddy Turnstone	Yukon Delta NWR	Punoarat Point
21	Black Brant	Yukon Delta NWR	Tutakoke
22	Emperor Goose	Yukon Delta NWR	Manokinak River
23	Black Brant	Yukon Delta NWR	Kigigak Island
23	Common Eider	Yukon Delta NWR	Kigigak Island
23	Emperor Goose	Yukon Delta NWR	Kigigak Island
23	Spectacled Eider	Yukon Delta NWR	Kigigak Island
24	Glaucous Gull	Kenai Peninsula	Soldotna Landfill

Site #	Species	General location	Specific location
25	Glaucous Gull	Valdez-Cordova	Middleton Island
26	Tundra Swan	Northern Alaska Peninsula	Bristol Bay, Lakes and Peninsulas
27	Glaucous Gull	Alaska Peninsula	Naknek River and Ugashik River
28	Long-tailed Duck	Kodiak Island	Gibson Cove
28	Steller's Eider	Kodiak Island	Gibson Cove, Woman's Bay, Dry Dock
29	Glaucous Gull	Kodiak Island	Kodiak Airport
30	Steller's Eider	Alaska Peninsula	Nelson Lagoon, Walrus Island
31	Tundra Swan	Northern Alaska Peninsula	Cold Bay
32	Rock Sandpiper	Aleutians West	St. George
32	Ruddy Turnstone	Aleutians West	St. George
33	Glaucous Gull	Aleutians West	Dutch Harbor
34	Glaucous Gull	Aleutians West	Adak

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 Eiders, 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.

Aerial survey data indicate that between 4000 and 5000 Steller's Eiders winter along the east side of Kodiak Island (Larned 1995, 2001, 2002) and forage in nearshore marine habitat. Some of the highest concentrations occur in Chiniak Bay.

In 2010, a new method of preserving paired samples was implemented. Oral-pharyngeal (OP) and cloacal (CL) swabs were collected from each bird and preserved together (field-pooled) in a single sample vial. In contrast, in previous sampling years the OP and CL swabs were preserved separately (individual sample vials) in the field and then combined in the lab (lab-pooled) once they reached the NWHC for testing.

Over 370 birds were sampled from Nelson Lagoon and Kodiak Island (Fig. 2). Each location is discussed separately and a final table presents analytical results at the end of this section.

Kodiak Island

Steller's Eiders were captured and sampled at three sites on Kodiak Island; Gibson Cove, Dry Dock, and Woman's Bay. Capture goals were not successfully met. Banding was intended to begin in March but due to permitting issues did not begin until the first week of April. Birds become harder to capture at that time as migration begins and numbers decline.

Capture Methods: Steller's Eiders were captured using floating mist nets.

Results: Twenty-two Steller's Eiders were captured and banded on Kodiak Island. Field - pooled cloacal and oral-pharyngeal samples were collected from 22 Steller's Eiders (Table 1). Of those, 10 were adult females, 6 were adult males, one was a juvenile male, two were juvenile females, two were juveniles, sex undetermined and one was an adult of unknown sex.

AI Results: None of the 22 samples collected from Kodiak Island Steller's Eiders tested positive for avian influenza.

Table 1. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from Steller's Eiders at Kodiak Island, April 2010.

Location	Total birds captured	AI Samples			AI field-pooled samples	Total AI samples
		Female	Male	Unk		
Gibson Cove	9	6	3	0	9	9
Dry Dock	3	2	0	1	3	3
Woman's Bay	10	4	4	2	10	10
Total	22	12	7	3	22	22

Other Accomplishments: Biometric measurements were taken on all birds to assist in determining age, sex and physiological condition. Blood was also collected for virus, bacterial and blood borne pathogen screening.

Nelson Lagoon

Steller's Eiders were captured and sampled on Walrus Island 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 a remote campsite on Deer Island, approx. 25 km southeast of the village. Flocks of flightless Steller's Eiders were herded onto the beach at Walrus Island 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 377 molting Steller's Eiders was captured and banded on Walrus Island in Nelson Lagoon. Field-pooled cloacal and oral-pharyngeal samples were collected from 320 Steller's Eiders (Table 2). Of those, 80 were adult females, 239 were adult males, and one was a juvenile male.

AI Results: Thirteen of the 320 samples collected from Nelson Lagoon Steller's Eiders tested positive for avian influenza. None of the samples were H5 or N1 positive. The field-pooled samples represent a 4.1% prevalence of avian influenza in the Nelson Lagoon birds.

Table 2. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from molting Steller's Eiders at Nelson Lagoon, September 2010.

Location	Total birds captured	AI samples		AI field-pooled samples	Total AI samples
		Female	Male		
Walrus Island, Nelson Lagoon	377	80	240	320	320

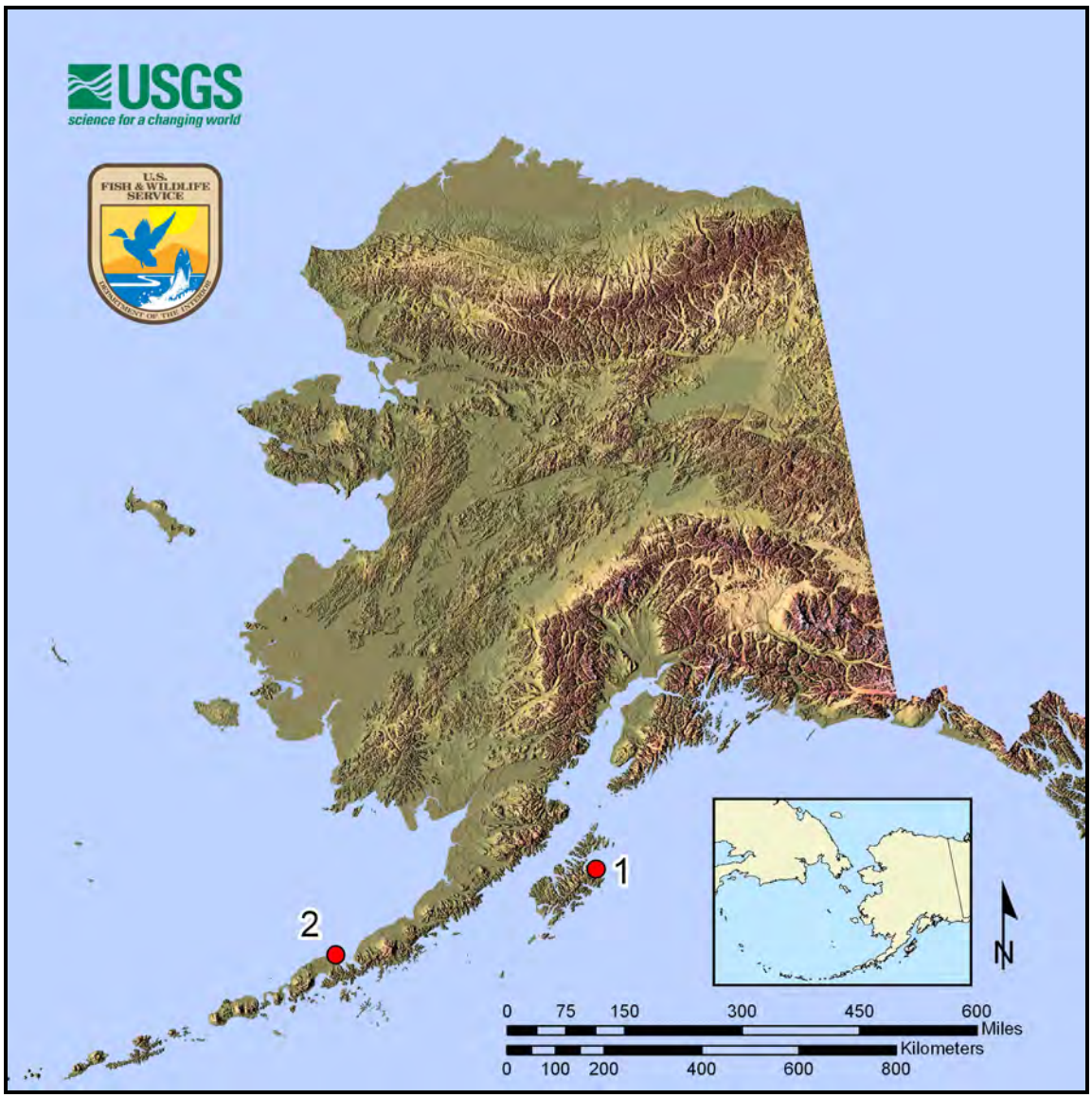
Other Accomplishments: All 2010 data on new and recaptured birds will be added to the important and growing Steller's Eider database for further analyses. Blood samples were collected from 78 Steller's Eiders for analysis to determine seroprevalence of avian influenza antibodies.

Table 3. Avian influenza analytical results for Steller's Eiders collected April and September 2010: field-pooled samples.

Location	Total samples	Total field-pooled AI positive	Prevalence
Kodiak Island	22	0	0
Walrus Island	320	13	0.041
Total	342	13	

Glen Smart, USFWS

Figure 2. Live bird sampling locations for Steller's Eiders in Alaska, 2010. For specific location names see key following map.



Site #	Geographic Location	Specific Location	Total Samples
1	Kodiak Island	Gibson Cove, Dry Dock, Woman's Bay	22
2	Alaska Peninsula	Nelson Lagoon, Walrus Island	320
	Total		**342**

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 represent 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.

In 2010, a new method of preserving paired samples was implemented. Oral-pharyngeal (OP) and cloacal (CL) swabs were collected from each bird and preserved together (field-pooled) in a single sample vial. In contrast, in previous sampling years the OP and CL swabs were preserved separately (individual sample vials) in the field and then combined in the lab (lab-pooled) once they reached the NWHC for testing.

Over 1,100 birds were sampled from four geographic locations around the state. Of those, 768 were live bird samples (Fig. 3) and 246 were hunter killed (see Spring Subsistence and Fall Harvest chapters). Each location is discussed separately and a final table presents analytical results at the end of this section.

Innoko NWR and Koyukuk NWR

Northern Pintails were captured and sampled 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 seventy Northern Pintails were captured and banded at Kaiyuh Flats and Willow Lake. Field-pooled cloacal and oral-pharyngeal samples were collected from 384 Northern Pintails (Table 4). Of those, 41 were adult females, 11 were adult males, 198 were juvenile females and 134 were juvenile males.

AI Results: Eight of the 384 field-pooled samples collected from Northern Pintails tested positive for avian influenza. These samples were not H5 or N1 positive. The field-pooled samples represent a 2.0% prevalence of avian influenza in the Kaiyuh Flats birds and 2.2% prevalence in the Willow Lake birds.

Table 4. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from Northern Pintails at Koyukuk and Innoko National Wildlife Refuge, August 2010.

Location	Total birds captured	AI samples		AI field-pooled samples	Total AI samples
		Female	Male		
Kaiyuh Flats	336	155	95	250	250
Willow Lake	134	84	50	134	134
Total	470	239	145	384	384

Other Accomplishments: Duck banding was initiated on the Koyukuk NWR at Willow Lake in 1989. This was the fourth banding project conducted on the Kaiyuh Flats.

Yukon Delta NWR

Northern Pintails were captured and sampled 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. Banding and AI sampling goals were not met as trapping was closed early due to mink predation and above average water levels.

Results: One hundred thirty-two Northern Pintails were captured and banded at Kgun Lake. Field-pooled cloacal and oral-pharyngeal samples were collected from 132 Northern Pintails (Table 5). Of those, 20 were adult females, 45 were adult males, 31 were juvenile females, and 36 were juvenile males.

AI Results: Four of the 132 Northern Pintail field-pooled samples tested positive for avian influenza. None of the samples were H5 or N1 positive. The field-pooled samples represent a 3.0 % prevalence of avian influenza in the Kgun Lake birds.

Table 5. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from Northern Pintails at Kgun Lake, August 2010.

Location	Total birds captured	AI Samples		AI field-pooled samples	Total AI samples
		Female	Male		
Kgun Lake	132	51	81	132	132

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 Lake area

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*:* In May and June, captive female ducks and decoy traps were used to capture pre-nesting waterfowl. In August, waterfowl were captured using swim-in traps made of wire mesh, baited with barley and corn and rocket netting was used at baited roost sites. All captured ducks were banded.

Results: One hundred thirty-nine birds were captured and banded at Minto Flats State Game Refuge. Field-pooled cloacal and oral-pharyngeal samples were collected (Table 6). Of those, 38 were adult females, 60 were adult males, 22 were juvenile females, and 19 were juvenile males.

AI Results: Ten of the 139 Northern Pintail field-pooled samples tested positive for avian influenza. None of the samples were H5 or N1 positive. The field-pooled samples represent a 7.2% prevalence of avian influenza in the Minto Lakes area birds.

Table 6. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from Northern Pintails at Minto Flats State Game Refuge, May through August 2010.

Location	Total birds captured	AI Samples		AI field-pooled samples	Total AI samples
		Female	Male		
Minto Lakes	139	60	79	139	139

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

Yukon Flats NWR

Northern Pintails were captured and sampled at Twelvemile Lake on the Yukon Flats NWR. Sampling goals were not met due to challenging sample location selection based on low water levels and a large wildfire. Twelvemile Lake was selected for the first time due to its ability to hold water for planes to land to establish camp. Few dabbling ducks were initially sighted, but baiting with cracked corn attracted approximately 1000 ducks at the bait site.

Capture Methods*:* Walk-in and swim-in traps were baited with cracked corn and situated on the shorelines of Twelvemile Lake. Captured birds were fitted with leg bands, sexed, and aged.

Results: One hundred fourteen Northern Pintails were captured and banded at Twelvemile Lake. Field-pooled cloacal and oral-pharyngeal samples were collected from 113 Northern Pintails (Table 7). Of those, 14 were adult females, 4 were adult males, 56 were juvenile females, and 39 juvenile males.

AI Results: Nine of the 113 Northern Pintail field-pooled samples tested positive for avian influenza. None of the samples were H5 or N1 positive. The field-pooled samples represent an 8.0 % prevalence of avian influenza in the Twelvemile Lake birds.

Table 7. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from Northern Pintails at Twelvemile Lake, July and August 2010.

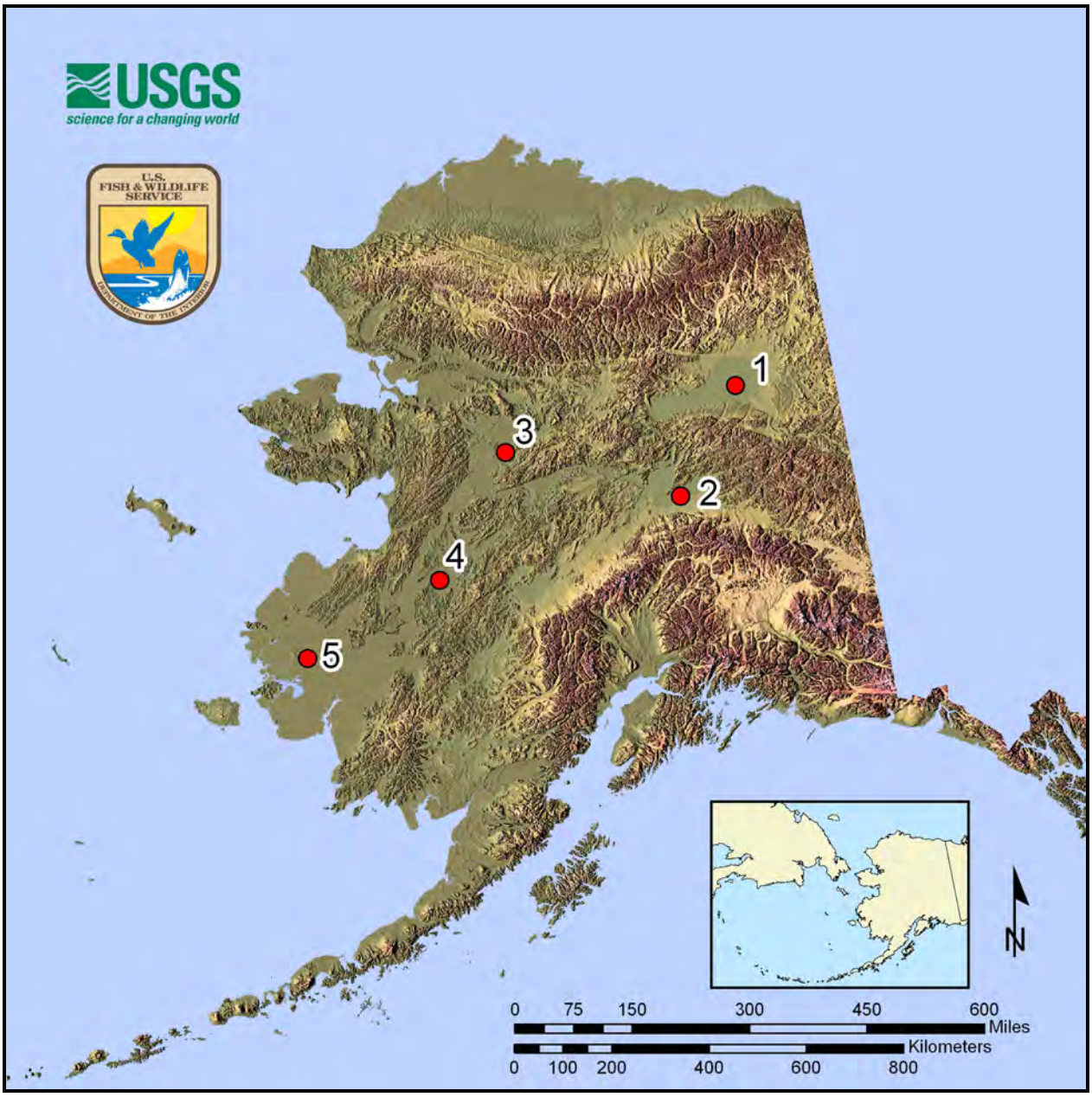
Location	Total birds captured	AI Samples		AI field-pooled samples	Total AI samples
		Female	Male		
Twelvemile Lake	114	70	43	113	113

Table 8. Avian influenza analytical results for Northern Pintails collected May, July and August 2010: field-pooled results.

Location	Total samples	Total field-pooled AI positive	Prevalence
Innoko NWR	250	5	0.020
Koyukuk NWR	134	3	0.022
Yukon Delta NWR	132	4	0.030
Minto Flats State Game Refuge	139	10	0.072
Yukon Flats NWR	113	9	0.080
Total	768	31	

Kelly Warren

Figure 3. Live bird sampling locations for Northern Pintails in Alaska, 2010. For specific location names see key following map.



Site #	Geographic Location	Specific Location	Total Samples
1	Yukon Flats NWR	Twelvemile Lake	113
2	Minto Flats State Game Refuge	Minto Lakes and Minto Flats	139
3	Koyukuk NWR	Willow Lake	134
4	Innoko NWR	Kaiyuh Flats	250
5	Yukon Delta NWR	Kgun Lake	132
	Total		**768**

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. Less than 100 birds are killed annually by sport hunters in southeast Alaska.

In 2010, a new method of preserving paired samples was implemented. Oral-pharyngeal (OP) and cloacal (CL) swabs were collected from each bird and preserved together (field-pooled) in a single sample vial. In contrast, in previous sampling years the OP and CL swabs were preserved separately (individual sample vials) in the field and then combined in the lab (lab-pooled) once they reached the NWHC for testing.

Over 700 birds were sampled from the North Slope, the Seward Peninsula, and the Yukon-Kuskokwim Delta. Of those, 186 were live bird samples (Fig. 4) and 519 were hunter killed (see Spring Subsistence chapter). A final table with analytical results is presented at the end of this section. See discussion below.

North Slope

Lesser Snow Geese were sampled at Kalubik Creek located on the North Slope.

Capture Methods: A six person crew captured, sampled and released birds over a two day period. A helicopter was used to drive geese into circular enclosures for sampling. All birds were banded with metal leg bands.

Results: A total of 1,084 geese were captured and banded. Field-pooled cloacal and oral-pharyngeal samples were collected from 186 Lesser Snow Geese (Table # 9). Of those, 56 were adult females, 54 were adult males, 46 were juvenile females and 30 were juvenile males.

AI Results: None of the 186 field-pooled samples collected from live Lesser Snow Geese tested positive for avian influenza.

Table 9. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from Lesser Snow Geese on the North Slope, July 2010.

Location	Total birds captured	AI Samples Female	Male	AI field-pooled samples	Total AI samples
Kalubik Creek	186	102	84	186	186

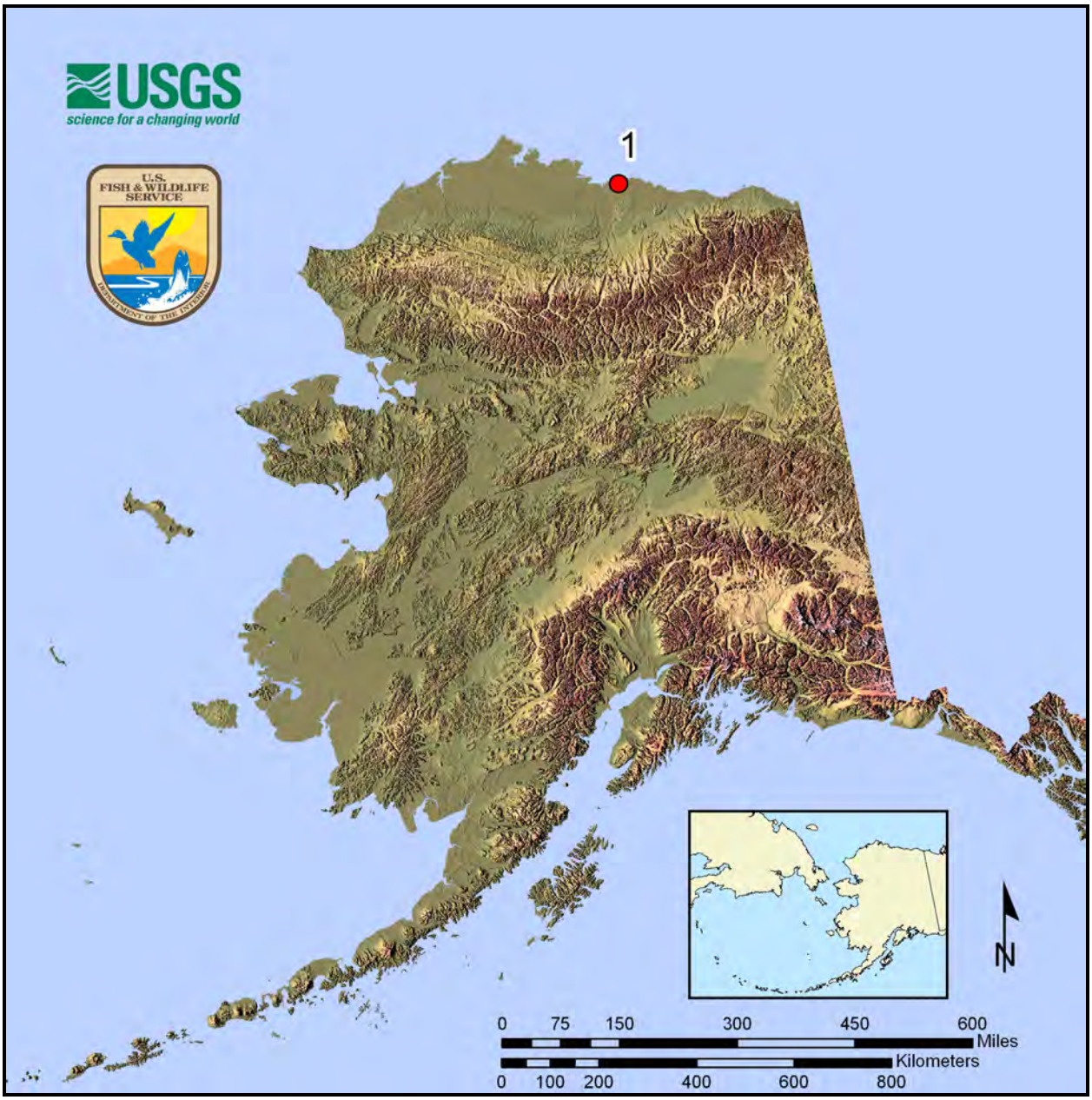
Other Accomplishments: The North Slope Borough has supported monitoring snow geese in the central North Slope since 1995 with annual banding efforts since 2000. The primary monitoring location has been in the Ikpikpuk River Delta. In 2010, production of goslings at that colony was near zero because of predation by brown bears, foxes and avian predators. Snow geese nesting near the Colville Delta were successful, thus banding and sampling of geese occurred there in 2010. Banding returns continue to be recorded, revealing that North Slope Lesser Snow Geese overwinter in the Pacific, Central and Mississippi flyways. Notably, several birds that were banded on the Ikpikpuk River Delta were recaptured at the Wrangel Island colony in Russia. Birds banded at other locations including, northern Canada, Howe Island, and Russia have also been recaptured at the Ikpikpuk. These band returns demonstrate the regular movements among snow goose colonies in North America and Russia.

Table 10. Avian influenza analytical results for Lesser Snow Geese collected July 2010: field-pooled samples.

Location	Total samples	Total field-pooled AI positive	Prevalence
Kalubik Creek	186	0	0

Donna Dewhurst, USFWS

Figure 4. Live sampling location for Lesser Snow Geese in Alaska, 2010. For specific location name see key following map.



Site #	Geographic Location	Specific Location	Total Samples
1	North Slope	Kalubik Creek	186

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).

In 2010, a new method of preserving paired samples was implemented. Oral-pharyngeal (OP) and cloacal (CL) swabs were collected from each bird and preserved together (field-pooled) in a single sample vial. In contrast, in previous sampling years the OP and CL swabs were preserved separately (individual sample vials) in the field and then combined in the lab (lab-pooled) once they reached the NWHC for testing.

More than 200 birds were sampled from eight locations around the state. Of these, 163 were live bird samples (Fig. 5) and 50 were hunter-killed samples (see Spring Subsistence and Fall Harvest chapters). Each location is discussed separately and a final table presents 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 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 nesting females were 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. Boats were used to keep birds from re-entering the river.

Results: A total of 107 Emperor Geese was captured and banded at Manokinak River. Field-pooled cloacal and oral-pharyngeal samples were collected from 107 Emperor Geese (Table 11). Of those, 68 were adult females, 12 were adult males, 11 were juvenile females, and 16 were juvenile males.

AI Results: None of the 107 field-pooled samples collected from Manokinak River Emperor Geese tested positive for avian influenza.

Table 11. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from nesting and molting Emperor Geese at Yukon Delta National Wildlife Refuge, June and August 2010.

Location	Total birds captured	AI Samples		AI field-pooled samples	Total AI samples
		Female	Male		
Manokinak	107	79	28	107	107

Other Accomplishments: Studies of Emperor Geese nesting and brood rearing ecology have been conducted on the lower Manokinak River for more than a decade. A total of 234 adult female Emperor Geese was found incubating nests and 51 were captured and sampled for AI. Of those, 4 were recaptures and 47 were uniquely 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 and added to the population of marked birds. All nests were revisited at hatch to mark goslings with web tags. In August, 56 were captured and sampled for AI. Of those, 4 of the molting birds were recaptured individuals. Twenty-five adult and juvenile females were uniquely banded with metal and plastic leg bands. Additionally, morphological measurements were recorded, feathers were collected for stable isotope analysis, eggshell membranes were gathered for determination of genetic relationship, and blood was collected for seroprevalence.

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 6 Emperor Geese was captured and banded at Old Chevak. Field-pooled cloacal and oral-pharyngeal samples were collected from 6 Emperor Geese (Table 12). Of those, 1 was an adult female, 1 was a female gosling and 4 were male goslings.

AI Results: None of the 6 field-pooled samples collected from Old Chevak Emperor Geese tested positive for avian influenza.

Table 12. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from molting Emperor Geese at Yukon Delta National Wildlife Refuge, July 2010.

Location	Total birds captured	AI Samples		AI field-pooled samples	Total AI samples
		Female	Male		
Old Chevak	6	2	4	6	6

Other Accomplishments: Feathers were collected for stable isotope analysis and blood was collected for seroprevalence.

Kigigak Island

Emperor Geese were sampled on Kigigak Island, a high-density nesting location on Yukon Delta NWR.

Capture Methods: Adult female Emperor Geese were captured using a bow net trap and mist nets.

Results: A total of 50 Emperor Geese was captured, sampled, and banded at Kigigak Island on the YDNWR. Field-pooled cloacal and oral-pharyngeal samples were collected from 50 Emperor Geese (Table 13). All were adult females.

AI Results: None of the 50 field-pooled samples tested positive for avian influenza.

Table 13. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from nesting Emperor Geese at Yukon Delta National Wildlife Refuge, June 2010.

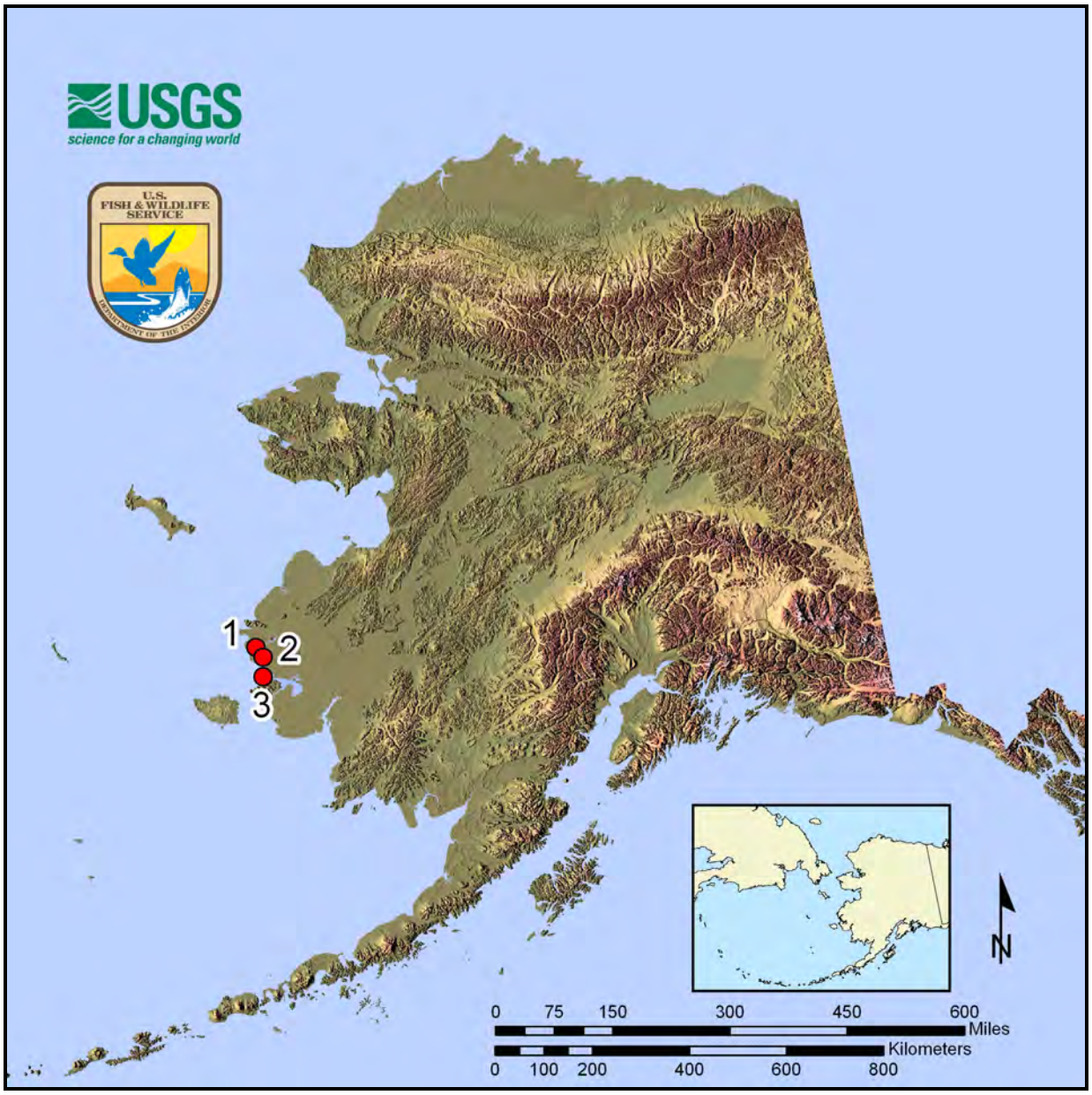
Location	Total birds captured	AI samples		AI field-pooled samples	Total AI samples
		Female	Male		
Kigigak Island	50	50	0	50	50

Table 14. Avian influenza analytical results for Emperor Geese collected June through August 2010: field-pooled samples.

Location	Total samples	Total field-pooled AI positive	Prevalence
Manokinak River	107	0	0
Old Chevak	6	0	0
Kigigak Island	50	0	0
Total	163	0	0

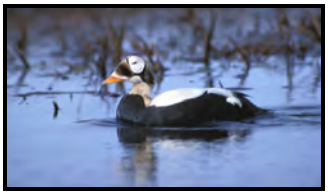
Andy Reeves, USGS ASC

Figure 5. Live bird sampling locations for Emperor Geese in Alaska, 2010. For specific location names see key following map.



Site #	Geographic Location	Specific Location	Total Samples
1	Yukon Delta NWR	Old Chevak	6
2	Yukon Delta NWR	Manokinak River	107
3	Yukon Delta NWR	Kigigak Island	50
	Total		**163**

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).

In 2010, a new method of preserving paired samples was implemented. Oral-pharyngeal (OP) and cloacal (CL) swabs were collected from each bird and preserved together (field-pooled) in a single sample vial. In contrast, in previous sampling years the OP and CL swabs were preserved separately (individual sample vials) in the field and then combined in the lab (lab-pooled) once they reached the NWHC for testing.

Forty-nine birds were sampled on the Yukon Delta NWR. A final table with analytical results is presented at the end of this section. See discussion below.

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.

Capture Methods: Incubating female Spectacled Eiders were captured using bow net traps and mist nets.

Results: Sixty-nine Spectacled Eiders were captured at Kigigak Island. A total of 49 field-pooled cloacal and oral-pharyngeal samples were collected (Table 15). Of those, all were adult females.

AI Results: None of the 49 field-pooled samples tested positive for avian influenza.

Table 15. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from Spectacled Eiders at Yukon Delta National Wildlife Refuge, June 2010.

Location	Total birds captured	AI samples		AI field-pooled samples	Total AI samples
		Female	Male		
Kigigak Island	69	49	0	49	49

Other Accomplishments: For 19 consecutive years, Spectacled Eider females have been monitored for nesting productivity, annual survival, age-specific demographics and recruitment estimates on Kigigak Island. A total of 119 nests were located, 69 females nest trapped and six additional females were visually identified by nasal disk. Twenty-five of the females were new captures and were marked with a metal leg band and a yellow plastic alphanumeric leg band and nasal disk. Feathers samples were also collected from nest bowls for future DNA and stable isotope analyses.

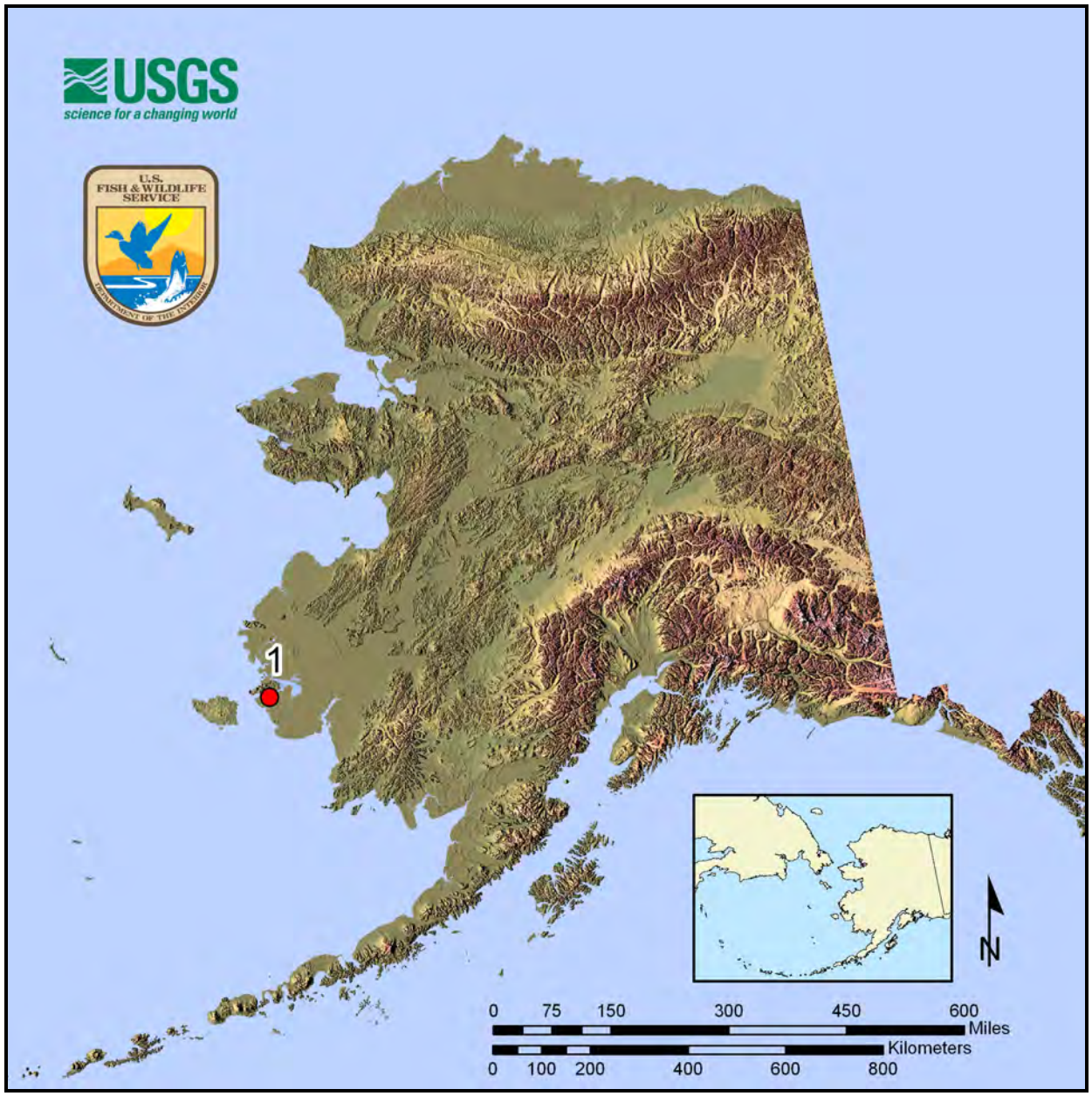
Table 16. Avian influenza analytical results for Spectacled Eiders collected June 2010: field-pooled samples.

Location	Total samples	Total field-pooled AI positive	Prevalence
Yukon Delta NWR	49	0	0

Kelly Warren

Kelly Warren

Figure 6. Live bird sampling location for Spectacled Eiders in Alaska, 2010. For specific location name see key following map.



Site #	Geographic Location	Specific Location	Total Samples
1	Yukon Delta NWR	Kigigak Island	49

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

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.

In 2010, a new method of preserving paired samples was implemented. Oral-pharyngeal (OP) and cloacal (CL) swabs were collected from each bird and preserved together (field-pooled) in a single sample vial. In contrast, in previous sampling years the OP and CL swabs were preserved separately (individual sample vials) in the field and then combined in the lab (lab-pooled) once they reached the NWHC for testing.

Over 550 birds were sampled from the Yukon Delta, Seward Peninsula, St. Lawrence Island and Izembek Lagoon using a 3-stage sampling design: arrival/early nesting, brood rearing, and fall staging. Of those, 179 were live bird samples (Fig. 7) and 410 were hunter killed (see Spring Subsistence and Fall Harvest chapters). Each sampling stage and its location will be discussed separately and a final table presents the analytical results at the end of this section.

Early Nesting
Sampling of early nesting was conducted in one area of the YKD in June 2010.

Yukon Delta NWR

Black Brant were captured, banded, and released from Kigigak Island, located along the outer fringe of Yukon-Kuskokwim Delta, near the mouth of Baird Inlet. Habitat consists of low coastal tundra, sedges, and grasses.

Capture Methods: Females were captured on nests late in incubation using bow net traps and mist nets. All birds received a metal band and an alphanumerically coded, yellow, plastic tarsal band and nasal disk.

Results: Sixty-six Black Brant was captured and sampled at Kigigak Island. Field-pooled cloacal and oral-pharyngeal samples were collected from 66 Black Brant (Table 17). All were adult females.

AI results: None of the 66 field-pooled samples collected from Yukon Delta nesting Black Brant tested positive for avian influenza.

Table 17. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from nesting Black Brant at Yukon Delta National Wildlife Refuge, June 2010.

Location	Total birds captured	AI samples		AI field-pooled samples	Total AI samples
		Female	Male		
Kigigak Island	66	66	0	66	66

Other Accomplishments: A total of 198 Black Brant nest were located in three nesting concentrations. Nest data including initiation dates and clutch sizes were collected and nests were monitored to estimate survival.

Brood-Rearing
Adults and goslings were sampled from the major brood-rearing colonies on the Yukon Delta NWR.

Yukon Delta NWR

Flightless geese were captured during brood drives conducted on the YK Delta's outer coast around Punaorat Point and Tutakoke River, about 8 km SSE of Chevak, AK.

Capture Methods: Brood drives were conducted by herding flocks of flightless geese into holding pens by banding crews walking across the tundra in a coordinated effort. All captured birds were banded with an aluminum leg band. Seven successful drives were conducted at Tutakoke.

Results: A total of 113 Black Brant was captured and banded at Punaorat Point and Tutakoke. Field-pooled cloacal and oral-pharyngeal samples were collected from 113 Black Brant (Table 18). Of those, 52 were adult females, 36 were adult males, 21 were juvenile females and 4 were juvenile males.

AI results: None of the 113 field-pooled samples collected from Yukon Delta Black Brant tested positive for avian influenza.

Table 18. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from brood-rearing Black Brant at Yukon Delta National Wildlife Refuge, July 2010.

Location	Total birds captured	AI Samples		AI field pooled samples	Total AI samples
		Female	Male		
Punaorat Point	13	9	4	13	13
Tutakoke	100	64	36	100	100
Total	113	73	40	113	113

Other Accomplishments: Feathers were collected from a subset of captured birds for stable isotope analysis to assist in determination of the birds wintering locations. Additionally, blood samples were collected from all birds to investigate sera prevalence of the H5N1 AI virus.

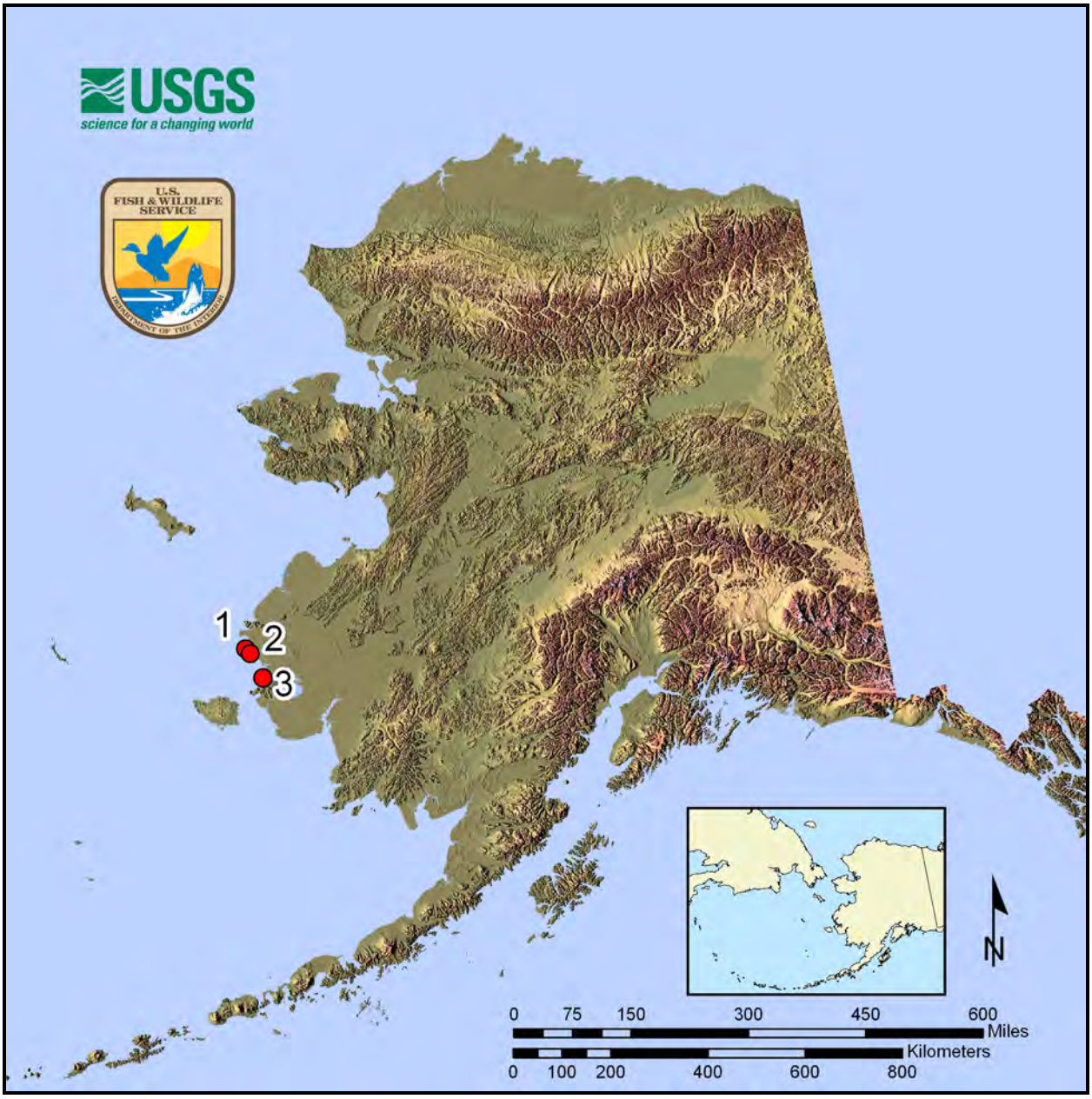
Fall Staging

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

Table 19. Avian influenza analytical results for Black Brant collected June through July 2010: field-pooled samples.

Location	Sampling stages	Total samples	Total field-pooled AI positive	Prevalence
Yukon Delta NWR	Nesting	66	0	0
Yukon Delta NWR	Brood-rearing	113	0	0
Total		179	0	0

Figure 7. Live bird sampling locations for Black Brant in Alaska, 2010. For specific location names see key following map.



Site #	Geographic Location	Specific Location	Total Samples
1	Yukon Delta NWR	Tutakoke	100
2	Yukon Delta NWR	Punaorat Point	13
3	Yukon Delta NWR	Kigigak Island	66
	Total		**179**

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.

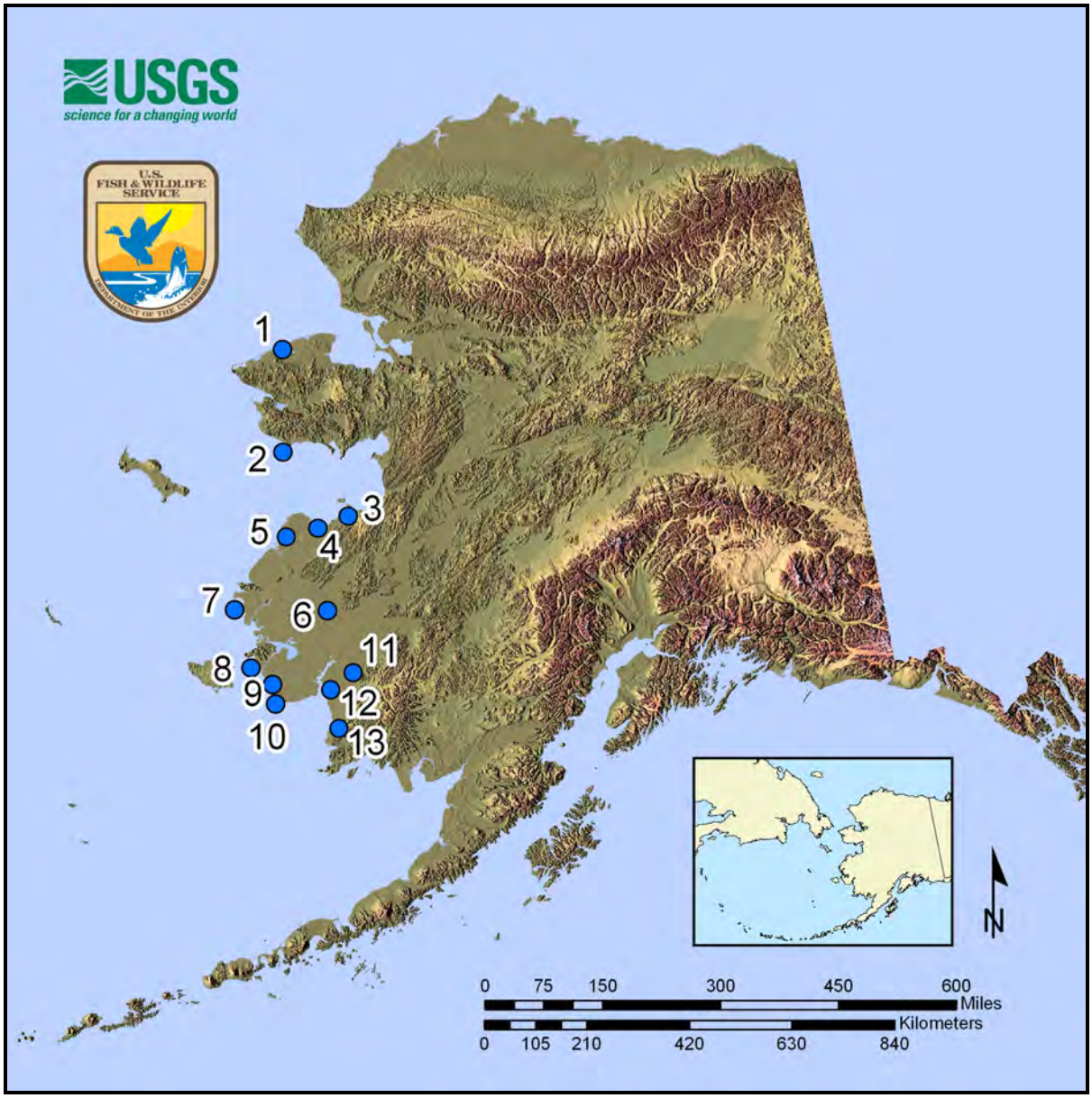
In 2010, a new method of preserving paired samples was implemented. Oral-pharyngeal (OP) and cloacal (CL) swabs were collected from each bird and preserved together (field-pooled) in a single sample vial. In contrast, in previous sampling years the OP and CL swabs were preserved separately (individual sample vials) in the field and then combined in the lab (lab-pooled) once they reached the NWHC for testing.

Methods: No live capture project focused on Lesser Sandhill Cranes, but samples were obtained via spring subsistence (Figure 8).

Results: Ninety-nine Lesser Sandhill Cranes were collected and analyzed through hunter harvest sampling (see Spring Subsistence chapter).

AI Results: None of the 99 field-pooled samples collected from Lesser Sandhill Crane tested positive for avian influenza.

Figure 8. Sampling locations for Lesser Sandhill Cranes in Alaska, 2010. For specific location names see key following map. Ninety-nine samples were collected through spring subsistence. Note: No live sampling of this species occurred.



Site #	Geographic Location	Specific Location	Site #	Geographic Location	Specific Location
1	Seward Peninsula	Shishmaref	8	Yukon Delta NWR	Toksook Bay
2	Seward Peninsula	Nome	9	Yukon Delta NWR	Chefornak
3	Seward Peninsula	Stebbins	10	Yukon Delta NWR	Kipnuk
4	Yukon Delta NWR	Kotlik	11	Yukon Delta NWR	Kwethluk
5	Yukon Delta NWR	Emmonak	12	Yukon Delta NWR	Eek
6	Yukon Delta NWR	Hooper Bay	13	Yukon Delta NWR	Quinhagak
7	Yukon Delta NWR	Pilot Station			

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).

In 2010, a new method of preserving paired samples was implemented. Oral-pharyngeal (OP) and cloacal (CL) swabs were collected from each bird and preserved together (field-pooled) in a single sample vial. In contrast, in previous sampling years the OP and CL swabs were preserved separately (individual sample vials) in the field and then combined in the lab (lab-pooled) once they reached the NWHC for testing.

Over 600 birds from the Alaska Peninsula, Kotzebue Sound, North Slope, and Yukon Delta NWR were sampled. Of those, 516 were from live birds (Fig. 9) and 116 were from spring subsistence harvest birds (see Spring Subsistence chapter). In 2008, fifty Tundra Swans were outfitted with satellite transmitters in five different breeding populations around the state. To track the latest Tundra Swan movements go to http://alaska.usgs.gov/science/biology/avian_influenza/TUSW/index.html. Each location is discussed separately and a final table presents analytical results at the end of this section. In addition, 13 swans were opportunistically sampled along the YK Delta's outer coast at Old Chevak.

Southern Alaska Peninsula:

Molting Tundra Swans were captured, sampled and released at locations near Cold Bay on the lower Alaska Peninsula.

Capture Methods: A four-person crew captured, sampled and released molting Tundra Swans over a four day period. In a coordinated effort the ground crew used large salmon nets to capture birds while the helicopter pilot attempted to push the flightless birds toward the ground crew. Captured swans were temporarily restrained with electrical tape wrapped around their legs and heads tucked under their wings.

Results: Tundra Swans were captured, banded, and released. Field-pooled cloacal and oral-pharyngeal samples were collected from 106 Tundra Swans (Table 20). The adult birds were comprised of 55 females, 50 males and one of unknown sex.

AI Results: None of the 106 Tundra Swans field-pooled samples tested positive for avian influenza on the southern Alaska Peninsula.

Table 20. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from molting Tundra Swans at Izembek National Wildlife Refuge on the southern Alaska Peninsula, July 2010.

Location	Total birds captured	AI Samples			AI field-pooled samples	Total AI samples
		Female	Male	Unk		
Cold Bay	106	55	50	1	106	106

Other Accomplishments: All captured birds were banded, measured and their lores were photographed. Feather samples were taken for isotopic analysis to obtain a signature for breeding areas. Blood samples were collected for baseline toxicology, for investigation of viral antibodies, and for work to explore genetic variation among populations. Each captured bird received a blue neck collar with a unique alpha-numeric code.

Northern Alaska Peninsula

Molting Tundra Swans were captured, sampled, and released on pothole lakes at locations near King Salmon. The Bristol Bay region may be important for monitoring AI because mixing may occur there between birds migrating up the Aleutian chain from Asia and eastward across the Bering Straits from Chukotka. In 2008, ten satellite transmitters were deployed in the Northern Alaska Peninsula population. Data confirmed the migration routes and wintering areas for the Northern Alaska Peninsula swans.

Capture Methods: A helicopter was used to capture swans in small groups on small or shallow lakes close to King Salmon. 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 temporarily 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: A total of 104 Tundra Swans was captured and banded. Field-pooled cloacal and oral-pharyngeal samples were collected from 104 Tundra Swans (Table 21). The adult birds were comprised of 52 females, 51 males and one of unknown sex.

AI Results: None of the 104 Tundra Swans field-pooled samples tested positive for avian influenza on the northern Alaska Peninsula.

Table 21. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from molting Tundra Swans on the Northern Alaska Peninsula, July 2010.

Location	Total birds captured	AI Samples			AI field-pooled samples	Total AI samples
		Female	Male	Unk		
King Salmon	104	52	51	1	104	104

Other Accomplishments: Birds were fitted with neck collars and USGS leg bands. Morphological measurements were taken and all birds were photographed. Feathers were collected from the wing for isotopic studies and blood was sampled for lead toxicity, viral seroprevalence and population genetics. Genetic samples may also be used to confirm sex. To date, 68% of birds marked prior to 2010 have been recovered or resighted. These observations will increase information about migratory paths between molting, staging, breeding, and wintering areas of Alaska Peninsula tundra swan and timing of migration for various populations, age groups, and breeding vs. non-breeding birds.

Kotzebue Sound

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

Capture Methods: Flightless Tundra Swans were captured using aircraft and an inflatable powered boat. 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: One hundred ninety-two Tundra Swans were captured from three locations around Kotzebue Sound. Field-pooled cloacal and oral-pharyngeal samples were collected from 192 swans (Table 22). Of those, 100 were adult females and 92 were adult males.

AI Results: None of the 192 field-pooled samples collected from Kotzebue Sound Tundra Swans tested positive for avian influenza.

Table 22. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from Tundra Swans around Kotzebue Sound, July 2010.

Location	Total birds captured	AI Samples Female	Male	AI field-pooled samples	Total AI samples
Buckland River	85	36	49	85	85
Kobuk Delta	45	29	16	45	45
Noatak Delta	62	35	27	62	62
Total	192	100	92	192	192

Other Accomplishments: All captured swans were marked with metal leg-bands and as many of the captured birds as possible were marked with unique, alpha-numerically coded plastic neck collars and photographed for subsequent morphometric examination. Additionally, feather samples for stable isotope analyses were collected from a subsample of individuals and blood samples were collected for contaminant, genetic, AI seroprevalence, and stable isotope analyses.

Yukon Kuskokwim Delta

Due to severe wind and rain no samples were taken on the Yukon Kuskokwim Delta for the 2010 AI Surveillance effort. Thirteen opportunistic samples however, were collected at Old Chevak on the Yukon Delta NWR.

Capture Methods: Brood drives were conducted using biologists from Anchorage and teenage volunteers from the village of Chevak. Along with flocks of flightless geese, thirteen Tundra Swans were herded into holding pens by the banding crew walking across the tundra in a coordinated effort.

Results: Thirteen birds were captured. Field-pooled cloacal and oral-pharyngeal samples were collected from 13 Tundra Swans (Table 23). Of those, 3 were adult females, 4 were adult males, 2 were juvenile females and 4 were juvenile males.

AI Results: None of the 13 field-pooled samples collected from YKD Tundra Swans tested positive for avian influenza.

Table 23. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from molting Tundra Swans on the Northern Alaska Peninsula, July 2010.

Location	Total birds captured	AI Samples Female	Male	AI field-pooled samples	Total AI samples
Onumtuk	10	3	7	10	10
South Slough	3	2	1	3	3
Total	13	13	13	13	13

Other Accomplishments: Feathers were collected from the captured birds for stable isotope analysis to assist in determination of the birds wintering locations. Additionally, blood samples were collected from the captured birds to investigate sera prevalence of the H5N1 AI virus. None of the 13 Tundra Swans were banded.

North Slope

Capture Methods: Flightless birds were caught at five locations in early August on the North Slope. Crew members were positioned using a Robinson R44 helicopter. Once deployed, crew raced to capture running swans; sometimes using a large fishing net to help in the capture.

Results: One hundred-one birds were captured and banded. Field-pooled cloacal and oral-pharyngeal samples were collected from 101 Tundra Swans (Table 24). Of those, 50 were adult females and 51 were adult males.

AI Results: None of the 101 field-pooled samples collected from North Slope Tundra Swans tested positive for avian influenza.

Table 24. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from flightless Tundra Swans on the North Slope, August 2010.

Location	Total birds captured	AI Samples		AI field-pooled samples	Total AI samples
		Female	Male		
Colville River Delta	12	7	5	12	12
Kalubik Creek	46	25	21	46	46
Miluveach River	36	15	21	36	36
Kachemach River	6	2	4	6	6
Oliktok Point	1	1	0	1	1
Total	101	50	51	101	101

Other Accomplishments: Morphological measurements were taken on all captured swans and all were marked with aluminum leg bands. Feathers were collected for stable isotope analysis and blood samples were collected for AI seroprevalence assessment. Of those 101 Tundra Swans captured, 15 were recaptures from the North Slope area. Two of the recaptures had internal PTT transmitters that were implanted in 2008 and two had radio collars from 2007.

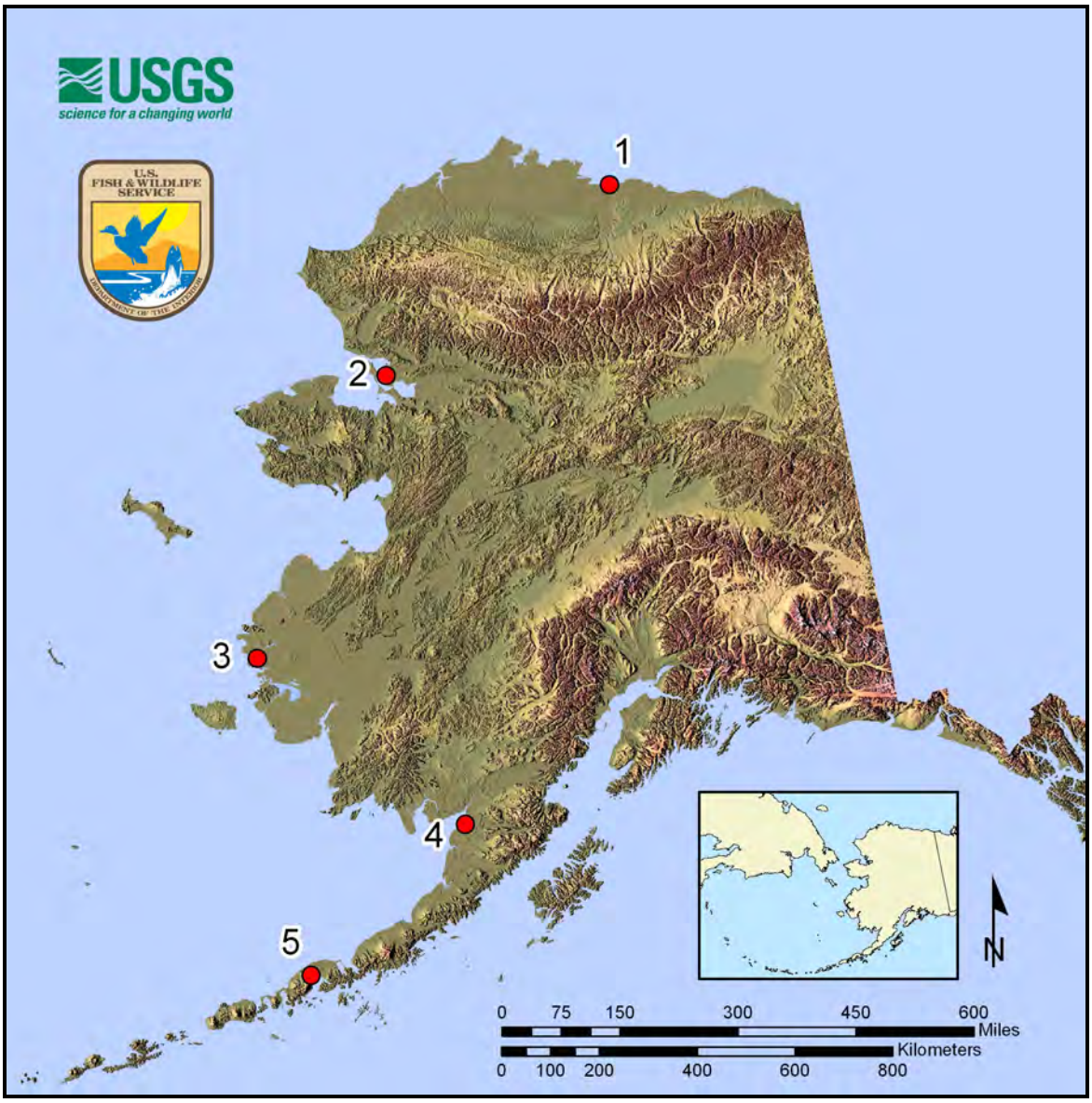
Table 25. Avian influenza analytical results for Tundra Swans collected July through August 2010: field-pooled samples.

Location	Total samples	Total field-pooled AI positive	Prevalence
Southern Alaska Peninsula	106	0	0
Northern Alaska Peninsula	104	0	0
Kotzebue Sound	192	0	0
North Slope	101	0	0
Yukon Delta NWR	13	0	0
Total	516	0	0

Jennifer Steffen

Craig, Ely, USGS ASC

Figure 9. Live bird sampling locations for Tundra Swans in Alaska, 2010. For specific location names see key following map.



Site #	Geographic Location	Specific Location	Total Samples
1	North Slope	Colville River Delta, Miluveach River, Kalubik Creek, Kachemach River, Oliktok Point	101
2	Kotzebue Sound	Buckland River, Kobuk Delta, Noatak Delta	192
3	Yukon Delta NWR	Old Chevak	13
4	Northern Alaska Peninsula	King Salmon	104
5	Southern Alaska Peninsula	Cold Bay	106
	Total		**516**

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

Justification: A large proportion of the Alaskan breeding Long-tailed Ducks winter 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. Long-tailed ducks have a circumpolar breeding distribution. Previous satellite telemetry studies in northern and western Alaska and western arctic Canada indicate that many long-tailed ducks that breed and molt in western North America spend the winter in coastal waters of eastern Asia, most notably Russia but as far south as Japan and China (M. Petersen, pers. comm., Petersen et al. 2003), and thus could carry Asian HPAI to North America.

No live capture project focused on Long-tailed Ducks because they nest at low densities, nest are difficult to find, and there are no know molting concentrations associated with one of the primary nesting areas.

In 2010, a new method of preserving paired samples was implemented. Oral-pharyngeal (OP) and cloacal (CL) swabs were collected from each bird and preserved together (field-pooled) in a single sample vial. In contrast, in previous sampling years the OP and CL swabs were preserved separately (individual sample vials) in the field and then combined in the lab (lab-pooled) once they reached the NWHC for testing.

Six birds were sampled from Kodiak Island and St. Lawrence Island. Of those, 3 were live bird samples (Fig. 10), and 3 hunter-killed sample (see Spring Subsistence chapter). A final table with analytical results is presented at the end of this section. See discussion below.

Kodiak Island

Long-tailed Ducks were opportunistly sampled in Gibson Cove on Kodiak Island.

Capture Methods: Birds were captured using a floating mist net. All Long-tailed Ducks were banded.

Results: Three Long-tailed Ducks were captured and field-pooled cloacal and oral-pharyngeal samples were collected (Table 26). Of those, 2 were adult females and 1was an adult male.

AI Results: None of the three field-pooled samples collected from Kodiak Long-tailed Ducks tested positive for avian influenza.

Table 26. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from Long-tailed Ducks on Kodiak Island, April 2010.

Location	Total birds captured	AI Samples		AI field-pooled samples	Total AI samples
		Female	Male		
Gibson Cove	3	2	1	3	3

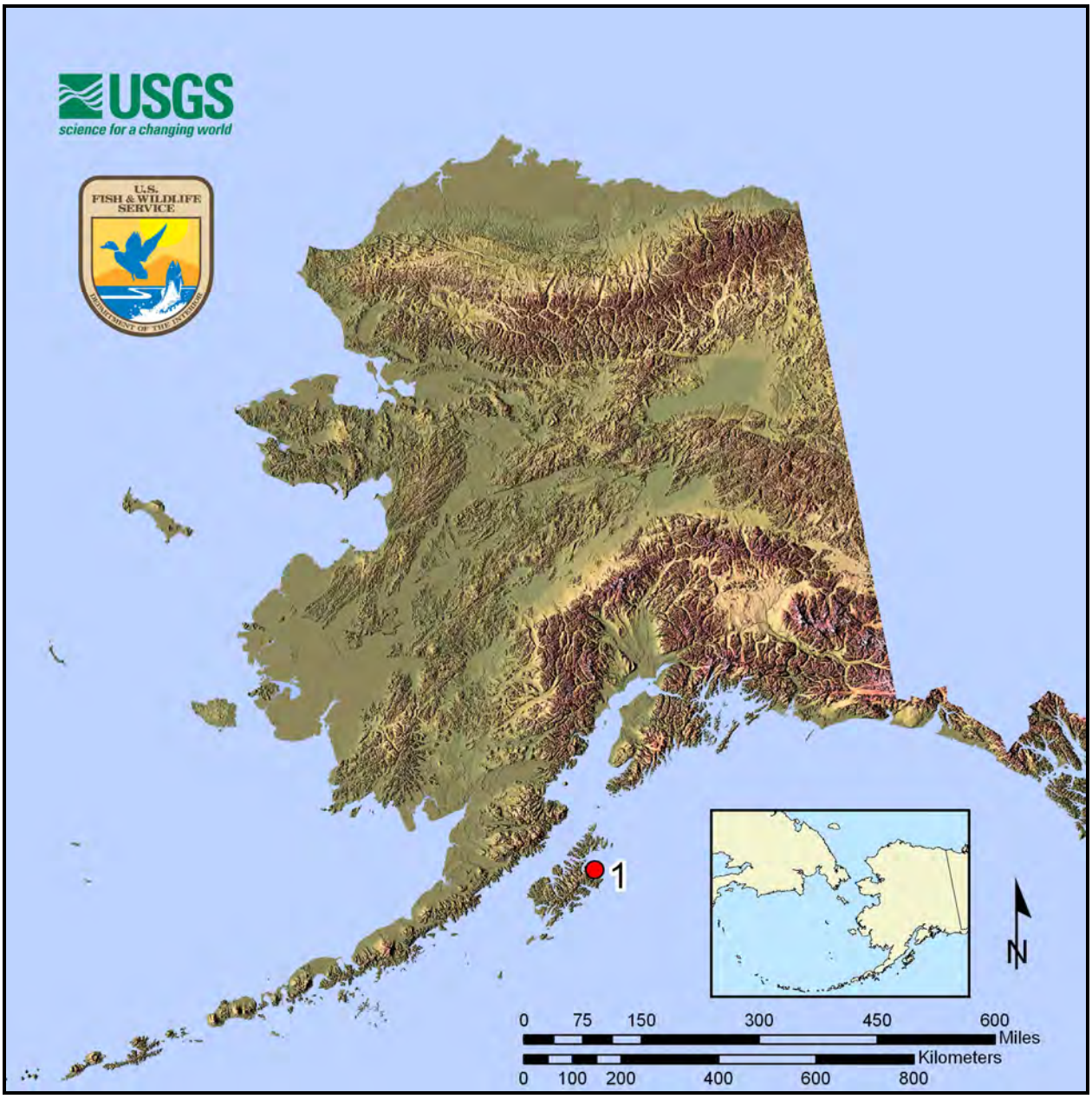
Other Accomplishments: Biometric measurements were taken to assist in determining age, sex and physiological condition.

Table 27. Avian influenza analytical results for Long-tailed Ducks collected April 2010: field-pooled samples.

Location	Total samples	Total field-pooled AI positive	Prevalence
Gibson Cove	3	0	0

Jim Zelenek, USFWS

Figure 10. Live bird sampling location for Long-tailed Ducks in Alaska, 2010. For specific location name see key following map.



Site #	Geographic Location	Specific Location	Total Samples
1	Kodiak Island	Gibson Cove	3

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.

In 2010, a new method of preserving paired samples was implemented. Oral-pharyngeal (OP) and cloacal (CL) swabs were collected from each bird and preserved together (field-pooled) in a single sample vial. In contrast, in previous sampling years the OP and CL swabs were preserved separately (individual sample vials) in the field and then combined in the lab (lab-pooled) once they reached the NWHC for testing.

Ninety-seven birds were sampled from St. Lawrence Island, Seward Peninsula and the Yukon Delta NWR. Of those, 59 were live bird samples (Fig. 11) and 38 were hunter killed (see Spring Subsistence and Fall Harvest chapters). See discussion below and final table with analytical results at end of this section.

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 which 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 using bownets and mist nets.

Results: A total of 59 Pacific Common Eiders was sampled at Kigigak Island on the YDNWR (Table 28). All were adult females.

AI Results: None of the 59 field-pooled samples collected from nesting Yukon Delta Pacific Common Eiders tested positive for avian influenza.

Table 28. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from nesting Pacific Common Eiders at Yukon Delta National Wildlife Refuge, June 2010.

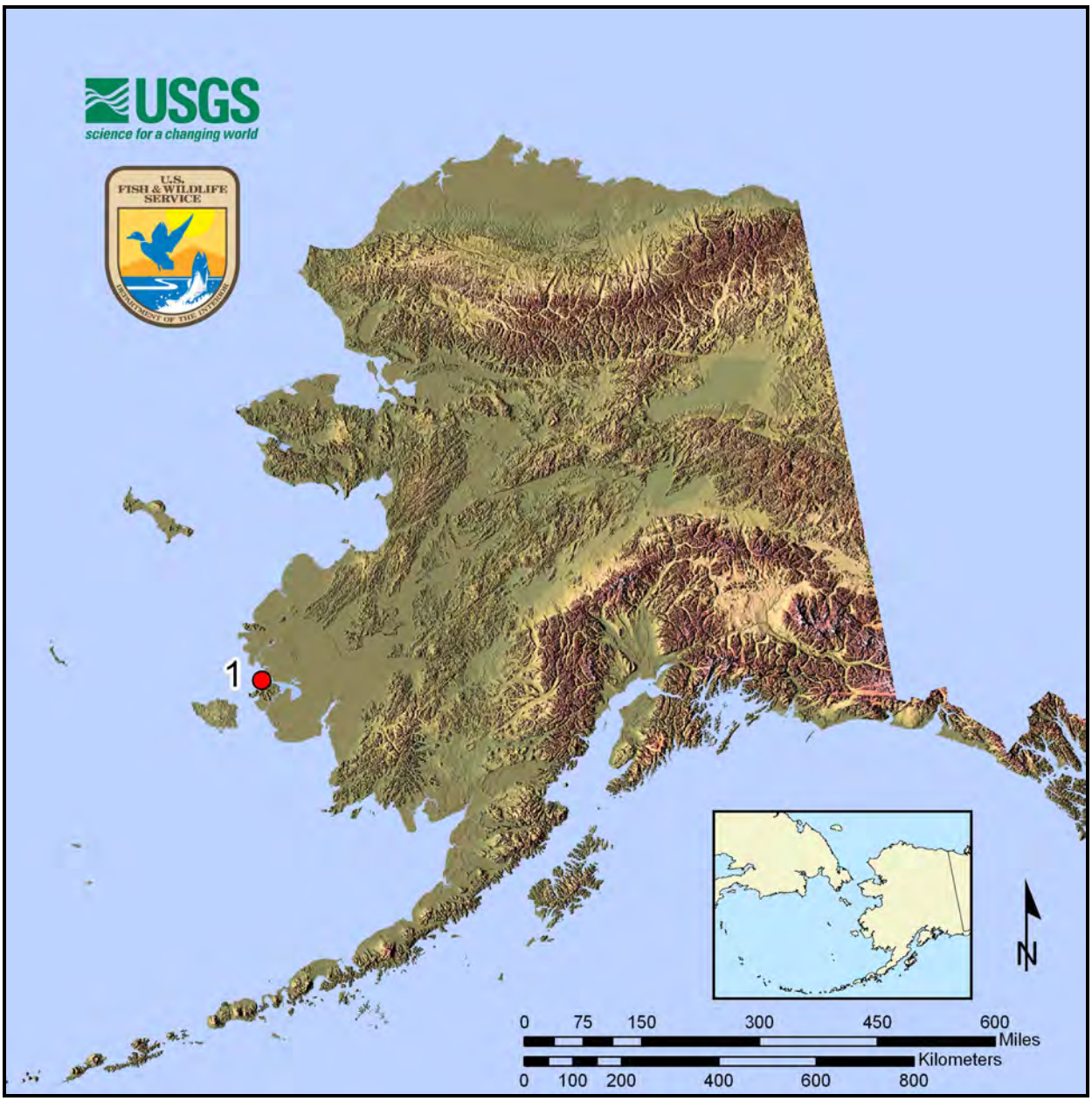
Location	Total birds captured	AI samples		AI field-pooled samples	Total AI samples
		Female	Male		
Kigigak Island	59	59	0	59	59

Table 29. Avian influenza analytical results for Pacific Common Eiders collected June 2010: field-pooled samples.

Location	Total samples	Total field-pooled AI positive	Prevalence
Yukon Delta NWR	59	0	0

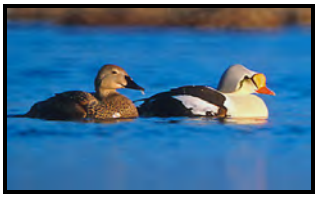
Jim Zelenek, USFWS

Figure 11. Live bird sampling location for Pacific Common Eiders in Alaska, 2010. For specific location name see key following map.



Site #	Geographic Location	Specific Location	Total Samples
1	Yukon Delta NWR	Kigigak Island	59

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.

In 2010, a new method of preserving paired samples was implemented. Oral-pharyngeal (OP) and cloacal (CL) swabs were collected from each bird and preserved together (field-pooled) in a single sample vial. In contrast, in previous sampling years the OP and CL swabs were preserved separately (individual sample vials) in the field and then combined in the lab (lab-pooled) once they reached the NWHC for testing.

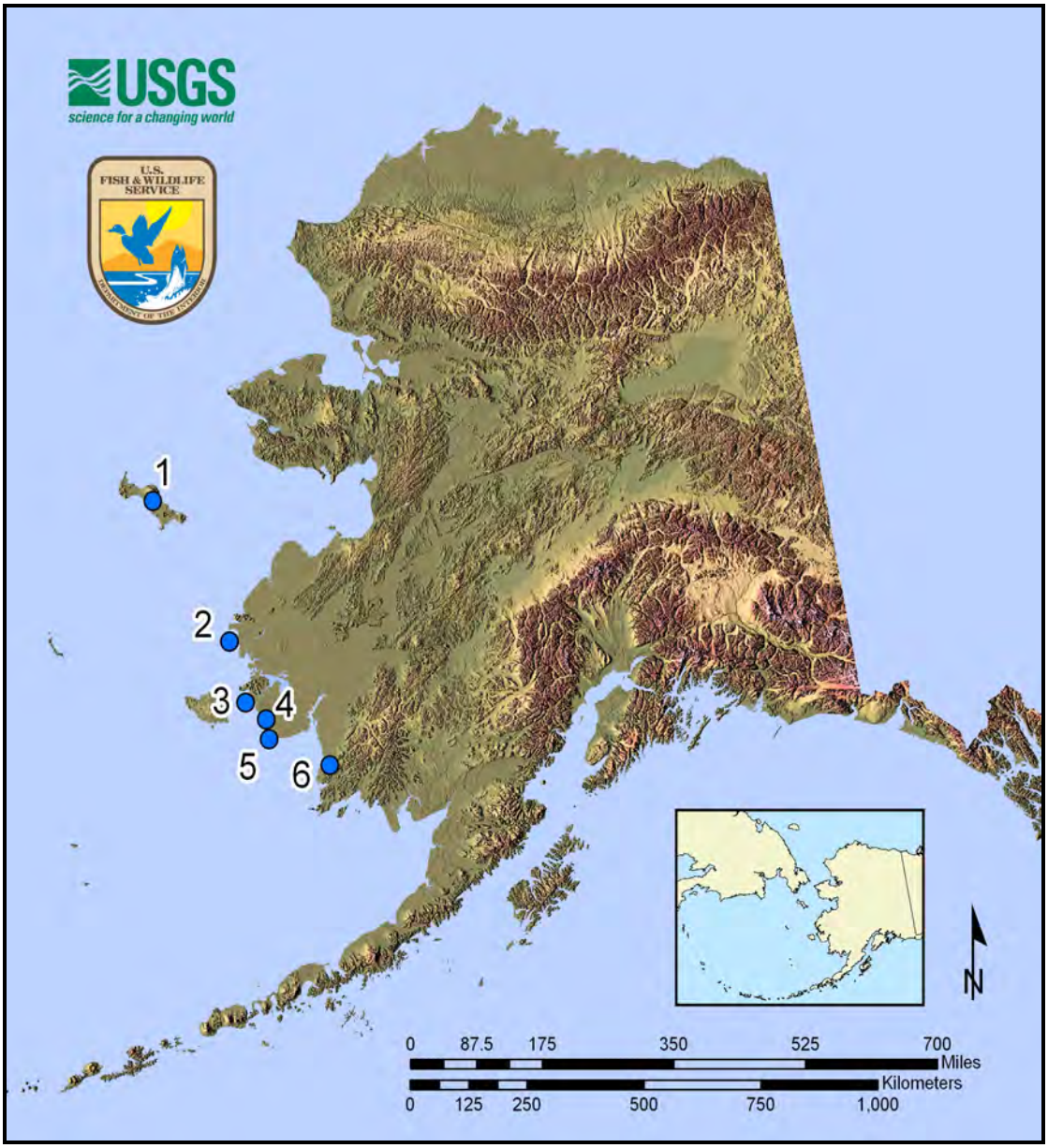
Methods: No live capture project focused on King Eiders, but samples were obtained via spring subsistence sampling (Figure 12).

Results: Two hundred seventy-eight King Eider field-pooled samples were collected and analyzed through hunter harvest sampling (see Spring Subsistence chapter).

AI Results: One of the 278 field-pooled spring subsistence samples collected from King Eiders tested positive for avian influenza. None of these samples were positive for H5 or N1.

Doyle J. Ohnemus

Figure 12. Sampling locations for King Eiders in Alaska, 2010. For specific location names see key following map. Two hundred seventy-eight samples were collected through spring subsistence harvested birds. Note: No live sampling of this species occurred.



Site #	Geographic Location	Specific Location
1	St. Lawrence Island	Savoonga
2	Yukon Delta NWR	Hooper Bay
3	Yukon Delta NWR	Toksook Bay
4	Yukon Delta NWR	Chefornak
5	Yukon Delta NWR	Kipnuk
6	Yukon Delta NWR	Quinhagak

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 mostly in East and South Asia and 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 of Dunlin 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 East Asia in September or October (Gill and Handel 1981, Warnock and Gill 1996).

In 2010, a new method of preserving paired samples was implemented. Oral-pharyngeal (OP) and cloacal (CL) swabs were collected from each bird and preserved together (field-pooled) in a single sample vial. In contrast, in previous sampling years the OP and CL swabs were preserved separately (individual sample vials) in the field and then combined in the lab (lab-pooled) once they reached the NWHC for testing.

Over 400 birds were sampled from the Arctic National Wildlife Refuge, the North Slope, Seward Peninsula and the Yukon-Kuskokwim Delta, using a 2-stage sampling design. The 2-stage sampling design is broken into breeding and post-breeding populations. Of those, 426 were live bird samples (Fig. 13) and six were hunter killed (see Spring Subsistence chapter). Each location is discussed separately and a final table presents 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 subspecies overlap (R. Gill, pers. comm.), although genetic and morphological studies have not been conducted to confirm this hypothesis.

North Slope and Northwestern Alaska

Breeding Dunlin were captured, sampled and released at Ikpikpuk, Barrow and Prudhoe Bay along the North Slope of Alaska. In addition, a new sampling site was established at Cape Krusenstern National Monument bordering the Arctic Ocean and Chukchi Sea in northwestern Alaska.

Capture Methods: All four sites searched for active nests to sample breeding Dunlin. Crews captured birds in Barrow at or near six established breeding plots and other areas of the tundra surrounding Barrow and Prudhoe Bay using 4-wheelers on the road system. In Cape Krusentern a 2-person crew searched and located nests in areas accessible via walking or kayak. All Dunlin were captured using mist nets or bow nets. All captured individuals had a metal band and a unique set of color bands placed on their legs.

Results: A total of 178 breeding Dunlin was captured and banded on the North Slope and Northwestern Alaska. Field-pooled cloacal and oral-pharyngeal samples were collected from 173 Dunlin (Table 30). Of those, 76 were adult females, 56 were adult males, and 41 adults were undetermined for sex.

AI Results: None of the 173 field-pooled samples collected from breeding Dunlin tested positive for avian influenza.

Table 30. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from breeding Dunlin on the North Slope and Northwestern Alaska, June and July 2010.

Location	Total birds captured	AI Samples			AI field-pooled samples	Total AI samples
		Female	Male	Unk		
Prudhoe Bay	6	4	1	1	6	6
Ikpikpuk	35	3	4	28	35	35
Barrow	107	58	41	3	102	102
Cape Krusenstern	30	11	10	9	30	30
Total	178	76	56	41	173	173

Other Accomplishments: Data was collected on shorebird demography as part of the Arctic Shorebird Demographic Network; connecting wintering, migration stopovers and breeding sites using band recoveries, stable isotopes (via feather collections), genetic markers (via blood samples), and light-level geolocators; and gathering blood for later genetic sexing and paternity analyses. All birds were also weighed and measured for age and sex determination. A total of 116 Dunlin at Cape Krusenstern, Barrow, and Ikpikpuk, were fitted with geolocators to document migration movements.

Arctic NWR

In 2010, a new study site for breeding Dunlin was established in the Canning River Delta as part of the Arctic Shorebird Demographics Network (ASDN). Breeding Dunlin were captured, sampled and released at the Canning River Delta ASDN site on the Arctic National Wildlife Refuge. This site was used to collect shorebird samples to screen for avian influenza in 2006 and 2007.

Capture Methods: Dunlin were captured using mist nets, bow nets, walk-in traps or nooses. All captured individuals had a metal band and a unique set of color bands placed on their legs.

Results: Breeding Dunlin were captured and banded on the Arctic National Wildlife Refuge. Field-pooled cloacal and oral-pharyngeal samples were collected from 23 Dunlin (Table 31). All were adults undetermined for sex.

AI Results: None of the 23 field-pooled samples collected from Arctic National Wildlife Refuge breeding Dunlin tested positive for avian influenza.

Table 31. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from breeding Dunlin on the Arctic National Wildlife Refuge, June 2010.

Location	Total birds captured	AI Samples			AI field-pooled samples	Total AI samples
		Female	Male	Unk		
Canning River Delta	23	0	0	23	23	23

Other Accomplishments: Biometric measurements were taken on all birds to assist in determining age, sex and physiological condition. All captured birds were also marked with color bands. This auxiliary marking was done in order to evaluate annual survival rates for breeding birds and to better document wintering areas. Blood and feather samples were collected from all captured breeding birds for stable isotope and genetic analyses. A total of 22 breeding Dunlin at Canning River Delta, were fitted with geolocators to document migration movements.

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 will leave the YKD for Asia in September or early October.

Arctic NWR

Post-breeding Dunlin were captured, sampled, and released at the Canning River Delta along the coast of the Arctic National Wildlife Refuge. Since 2002, a collaborative study investigating the impact of human development on nesting birds and shorebird breeding ecology has taken place on the Arctic NWR.

Capture Methods: Birds were primarily captured with mist nets, walk in traps, or nooses. All captured individuals were banded with a metal band and color bands to uniquely identify each bird.

Results: A total of 10 post-breeding Dunlin was captured, banded, and released on the Arctic NWR. Field-pooled cloacal and oral-pharyngeal swabs were collected from 10 Dunlin (Table 32). All were juveniles undetermined for sex.

AI Results: None of the 10 field-pooled samples collected from Arctic NWR Dunlin tested positive for avian influenza.

Table 32**.** Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from post-breeding Dunlin at Arctic National Wildlife Refuge, July and August 2010.

Location	Total birds captured	AI Samples			AI field-pooled samples	Total AI samples
		Female	Male	Unk		
Canning River Delta	10	0	0	10	10	10

Other Accomplishments: Biometric measurements were taken on all birds to assist in determining age, sex, and physiological condition. Blood samples were collected to assess stress hormone and fat metabolite levels as an indicator of bird condition.

Yukon-Kuskokwim Delta

Post-breeding Dunlin were captured, sampled, and released at Punoarat Point near Angyoyaravak Bay on the central Yukon-Kuskokwim Delta. Post-breeding Dunlin use this area July through October.

Capture Methods: Fall migrant Dunlin were sampled in August and September on intertidal mudflats and near shore ponds on the YKD. Birds were captured using, mist nets, rocket, and whoosh nets. All captured birds were banded with a metal band and color bands.

Results: A total of 220 Dunlin was captured, banded, and sampled at Punoarat Point on the Yukon-Kuskokwim Delta. Field-pooled cloacal and oral-pharyngeal samples were collected from 220 post-breeding Dunlin (Table 33). Of those, 203 were adult, sex undetermined and 17 were juvenile, sex undetermined.

AI Results: None of the field-pooled samples collected from YKD post-breeding Dunlin tested positive for avian influenza.

Table 33. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from post-breeding Dunlin on the Yukon-Kuskokwim Delta, August through September 2010.

Location	Total birds captured	AI Samples			AI field-pooled samples	Total AI samples
		Female	Male	Unk		
Punoarat Point	220	0	0	220	220	220

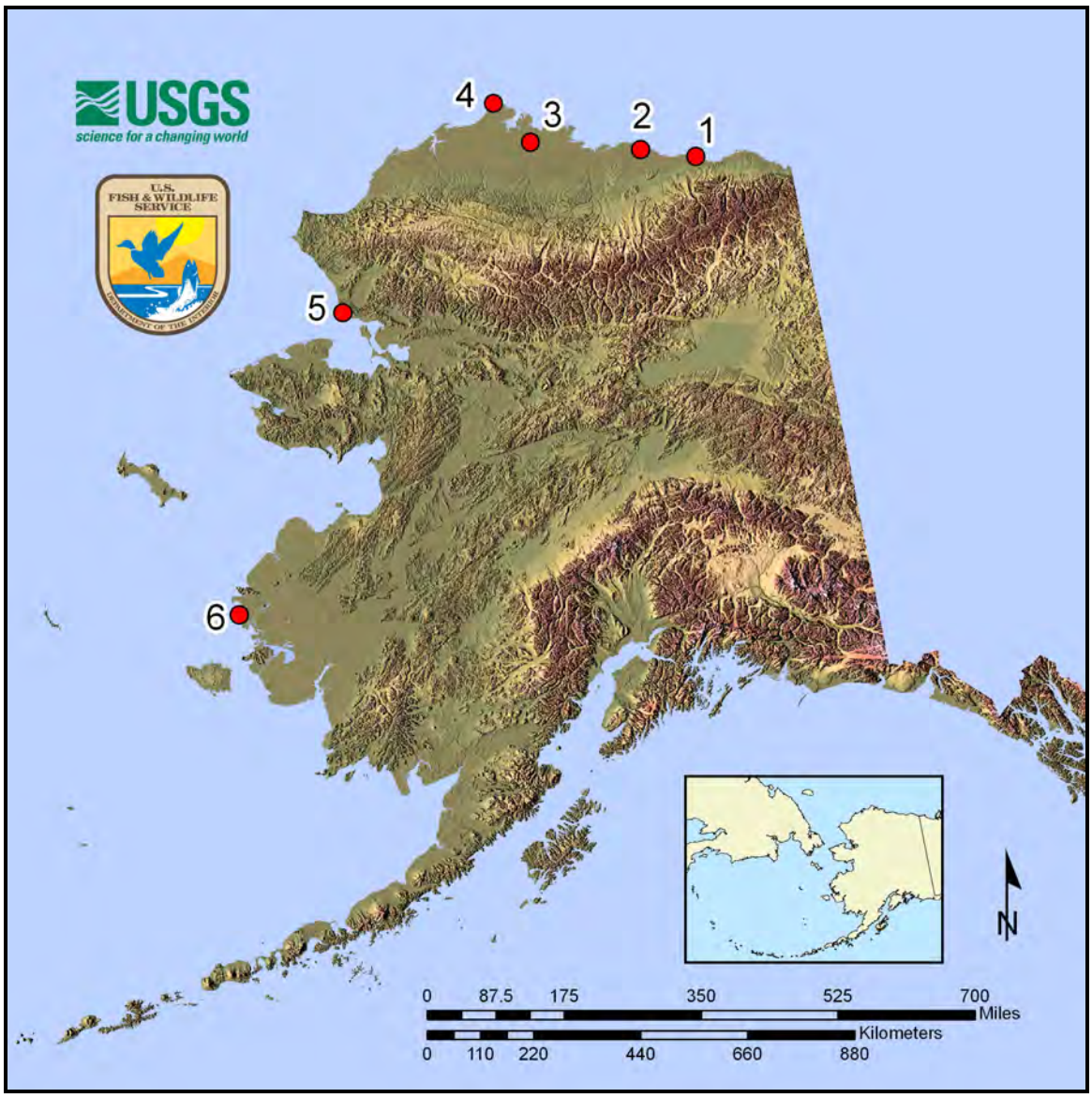
Other Accomplishments: Blood samples were collected from 155 Dunlin for seroprevalence. In addition to collecting blood and AI samples, foot-based benthic invertebrate samples at 20 near-shore sites along a randomly situated 250 m grid were collected to better describe the species composition and prey density at this important migratory staging site.

Table 34. Avian influenza analytical results for Dunlin collected June through September 2010: field-pooled samples.

Location	Sampling stages	Total samples	Total field-pooled AI positive	Prevalence
North Slope and Northwest Alaska	Breeding	173	0	0
Arctic NWR	Breeding	23	0	0
Yukon Delta NWR	Post-breeding	220	0	0
Arctic NWR	Post Breeding	10	0	0
Total		426	0	0

Luke DeCicco, USFWS

Figure 13. Live bird sampling locations for Dunlin in Alaska 2010. For specific location names see key following map.



Site #	Geographic Location	Location	Total Samples
1	Arctic NWR	Canning River Delta	33
2	North Slope	Prudhoe Bay	6
3	North Slope	Ikpikpuk	35
4	North Slope	Barrow	102
5	Northwest Alaska	Cape Krusenstern	30
6	Yukon Delta NWR	Punoarat Point	220
	Total		**426**

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.

In 2010, a new method of preserving paired samples was implemented. Oral-pharyngeal (OP) and cloacal (CL) swabs were collected from each bird and preserved together (field-pooled) in a single sample vial. In contrast, in previous sampling years the OP and CL swabs were preserved separately (individual sample vials) in the field and then combined in the lab (lab-pooled) once they reached the NWHC for testing.

Fourteen birds were sampled from Yukon Delta NWR. Of these, 3 were live bird samples (Fig. 14), and 11 hunter-killed samples (see Spring Subsistence chapter). A final table with analytical results is presented at the end of this section. See discussion below.

Yukon Delta NWR

Fall migrant Sharp-tailed Sandpipers were sampled in August and September on mudflats, and nearshore ponds, from Punaorat Point near Angyoyaravak Bay on the central Yukon-Kuskokwim Delta.

Capture Methods: Mist nets, rocket nets, and, whoosh nets were used to capture birds at Punoarat Point.

Results: A total of 3 Sharp-tailed Sandpipers was captured, banded, and sampled at Punoarat Point. Field-pooled cloacal and oral-pharyngeal samples were collected (Table 35). All samples were from juvenile birds undetermined for sex.

AI Results: None of the 3 field-pooled samples collected from Yukon Delta Sharp-tailed Sandpipers tested positive for avian influenza.

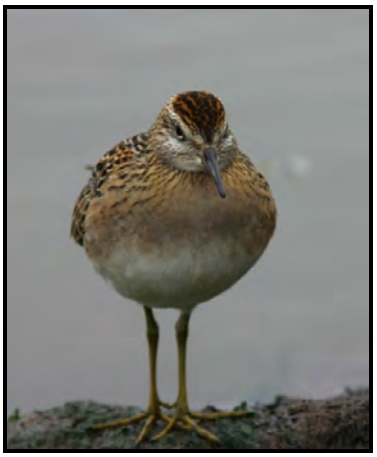
Table 35. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from fall migrant Sharp-tailed Sandpipers at Yukon Delta National Wildlife Refuge, August and September 2010.

Location	Total birds captured	AI Samples			AI field-pooled samples	Total AI samples
		Female	Male	Unk		
Punoarat Point	3	0	0	3	3	3

Other Accomplishments: All captured birds were banded to help document migration pathways and blood was collected for seroprevalence analysis.

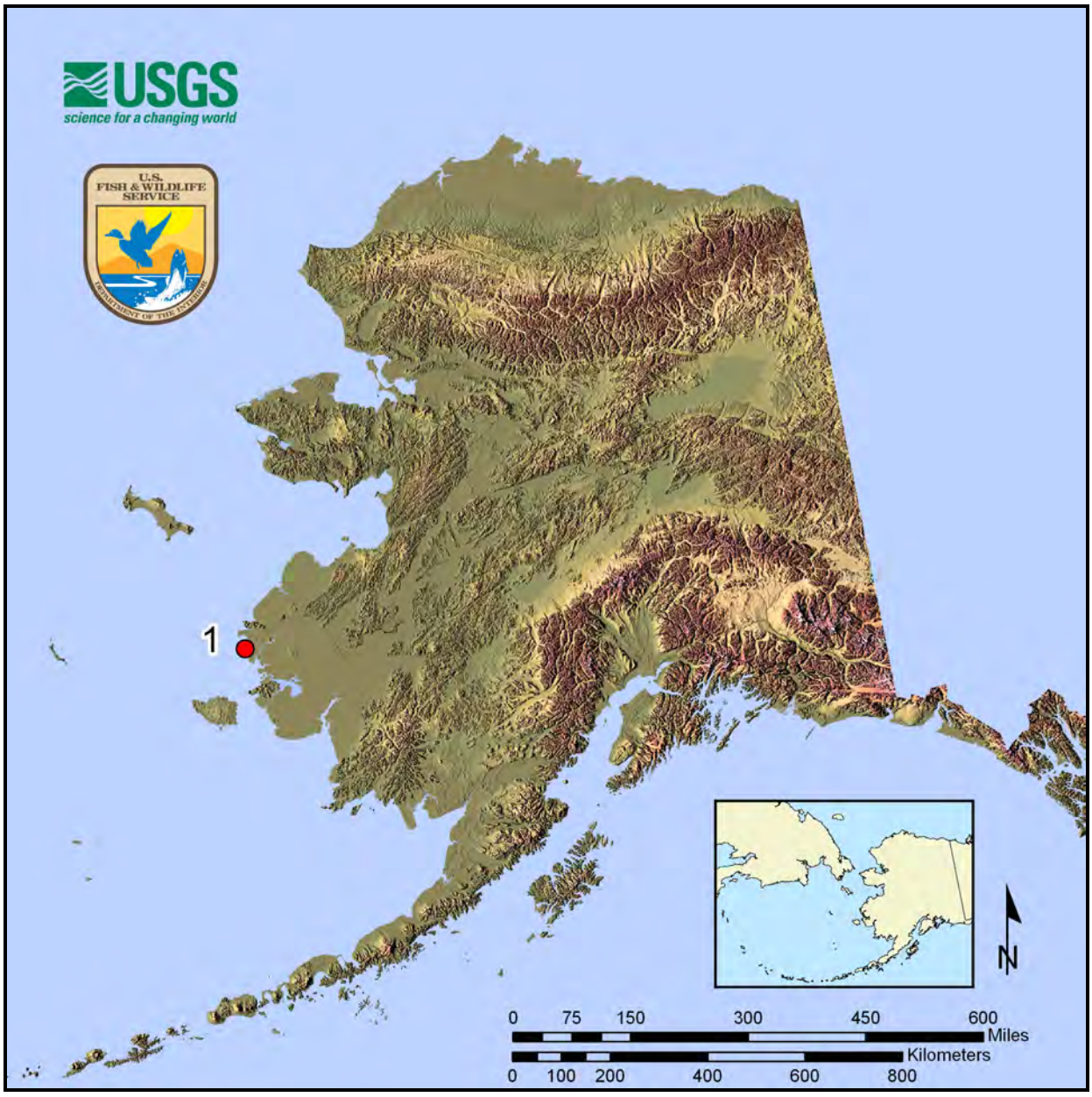
Table 36. Avian influenza analytical results for fall migrant Sharp-tailed Sandpipers collected August and September 2010: field-pooled samples.

Location	Total samples	Total field-pooled AI positive	Prevalence
Yukon Delta NWR	3	0	0



Robert E. Gill, Jr., USGS ASC

Figure14. Live bird sampling location for Sharp-tailed Sandpipers in Alaska, 2010. For specific location name see key following map.



Site #	Geographic Location	Specific Location	Total Samples
1	Yukon Delta NWR	Punoarat Point	3

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).

In 2010, a new method of preserving paired samples was implemented. Oral-pharyngeal (OP) and cloacal (CL) swabs were collected from each bird and preserved together (field-pooled) in a single sample vial. In contrast, in previous sampling years the OP and CL swabs were preserved separately (individual sample vials) in the field and then combined in the lab (lab-pooled) once they reached the NWHC for testing.

Nineteen birds were sampled on the North Slope. All 19 samples were from live birds (Fig. 15). See discussion below and final table of analytical results at the end of this section.

North Slope

A total of 19 Bar-tailed Godwits was captured, sampled, and released at two locations on the North Slope.

Capture Methods: Bar-tailed Godwits were sampled at nesting sites at Ikpikpuk and opportunistically sampled as part of a satellite telemetry study conducted along the Colville River. Birds were captured using mist nets and nest traps.

Results: Nineteen Bar-tailed Godwits were captured, banded, sampled, and released on the North Slope. Field-pooled cloacal and oral-pharyngeal samples were collected at Ikpikpuk and the Colville River (Table 37). Of those, 13 were adult females and 6 were adult males.

AI Results: None of the field-pooled samples collected from North Slope Bar-tailed Godwits was positive for avian influenza.

Table 37. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from Bar-tailed Godwits on the North Slope, June and July 2010.

Location	Total birds captured	AI samples		AI field-pooled samples	Total AI samples
		Female	Male		
Colville River	13	11	2	13	13
Ikpikpuk	6	2	4	6	6
Total	19	13	6	19	19

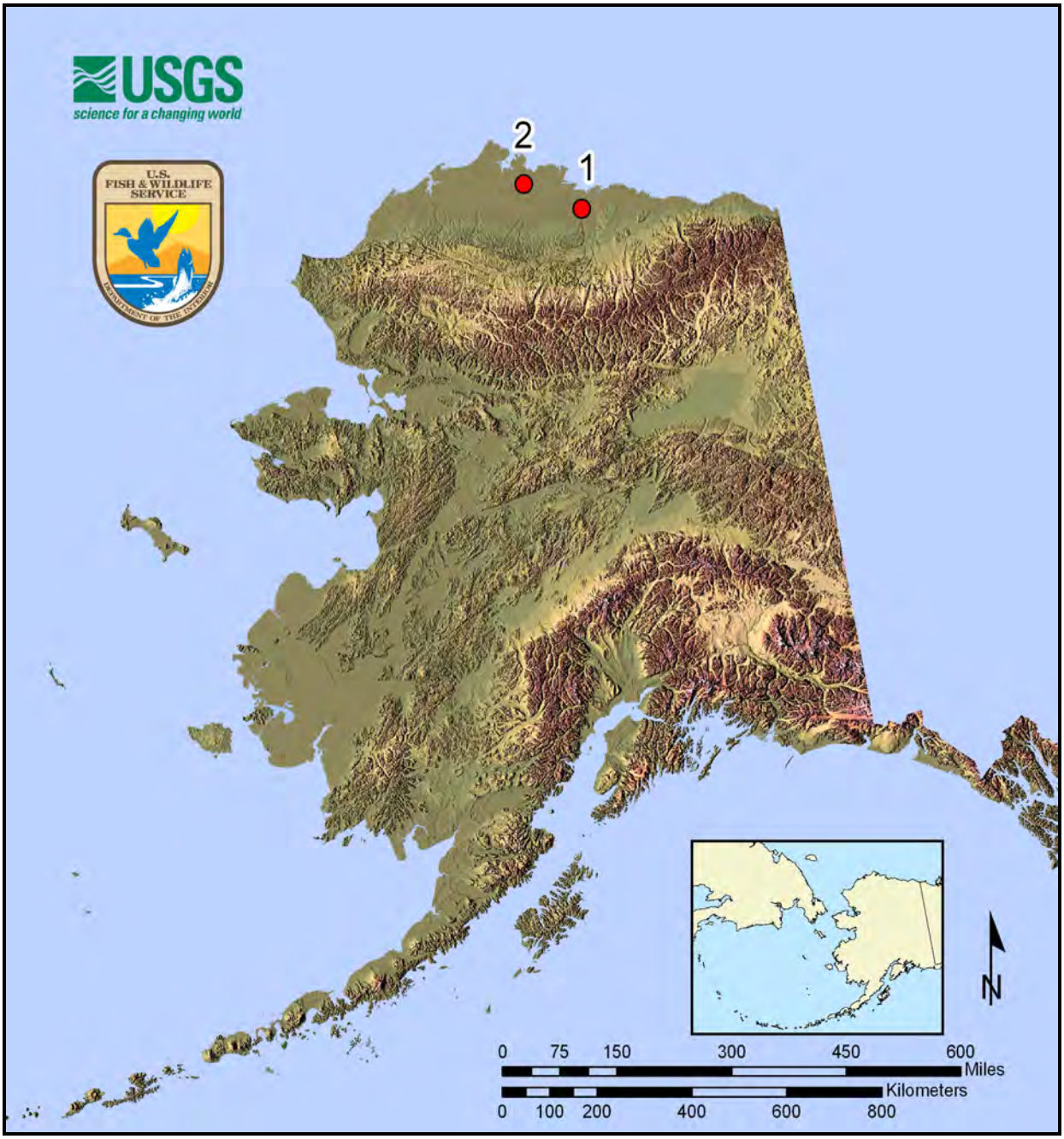
Other Accomplishments: As part of the Pacific Shorebird Migration Project, PTT transmitters were surgically implanted in breeding Bar-tailed Godwits captured along the Colville River. Biometric measurements were taken on all birds to assist in determining age, sex, and physiological condition. Blood samples were collected to assess stress hormone and fat metabolite levels as an indicator of bird condition. Feather samples were collected for isotope and genetic studies.

Table 38. Avian influenza analytical results for Bar-tailed Godwits collected June and July 2010: field-pooled samples.

Location	Total samples	Total field-pooled AI positive	Prevalence
North Slope	19	0	0

Dan Ruthrauff, USGS ASC

Figure 15. Live bird sampling locations for Bar-tailed Godwits in Alaska, 2010. For specific location names see key following map.



Site #	Geographic Location	Specific Location	Total Samples
1	North Slope	Colville River	13
2	North Slope	Ikpikpuk	6
	Total		**19**

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.

In 2010, a new method of preserving paired samples was implemented. Oral-pharyngeal (OP) and cloacal (CL) swabs were collected from each bird and preserved together (field-pooled) in a single sample vial. In contrast, in previous sampling years the OP and CL swabs were preserved separately (individual sample vials) in the field and then combined in the lab (lab-pooled) once they reached the NWHC for testing.

Seventy-three birds were sampled from the Arctic NWR, North Slope, Pribilof Islands and the Yukon Delta NWR. All samples were from live birds (Fig. 16). See discussions below and final table with analytical results at the end of this section.

Arctic NWR

Five samples were collected from Canning River Delta on the Arctic NWR.

Capture Methods: Birds were captured using mist nets, walk-in traps or nooses.

Results: Five Ruddy Turnstones were captured, banded, and released. Field-pooled cloacal and oral-pharyngeal samples were collected (Table 39). Of those, one was an adult female and four were adults of unknown sex.

AI Results: None of the five field-pooled samples collected from Arctic NWR Ruddy Turnstones tested positive for avian influenza.

Table 39. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from Ruddy Turnstones at Arctic NWR, June 2010.

Location	Total birds captured	AI Samples			AI field-pooled samples	Total AI samples
		Female	Male	Unk		
Canning River Delta	5	1	0	4	5	5

Other Accomplishments: Biometric measurements were taken on all birds to assist in determining age, sex, and physiological condition. Blood and feather samples were collected from all breeding birds for stable isotope and genetic analyses.

North Slope

Three samples were collected from Prudhoe Bay on the North Slope. Prudhoe Bay is located on the northern coastline of Alaska along the Beaufort Sea.

Capture Methods: Birds were captured using mist nets, walk-in traps or nooses.

Results: Three Ruddy Turnstones were captured, banded, and sampled. Field-pooled cloacal and oral-pharyngeal samples were collected (Table 40). Of those, one was an adult female and two were adult males.

AI Results: None of the three field-pooled samples collected from North Slope Ruddy Turnstones tested positive for avian influenza.

Table 40. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from Ruddy Turnstones in Alaska, June 2010.

Location	Total birds captured	AI Samples		AI field-pooled samples		Total AI samples
		Female	Male			
Prudhoe Bay	3	1	2	3	3	3

Other Accomplishments: Biometric measurements were taken on all birds to assist in determining age, sex, and physiological condition. Blood samples were collected from all breeding birds for genetic and hormone analyses and feather samples for stable isotope analyses.

Yukon Delta NWR

Ruddy Turnstones were sampled at Punaorat Point located on the Yukon Delta NWR.

Capture Methods: Mist nets, rocket nets, and, whoosh nets were used to capture birds. All were measured, weighed, banded, and released.

Results: Six birds were sampled at Punoarat Point. Field-pooled cloacal and oral-pharyngeal samples were collected (Table 41). All were juveniles, sex unidentified.

AI Results: None of the six field-pooled samples collected from Yukon Delta Ruddy Turnstones tested positive for avian influenza.

Table 41. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from Ruddy Turnstones in Alaska, August 2010.

Location	Total birds captured	AI Samples			AI field-pooled samples		Total AI samples
		Female	Male	Unk			
Punaorat Point	6	0	0	6	6	6	6

Pribilof Islands

Ruddy Turnstones were sampled from St. George Island where they stage during the fall migration.

Capture Methods: Mist nets, rocket nets, and, whoosh nets were used to capture birds. All birds were measured, weighed, banded, and released.

Results: Sixty-one birds were captured on St. George Island. Field-pooled cloacal and oral-pharyngeal samples were collected from 59 Ruddy Turnstones (Table 42). Thirty-one were adults, 27 were juveniles and one was unidentified for age. All were unidentified for sex.

AI Results: One of the 59 field-pooled samples collected from St. George Island Ruddy Turnstones tested positive for avian influenza. None of the samples were H5 or N1 positive. The field-pooled sample represents a 1.7% prevalence of avian influenza in the St. George Island birds.

Table 42. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from Ruddy Turnstones in Alaska, August 2010.

Location	Total birds captured	AI Samples			AI field-pooled samples	Total AI samples
		Female	Male	Unk		
St. George Island	59	0	0	59	59	58

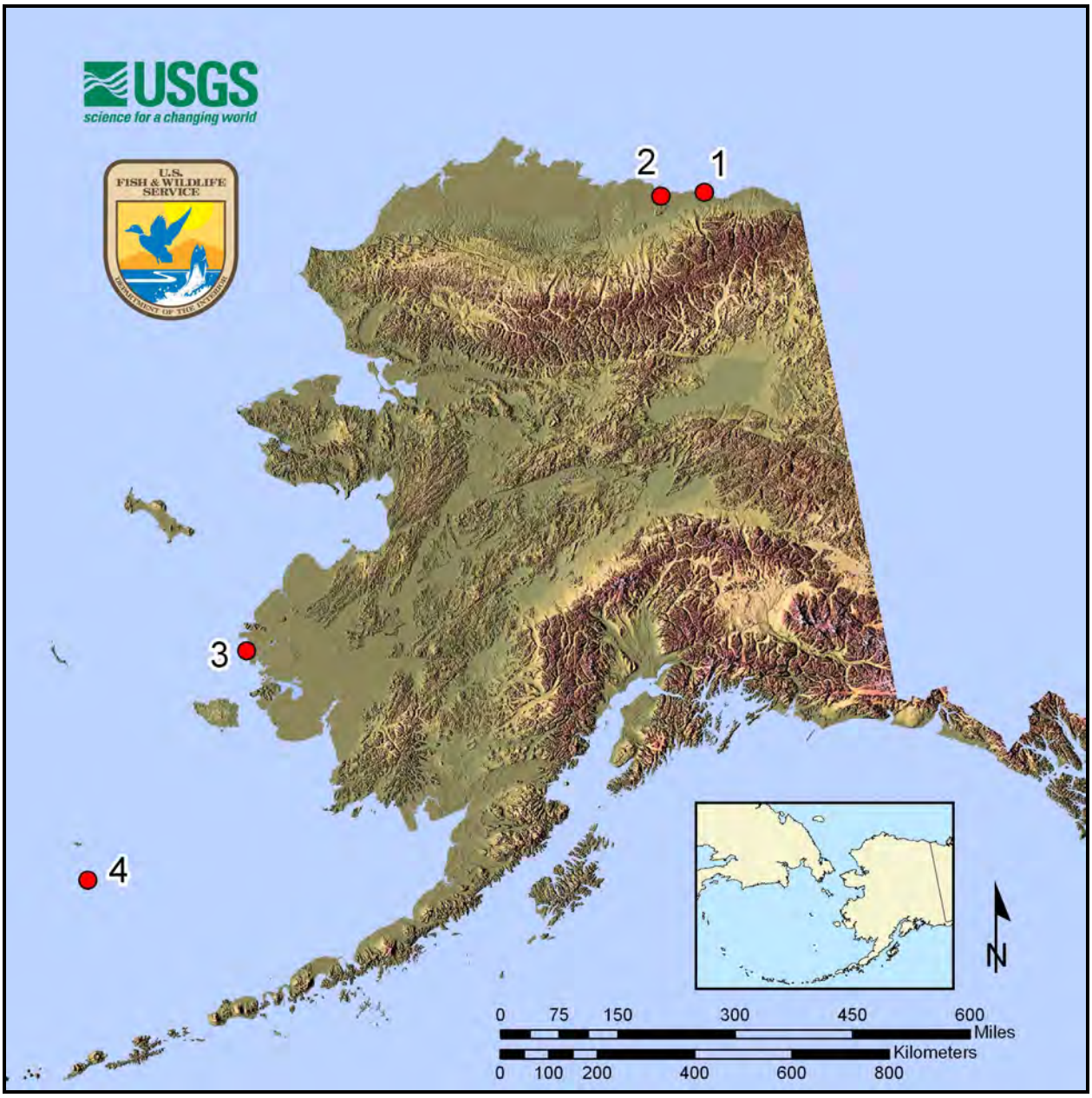
Other Accomplishments: Blood was collected for seroprevalence analysis.

Table 43. Avian influenza analytical results for Ruddy Turnstones collected June and August 2010: field-pooled samples.

Location	Total samples	Total field-pooled AI positive	Prevalence
Arctic NWR	5	0	0
North Slope	3	0	0
Yukon Delta NWR	6	0	0
Pribilof Islands	59	1	0.017
Total	73	1	

Tim Bowman, USFWS

Figure 16. Live bird sampling locations for Ruddy Turnstones in Alaska, 2010. 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	Prudhoe Bay	3
3	Yukon Delta NWR	Punaorat Point	6
4	Pribilof Islands	St. George Island	59
	Total		**73**

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.

In 2010, a new method of preserving paired samples was implemented. Oral-pharyngeal (OP) and cloacal (CL) swabs were collected from each bird and preserved together (field-pooled) in a single sample vial. In contrast, in previous sampling years the OP and CL swabs were preserved separately (individual sample vials) in the field and then combined in the lab (lab-pooled) once they reached the NWHC for testing.

Over 250 birds were sampled from Yukon Delta NWR, Arctic NWR and the North Slope (breeding and post breeding). Of these, 210 were live bird samples (Fig. 17), and 45 hunter-killed samples (see Spring Subsistence chapter). Each sampling stage and its location will be discussed separately and a final table presents 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 on the North Slope. 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, Prudhoe Bay, Ikpikpuk and Canning River Delta are located on the northern coastline of Alaska along the Beaufort Sea.

Capture Methods: Birds were captured at four breeding sites. Bow nets were used for incubating birds and some were captured with mist nets, walk-in traps or nooses.

Results: A total of 114 breeding Pectoral Sandpipers was captured and banded. Field-pooled cloacal and oral-pharyngeal samples were collected from breeding Pectoral Sandpipers (Table 44). Of those, 113 were adult females and one was an adult male.

AI Results: None of the 114 field-pooled samples collected from North Slope and Arctic NWR breeding Pectoral Sandpipers tested positive for avian influenza.

Table 44. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from breeding Pectoral Sandpipers on the North Slope and Arctic NWR, June through July 2010.

Location	Total birds captured	AI samples		AI field-pooled samples	Total AI samples
		Female	Male		
Barrow	26	26	0	26	26
Prudhoe Bay	20	20	0	20	20
Ikpikpuk	30	29	1	29	29
Canning River Delta	38	38	0	38	38
Total	114	113	1	114	114

Other Accomplishments: Feathers were collected for stable isotope studies and blood samples were collected for genetic studies. Morphological measurements were also recorded. All captured individuals had a metal band placed on their legs and some had a unique set of color bands placed on their legs.

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.

Arctic NWR

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

Capture Methods: Post-breeding birds were captured with mist nets and walk in traps or nooses at three locations. All captured individuals had a metal band placed on their leg.

Results: A total of 96 post-breeding Pectoral Sandpipers was captured and banded at Jago River Delta, Okpilak River Delta and Canning River Delta. Field-pooled cloacal and oral-pharyngeal samples were collected from post-breeding Pectoral Sandpipers (Table 45). Of those, 94 were juveniles, undetermined for sex and 2 were adults of unknown sex.

AI Results: None of the 96 field-pooled samples collected from post-breeding Pectoral Sandpipers tested positive for avian influenza.

Table 45. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from post-breeding Pectoral Sandpipers on the Arctic NWR, July and August 2010.

Location	Total birds captured	AI Samples			AI field-pooled samples	Total AI samples
		Female	Male	Unk		
Jago River Delta	26	0	0	26	26	26
Okpilak River Delta	26	0	0	26	26	26
Canning River Delta	44	0	0	44	44	44
Total	96	0	0	96	96	96

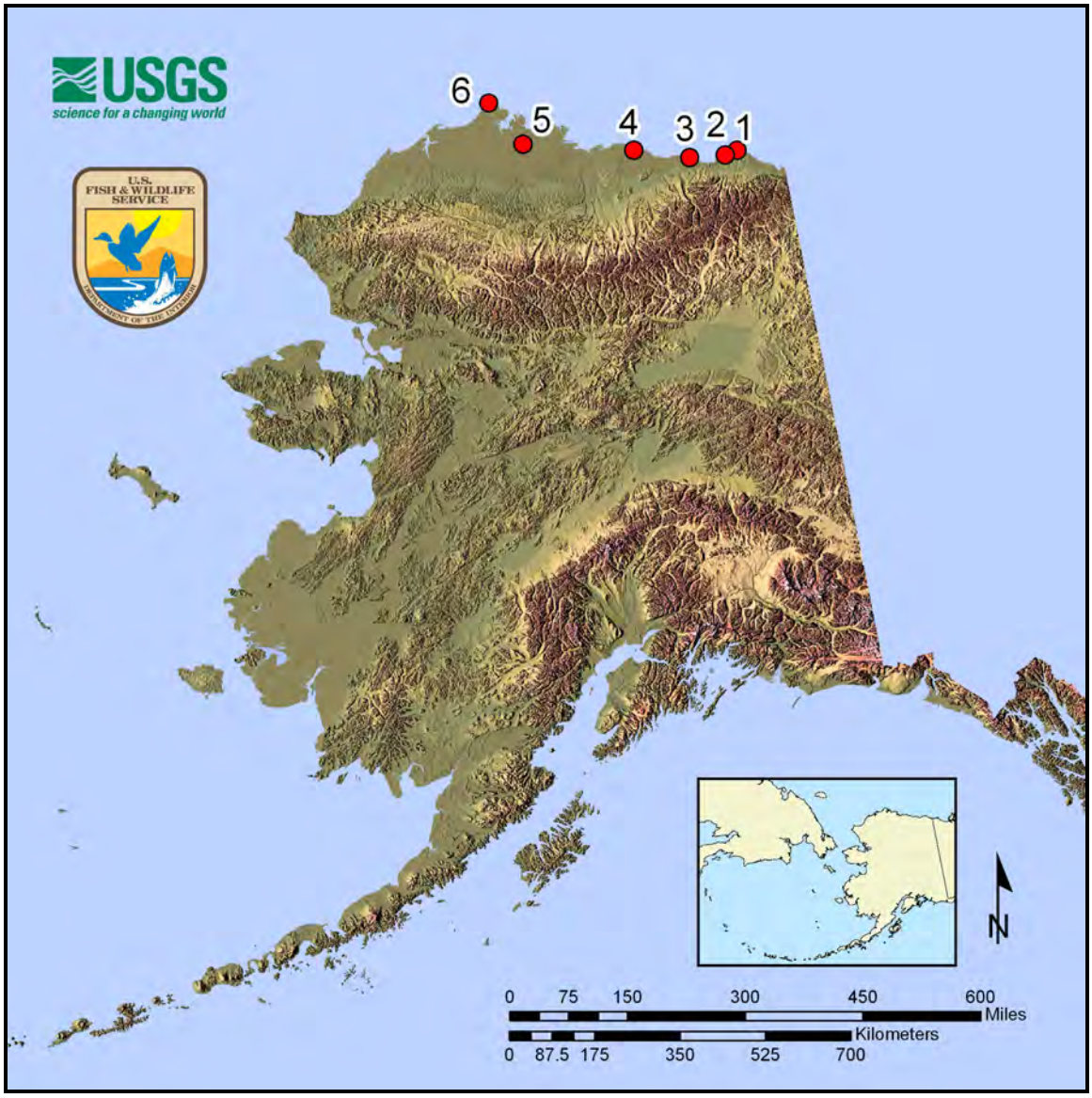
Other Accomplishments: Blood samples were collected to assess stress hormone and fat metabolite levels as an indicator of bird condition. Since 2005, assessment of the abundance, distribution, timing, species composition and habitat requirements of shorebirds staging on coastal areas has been conducted on post-breeding shorebirds on the Arctic National Wildlife Refuge.

Table 46. Avian influenza analytical results for Pectoral Sandpipers collected June through August 2010: field-pooled samples.

Location	Sampling Stages	Total samples	Total field-pooled AI positive	Prevalence
Barrow	Breeding	26	0	0
Prudhoe Bay	Breeding	20	0	0
Ikpikpuk	Breeding	30	0	0
Canning River Delta	Breeding	38	0	0
Jago River Delta	Post-breeding	26	0	0
Okpilak River Delta	Post-breeding	26	0	0
Canning River Delta	Post-breeding	44	0	0
Total		210	0	0

Dan Ruthrauff, USGS ASC

Figure 17. Live bird sampling locations for Pectoral Sandpipers in Alaska, 2010. For specific location names see key following map.



Site #	Geographic Location	Specific Location	Total Samples
1	Arctic NWR	Jago River Delta	26
2	Arctic NWR	Okpilak River Delta	26
3	Arctic NWR	Canning River Delta	82
4	North Slope	Prudhoe Bay	20
5	North Slope	Ikpikpuk	30
6	North Slope	Barrow	26
	Total		**210**

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.

In 2010, a new method of preserving paired samples was implemented. Oral-pharyngeal (OP) and cloacal (CL) swabs were collected from each bird and preserved together (field-pooled) in a single sample vial. In contrast, in previous sampling years the OP and CL swabs were preserved separately (individual sample vials) in the field and then combined in the lab (lab-pooled) once they reached the NWHC for testing.

Methods: No live capture focused on Red Knots and no opportunistic sampling occurred this field season.

Robert E. Gill, Jr., USGS ASC

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). Close to 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).

In 2010, a new method of preserving paired samples was implemented. Oral-pharyngeal (OP) and cloacal (CL) swabs were collected from each bird and preserved together (field-pooled) in a single sample vial. In contrast, in previous sampling years the OP and CL swabs were preserved separately (individual sample vials) in the field and then combined in the lab (lab-pooled) once they reached the NWHC for testing.

Thirty birds were sampled on the Yukon Delta NWR and the North Slope. Of those, 27 were live bird samples (Fig. 18), and 3 hunter-killed samples (see Spring Subsistence chapter). A final table with analytical results is presented at the end of this section. See discussion below.

North Slope & Arctic NWR

Long-billed Dowitchers were captured, sampled, and released at three sites on the North Slope: Barrow, Ikpikpuk and Prudhoe Bay and two sites on the Arctic NWR: Jago River Delta and Canning River Delta.

Capture Methods: Birds were captured with mist nets, walk-in traps or nooses and bow nets while incubating.

Results: A total of 27 Long-billed Dowitchers was sampled and banded. Field-pooled cloacal and oral-pharyngeal samples were collected (Table 47). Of those, 8 were adult females, 12 were adult males, 5 were adults, sex unidentified and 2 were juveniles, sex unidentified.

AI Results: None of the 27 field-pooled samples collected from North Slope or Arctic NWR Long-billed Dowitchers tested positive for avian influenza.

Table 47. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from Long-billed Dowitchers on the North Slope and Arctic NWR, June and July 2010.

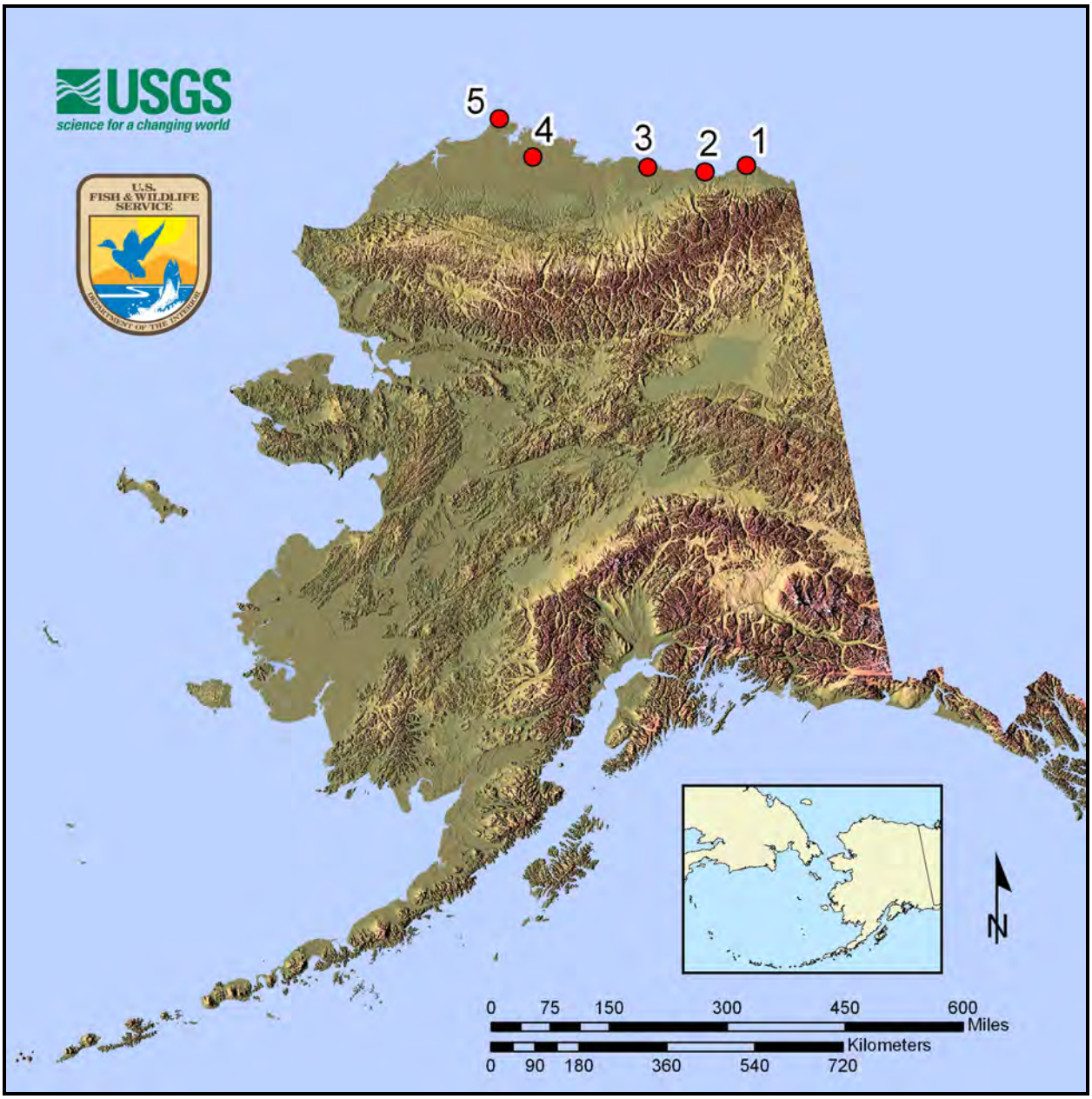
Location	Total birds captured	AI Samples			AI field-pooled samples	Total AI samples
		Female	Male	Unk		
Jago River Delta	1	0	0	1	1	1
Canning River Delta	2	0	0	2	2	2
Ikpikpuk	8	1	4	3	8	8
Prudhoe Bay	1	0	1	0	1	1
Barrow	15	7	7	1	15	15
Total	27	8	12	7	27	27

Other Accomplishments: All captured birds were banded with a metal band and a unique set of color bands. Biometric measurements were recorded for all birds. Feather and blood samples were collected for isotope studies and genetic analyses.

Table 48. Avian influenza analytical results for Long-billed Dowitchers collected June and July 2010: field-pooled samples.

Location	Total samples	Total field-pooled AI positive	Prevalence
Jago River Delta	1	0	0
Canning River Delta	2	0	0
Ikpikpuk	8	0	0
Prudhoe Bay	1	0	0
Barrow	15	0	0
Total	27	0	0

Figure 18. Live bird sampling locations for Long-billed Dowitchers in Alaska, 2010. For specific location names see key following map.



Site #	Geographic Location	Specific Location	Total Samples
1	Arctic NWR	Jago River Delta	1
2	Arctic NWR	Canning River Delta	2
3	North Slope	Ikpikpuk	8
4	North Slope	Prudhoe Bay	1
5	North Slope	Barrow	15
	Total		**27**

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.

In 2010, a new method of preserving paired samples was implemented. Oral-pharyngeal (OP) and cloacal (CL) swabs were collected from each bird and preserved together (field-pooled) in a single sample vial. In contrast, in previous sampling years the OP and CL swabs were preserved separately (individual sample vials) in the field and then combined in the lab (lab-pooled) once they reached the NWHC for testing.

Over 100 birds were sampled from Yukon Delta NWR and St. George Island. Of those, 98 were live bird samples (Fig. 19), and 3 were hunter-killed samples (see Spring Subsistence chapter). See discussion below and final table of analytical results at the end of this discussion.

Yukon Delta NWR

Rock Sandpipers were captured, sampled, and released at Punoarat Point near Angyoyaravak Bay on the central Yukon-Kuskokwim Delta.

Capture Methods: Post-breeding Rock Sandpipers were captured using mist nets, rocket nets, and, whoosh nets. All birds were measured, weighed, banded, and released. Capture efforts were reduced due to inclement weather which eventually closed down camp one week earlier than previous years. Additionally, sampling efforts focused on smaller catches for collection of seroprevalence samples.

Results: Fifty-three Rock Sandpipers were captured and banded at Punoarat Point. Field-pooled cloacal and oral-pharyngeal samples were collected (Table 49). Of those, 34 were adults and 19 were juveniles. All were unidentified for sex.

AI Results: None of the 53 field-pooled samples collected from Yukon Delta Rock Sandpipers tested positive for avian influenza.

Table 49. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from Rock Sandpipers at Punoarat Point August and September 2010.

Location	Total birds captured	AI Samples			AI field-pooled samples	Total AI samples
		Female	Male	Unk		
Punoarat Point	53	0	0	53	53	53

Other Accomplishments: Blood samples were collected for seroprevalence analysis.

Pribilof Islands

Rock Sandpipers were opportunistically sampled on St. George Island.

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

Results: Forty-eight Rock Sandpipers were captured and banded on St. George Island. Field-pooled cloacal and oral-pharyngeal samples were collected from 45 birds (Table 50). Of those, 13 were adults and 31 were juveniles and one was of unknown age. All were unidentified for sex.

AI Results: None of the 45 field-pooled samples collected from St. George Island Rock Sandpipers tested positive for avian influenza.

Table 50. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from Rock Sandpipers on St. George Island August and September 2010.

Location	Total birds captured	AI Samples			AI field-pooled samples	Total AI samples
		Female	Male	Unk		
St. George Island	45	0	0	45	45	45

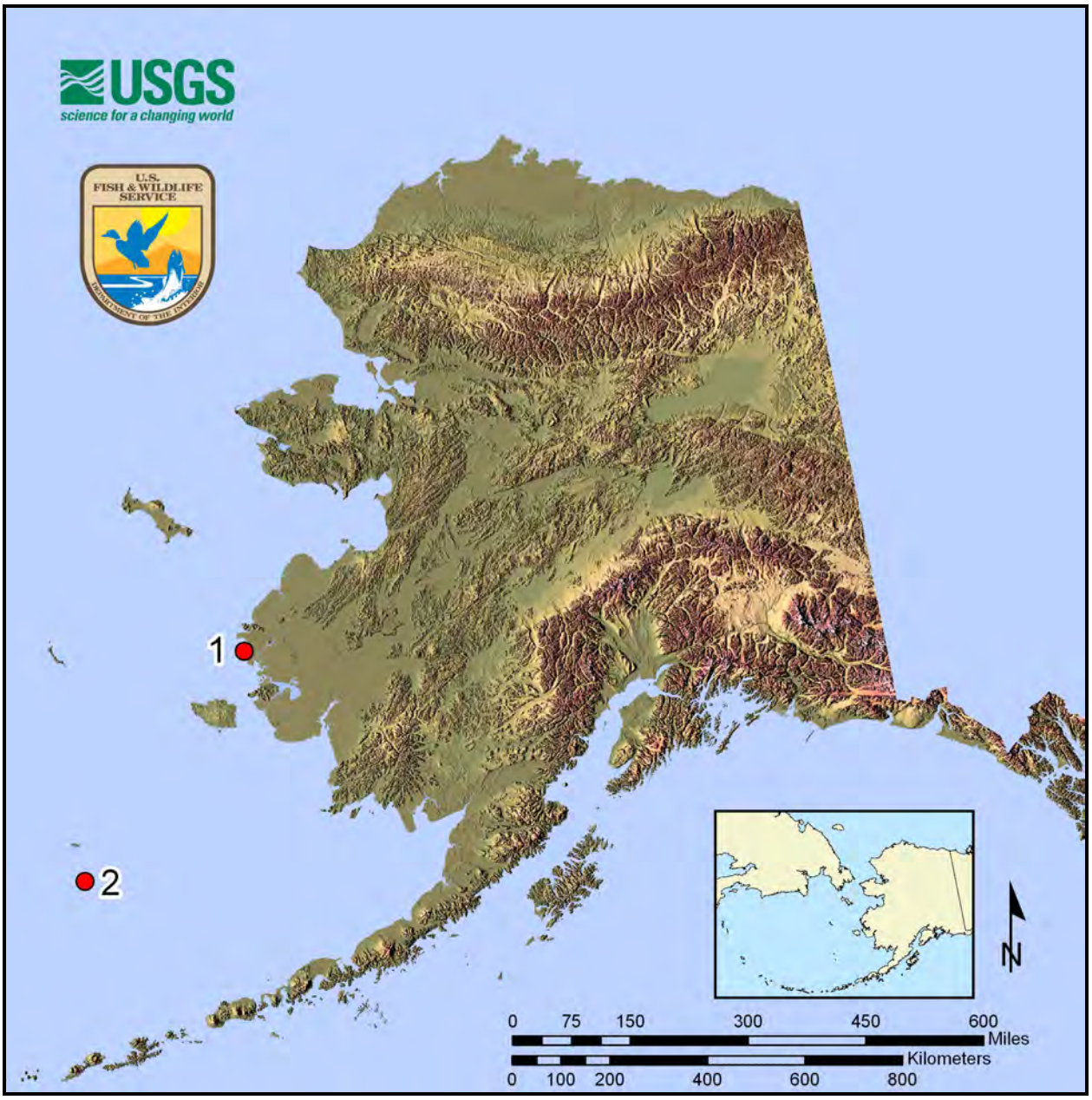
Other Accomplishments: Twenty-one seroprevalence samples were collected for analysis.

Table 51. Avian influenza analytical results for Rock Sandpipers collected August and September 2010: field-pooled samples.

Location	Total samples	Total field-pooled AI positive	Prevalence
Punoarat Point	53	0	0
St. George Island	45	0	0
Total	98	0	0

Robert E. Gill, USGS, ASC

Figure 19. Live bird sampling locations for Rock Sandpipers in Alaska, 2010. For specific location names see key following map.



Site #	Geographic Location	Specific Location	Total Samples
1	Yukon Delta NWR	Punoarat Point	53
2	Pribilof Islands	St. George Island	45
	Total		**98**

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.

In 2010, a new method of preserving paired samples was implemented. Oral-pharyngeal (OP) and cloacal (CL) swabs were collected from each bird and preserved together (field-pooled) in a single sample vial. In contrast, in previous sampling years the OP and CL swabs were preserved separately (individual sample vials) in the field and then combined in the lab (lab-pooled) once they reached the NWHC for testing.

Twenty-three birds were sampled from the Seward Peninsula. All samples were collected from live birds (Fig. 19). See discussion below and final table with analytical results at the end of this section.

Seward Peninsula

Pacific Golden-Plovers were sampled from the Nome region located on the Seward Peninsula.

Capture Methods: A trap based on the "luchock" design, a self-triggering clap-net, was used to capture birds. All birds were measured, weighed, banded, and released.

Results: Twenty-three birds were sampled in the Nome area. Field-pooled cloacal and oral-pharyngeal samples were collected (Table 52). Of those, 8 were adult females and 15 were adult males.

AI Results: None of the 23 field-pooled samples collected from Seward Peninsula Pacific Golden-Plovers tested positive for avian influenza.

Table 52. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from Seward Peninsula, June 2010.

Location	Total birds captured	AI Samples		AI field-pooled samples	Total AI samples
		Female	Male		
Nome Region	23	8	15	23	23

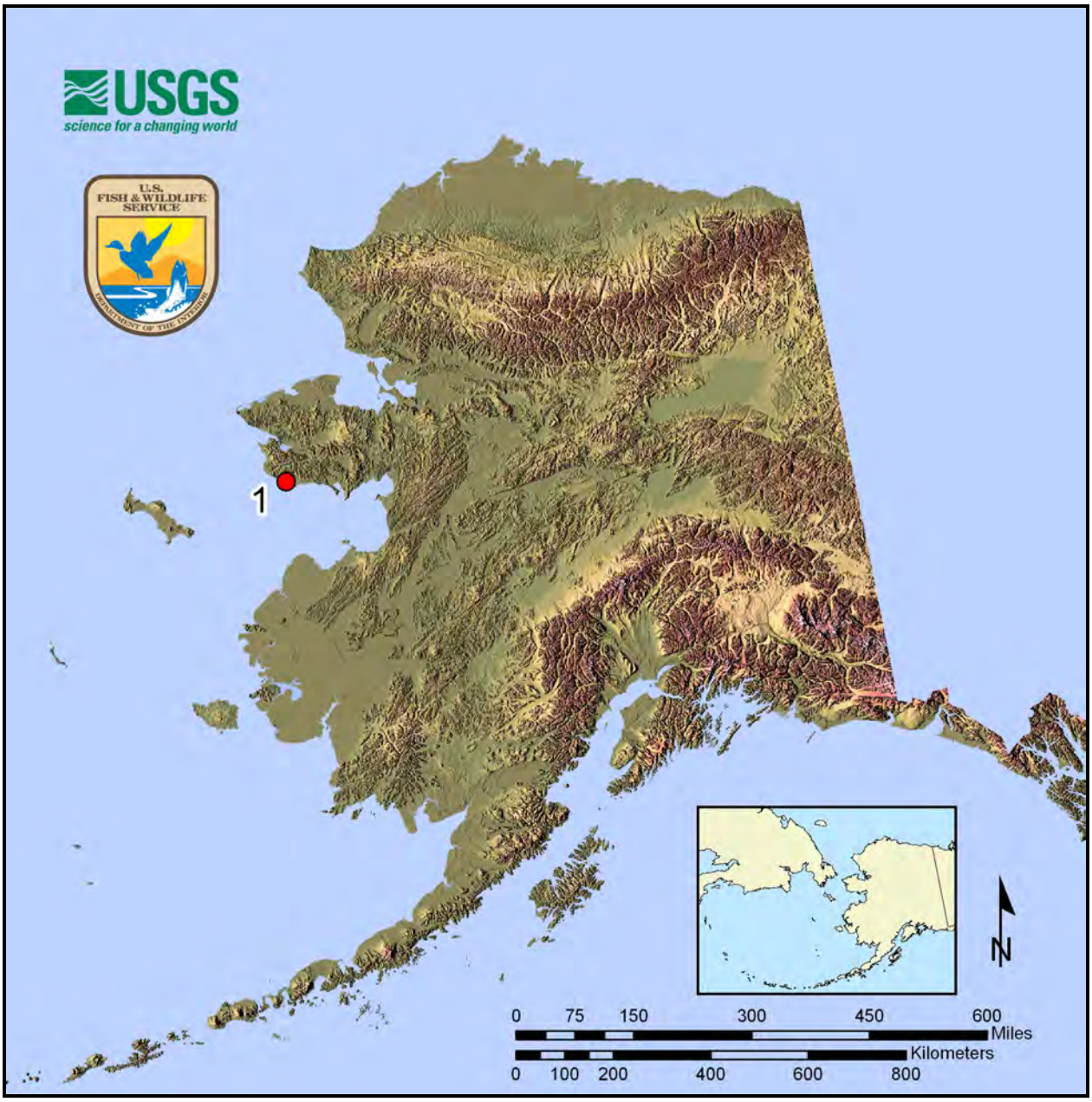
Other Accomplishments: All birds were banded with metal bands and unique color combination bands on their legs. Feathers for isotope analyses were collected from all birds and all males were equipped with a geolocator. Of the 15 birds fitted with geolocators in 2009, 13 returned in 2010 and 8 were recaptured. Data collected together from the geolocators and isotope analyses will help determine wintering ground connectivity for Pacific Golden-Plovers nesting on the Seward Peninsula.

Table 53. Avian influenza analytical results for Pacific Golden-Plovers collected June 2010: field-pooled samples.

Location	Total samples	Total field-pooled AI positive	Prevalence
Seward Peninsula	23	0	0

Oscar W. Johnson

Figure 20. Live bird sampling location for Pacific Golden Plovers in Alaska, 2010. For specific location name see key following map.



Site #	Geographic Location	Specific Location	Total Samples
1	Seward Peninsula	Nome	23

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.

In 2010, a new method of preserving paired samples was implemented. Oral-pharyngeal (OP) and cloacal (CL) swabs were collected from each bird and preserved together (field pooled) in a single sample vial. In contrast, in previous sampling years the OP and CL swabs were preserved separately (individual sample vials) in the field and then combined in the lab (lab pooled) once they reached the NWHC for testing.

A total of five birds were sampled on the North Slope. All were live bird samples (Fig. 21). A final table with analytical results is presented at the end of this section. See discussion below.

North Slope

Buff-breasted Sandpipers were captured, banded, and released on the North Slope at Prudhoe Bay, located on the northern coastline of Alaska along the Beaufort Sea.

Capture Methods: Birds were captured using mist nets at known lek locations. Unlike previous years, appreciable numbers of Buff-breasted Sandpipers were not captured due to a combination of low lek numbers and a reduced crew size.

Results: On the North Slope, five Buff-breasted Sandpipers were captured and banded at Prudhoe Bay. Field-pooled cloacal and oral-pharyngeal samples were collected (Table 54). All were adult males.

AI Results: None of the five field-pooled samples collected from the North Slope Buff-breasted Sandpipers tested positive for avian influenza.

Table 54. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from Buff-breasted Sandpipers on the North Slope, June 2010.

Location	Total birds captured	AI Samples		AI field-pooled samples	Total AI samples
		Female	Male		
Prudhoe Bay	5	0	5	5	5

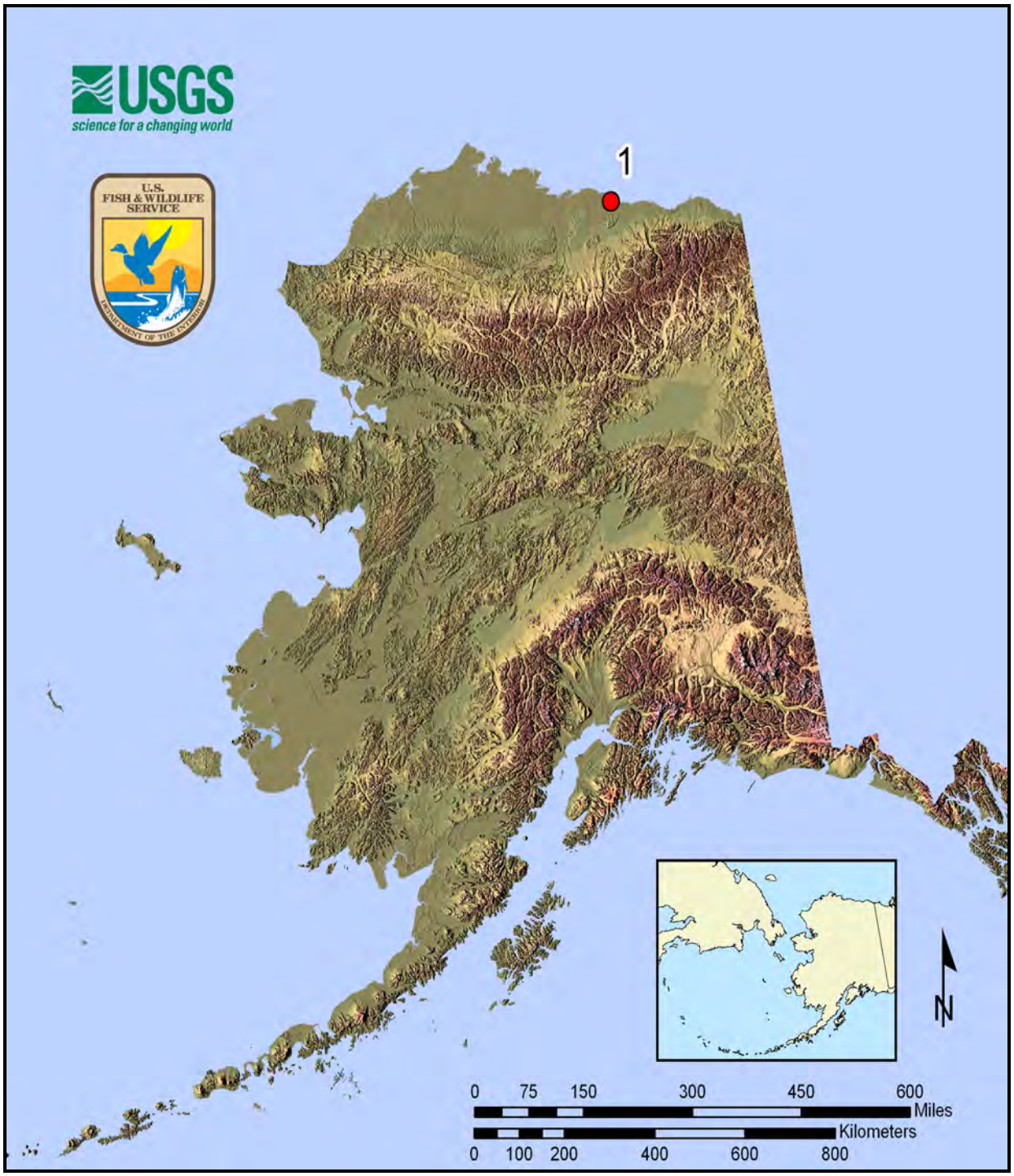
Other Accomplishments: Biometric measurements were taken on all birds to assist in determining age, sex and physiological condition. In addition, blood samples were collected for genetic and hormone studies and feather samples were collected for stable isotope studies.

Table 55. Avian influenza analytical results for Buff-breasted Sandpipers collected June 2010: field pooled samples.

Location	Total samples	Total field-pooled AI positive	Prevalence
North Slope	5	0	0

Steve Kendall, USFWS

Figure 21. Live bird sampling location for Buff-breasted Sandpipers in Alaska, 2010. For specific location name see key following map.



Site #	Geographic Location	Specific Location	Total Samples
1	North Slope	Prudhoe Bay	5

Taxon: Gulls (*Larus*)

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

Ranking score: 11.5

Background: *Larus* species gulls are often predatory, feeding on birds, small mammals, fish and invertebrates (Gilchrist 2001, Bowman et al. 2004). The Glaucous Gull (*Larus hyperboreus*) specifically 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).

Sequence data suggests that *Larus* species gulls are involved in the trans-hemispheric movement of influenza virus genes (Makarova et al. 1999, Widjaja et al. 2004, Krauss et al. 2007, Ramey et al. 2010) and in the transmission of avian influenza to other species (Hanson et al. 2008, Ramey et al. 2010). Thus, there is a need to better understand the migration, avian influenza prevalence, and genomics of gull species.

A more intensive sampling plan was implemented for the 2010 field season due to the accumulative low sampling numbers of gulls collected since the start of the avian influenza surveillance program in 2006. Sampling was broken into spring and fall across Alaska, primarily focusing within coastal areas of northern and western portions of the state as birds in these areas are thought to winter in areas of Russia and Asia. Gull sampling was conducted under scientific collection permits (e.g. lethal collection using a firearm) at all locations except Middleton Island where live bird sampling occurred. In addition, live bird samplings occurred opportunistically at Barrow.

Over 500 Glaucous Gulls, Glaucous-Winged Gulls (*Larus glaucescens*), and Herring Gulls (*Larus argentatus*) were sampled from 11 geographic locations within the state. Of those, 103 were live bird samples and 411 were samples obtained under scientific collection permits (Fig. 22). Spring, fall, and live sampling are discussed separately and a final table with analytical results may be found at the end of this section.

Spring sampling

Spring Capture Methods: Because gulls are difficult to capture live in large numbers the majority of sampling was conducted under scientific collection permits (e.g. lethal collection using a firearm). In some locations sample collection was accomplished through routine airport and landfill hazing operations conducted by USDA Wildlife Services. Spring samples were obtained in May and June.

Results: One hundred ninety-six *Larus* gulls were sampled during spring at 9 sites in 7 geographic locations throughout the state. Field-pooled cloacal and oral-pharyngeal samples were collected from Glaucous Gulls, Glaucous-Winged, Gulls and Herring Gulls (Table 56). Of those, 142 were adults (sex undetermined) and 27 were undetermined for age and sex.

AI Results: None of the 196 Glaucous, Glaucous-Winged, and Herring Gulls field-pooled samples tested positive for avian influenza.

Table 56. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from spring gulls, May and June 2010.

Location	Glaucous Gull	Glaucous-Winged Gull	Herring Gull	Total birds sampled	Sex Unk	Field-pooled AI samples
Prudhoe Bay	25	0	0	25	25	25
Barrow	25	0	0	25	25	25
Galena	4	0	21	25	25	25
Innoko NWR, Iditarod River	1	0	1	2	2	2
Soldotna	0	25	0	25	25	25
Kodiak	0	27	0	27	27	27
King Salmon	0	17	0	17	17	17
Dutch Harbor	0	0	25	25	25	25
Adak	0	25	0	25	25	25
Total	55	94	47	196	196	196

Other Accomplishments: All scientific collected specimens were donated to the Burke Museum of Natural History and Culture in Seattle, Washington where further species assessments will be made.

Fall sampling

Fall Capture Methods: The majority of sampling was conducted under scientific collection permits (e.g. lethal collection using firearms). In some locations sample collection was accomplished through routine airport and landfill hazing operations conducted by USDA Wildlife Services. In addition, live captured gull sampling was conducted in July on Middleton Island. Live sampling efforts will be discussed separately. Fall samples were obtained in August and September.

Results: Two hundred fifteen *Larus* gulls were sampled at 8 sites in 6 geographic locations throughout the state. Field-pooled cloacal and oral-pharyngeal samples were collected from Glaucous Gulls, Glaucous-Winged Gulls, and Herring Gulls (Table 57). Of those, 124 were adults and 91 were juveniles. All were undetermined for sex.

AI Results: One of the Glaucous-Winged Gull field-pooled samples tested positive for avian influenza. None of the fall gull samples were H5 or N1 positive. The field-pooled sample represents a 0.5% prevalence of avian influenza in the fall Adak birds.

Table 57. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from fall gulls, August and September 2010.

Location	Glaucous Gull	Glaucous-Winged Gull	Herring Gull	Total birds sampled	Sex Unk	Field-pooled AI samples
Prudhoe Bay	22	0	0	22	22	22
Barrow	27	0	0	27	27	27
Galena	8	0	15	23	23	23
Selawik	49	0	0	49	49	49
Soldotna	0	26	0	26	26	26
Kodiak	0	19	0	19	19	19
Dutch Harbor	0	24	0	24	24	24
Adak	0	25	0	25	25	25
Total	106	94	15	215	215	215

Other Accomplishments: All scientific collected specimens were donated to the Burke Museum of Natural History and Culture in Seattle, Washington where further species assessments will be made.

Live gull sampling

Middleton Island and Barrow

Glaucous-Winged Gulls chicks were captured, banded, and released from Middleton Island, located in the Gulf of Alaska south of Prince William Sound. The island is approximately 8 km long and 1.6 km wide and is located near the edge of the continental shelf. Overall, the topography of the island is generally flat with the exception of the prominent sea cliffs which separate the upland habitat from an expansive coastal flat. In addition, Glaucous Gulls were opportunistically sampled at Barrow, located on the North Slope.

Capture Methods: A three person team walked the tundra searching for nest sites on Middleton Island. All juvenile birds were sampled, banded and marked with alpha-numeric yellow tarsus bands. Three Glaucous Gulls were opportunistically sampled at Barrow using a noose mat.

Results: One hundred Glaucous-Winged Gulls were captured and sampled at Middleton Island and three Glaucous Gulls were opportunistically sampled at Barrow. Field-pooled cloacal and oral-pharyngeal samples were collected from 103 gulls (Table 58). Of those, 100 were juveniles and 3 were adults. All were undetermined for sex.

AI results: None of the 103 field-pooled samples collected from Middleton Island and Barrow gulls tested positive for avian influenza.

Table 58. Birds captured and field-pooled cloacal and oral-pharyngeal swabs collected from live gulls and at Middleton Island and Barrow, July and September 2010.

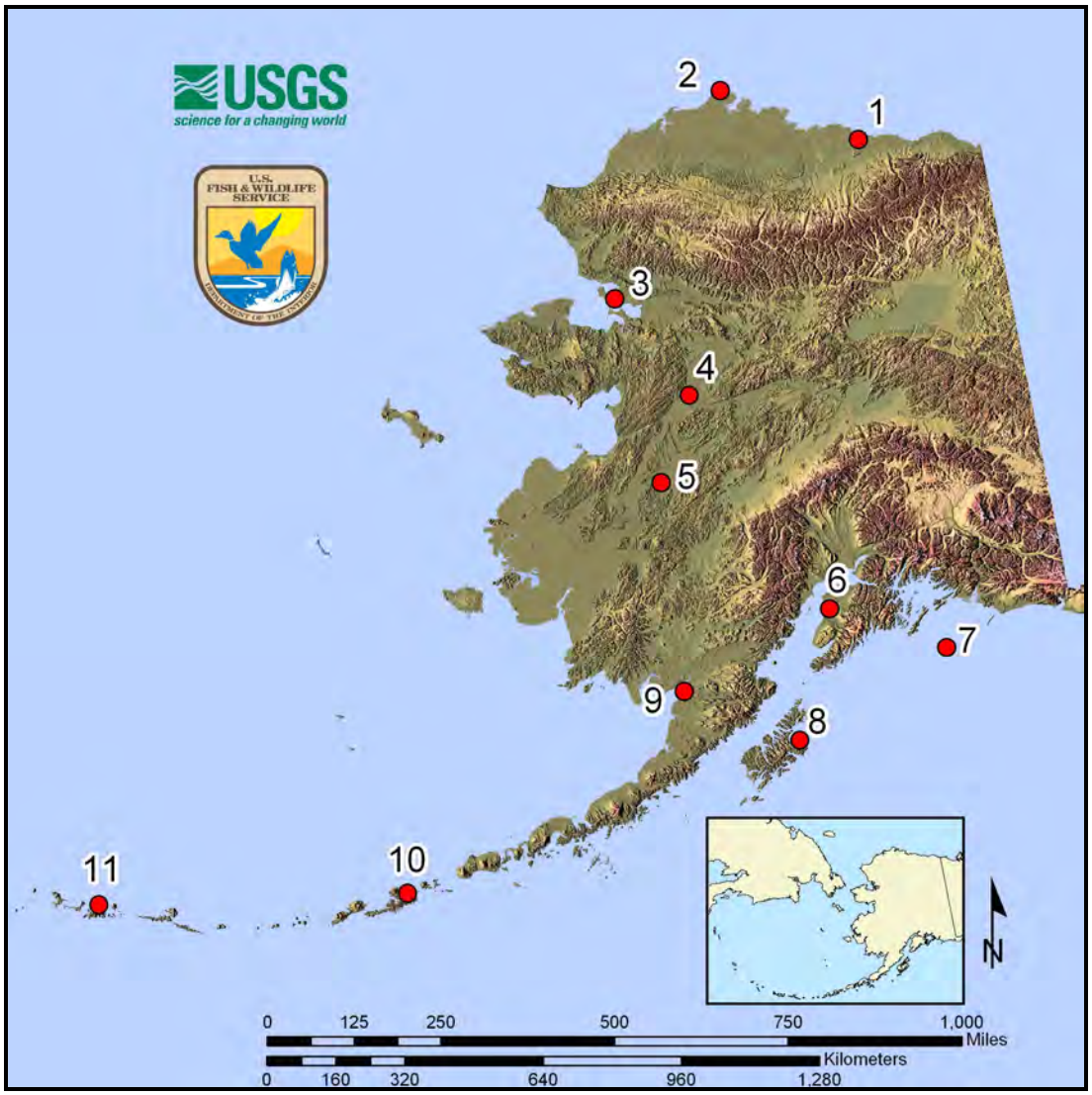
Location	Glaucous Gull	Glaucous-Winged Gull	Total birds sampled	Sex Unknown	Field-pooled AI samples
Barrow	3	0	3	3	3
Middleton Island	0	100	100	100	100
Total	3	100	103	103	103

Andy Reeves, USGS, ASC

Table 59. Avian influenza analytical results for Glaucous, Glaucous-Winged, and Herring Gulls collected May through September 2010: field-pooled results.

Location	Sampling stages	Total samples	Total field-pooled AI positive	Prevalence
Prudhoe Bay	Spring	25	0	0
Barrow	Spring	25	0	0
Galena	Spring	25	0	0
Innoko NWR, Iditarod River	Spring	2	0	0
Soldotna	Spring	25	0	0
Kodiak	Spring	27	0	0
King Salmon	Spring	17	0	0
Dutch Harbor	Spring	25	0	0
Adak	Spring	25	0	0
Spring subtotal		**196**	0	0
Prudhoe Bay	Fall	22	0	0
Barrow	Fall	27	0	0
Galena	Fall	23	0	0
Selawik	Fall	49	0	0
Soldotna	Fall	26	0	0
Kodiak	Fall	19	0	0
Dutch Harbor	Fall	24	0	0
Adak	Fall	25	1	0.04
Fall subtotal		**215**	0	0
Middleton Island	Live	100	0	0
Barrow	Live	3	0	0
Live subtotal		**103**		
Grand Total		**514**	**1**	

Figure 22. Sampling locations for Glaucous, Glaucous-Winged, and Herring Gulls in Alaska, 2010. For specific location names see key following map.



Site #	Geographic Location	Specific Location	Total Samples
1	North Slope	Prudhoe Bay Landfill	47
2	North Slope	Barrow	55
3	Selawik NWR	Kobuk Delta	49
4	Yukon-Koyukuk	Galena	48
5	Innoko NWR	Iditarod River	2
6	Kenai Peninsula	Soldotna Landfill	51
7	Gulf of Alaska	Middleton Island	100
8	Kodiak Island	Kodiak Airport	46
9	Alaska Peninsula	King Salmon	17
10	Aleutians West	Dutch Harbor	49
11	Aleutians West	Adak Island	50
	Total		**514**

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 2010, we employed a strategy similar to 2009 which 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.

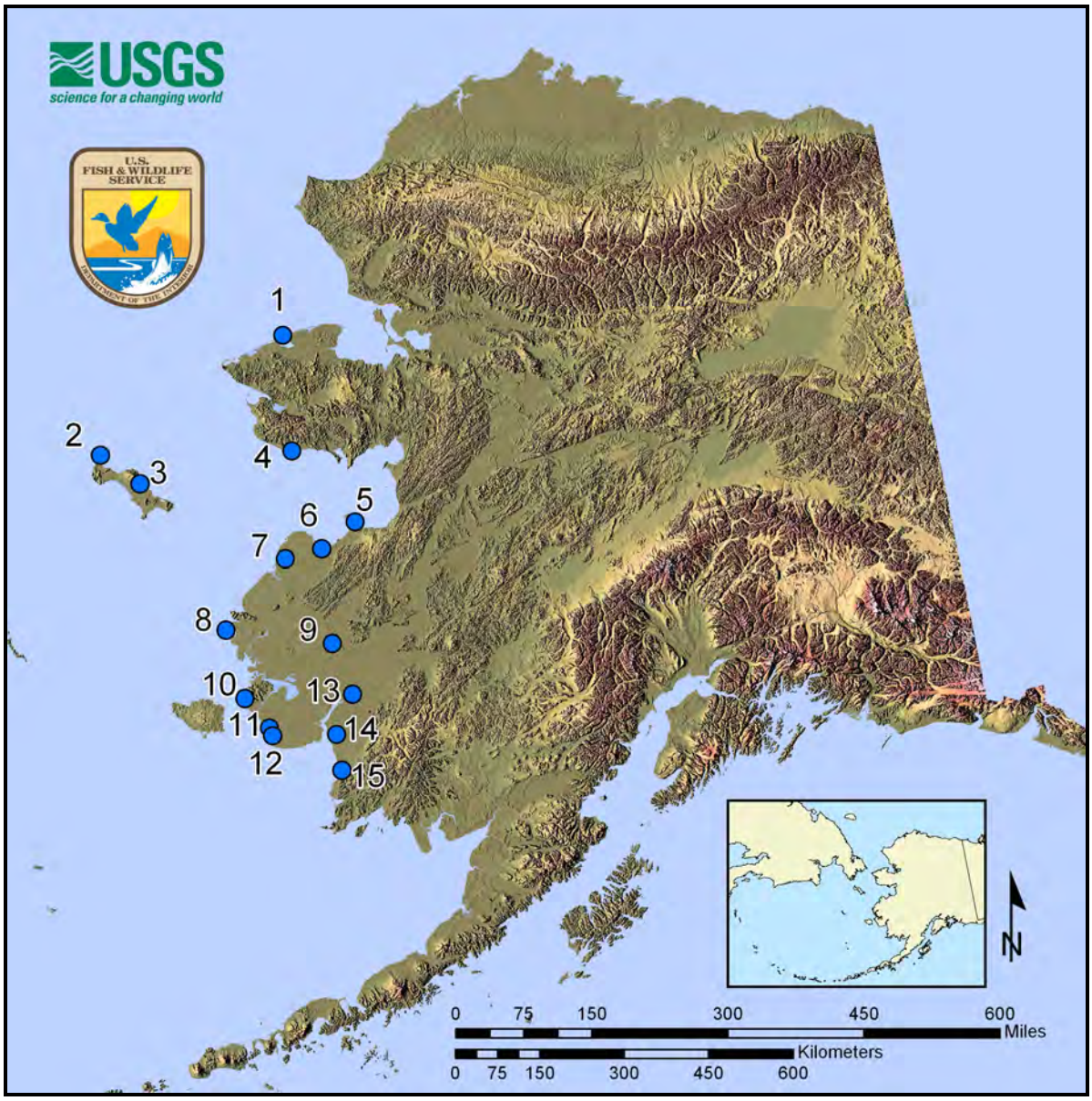
The primary value of sampling birds harvested in fall is detection of AI in birds migrating south from Alaska through Canada, all four North American flyways, and Mexico. In addition, some species of sea ducks return from Asia to winter in Alaska. The species composition and timing of fall harvest over 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. 23) 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, Emmonak, Hooper Bay, Kipnuk, Kotlik, Kwethluk, 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 300 spring harvested birds. In addition, 74 fall harvest birds were collected on St. Lawrence Island from Gambell and Savoonga. In all locations, subsistence users were encouraged, through various outreach methods, to provide harvested birds to sample coordinators.

Figure 23. Spring subsistence sampling locations for H5N1 Avian Influenza in Alaska, 2010. For specific locations see key following map.



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

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 Black Brant, King Eiders, and Lesser Snow Geese. However, samples from numerous other species were also collected.

Results

Yukon-Kuskokwim Delta

The Yukon–Kuskokwim Delta is located in western Alaska where its two main rivers, the Yukon and the Kuskokwim, empty into the Bering Sea. The area's rivers, streams, lakes, sloughs, ponds, tundra and wetlands are home to millions of migrating ducks, geese, and other water birds.

Results: A total of 2,943 samples was collected and analyzed from 43 different species, 16 of which were priority species. Eighty of the field-pooled samples tested positive for avian influenza (Table 60). A total of 10 samples tested positive for Low pathology H5. The positives included 4 Cackling Geese, 3 Greater White-fronted Geese, 1 Snow Goose, and 2 Tundra Swan samples. None of the samples were N1 positive.

Craig Ely, USGS ASC

Table 60. Avian influenza results for field-pooled cloacal and oral-pharyngeal swabs obtained from spring subsistence harvested birds on the Yukon Delta National Wildlife Refuge, Alaska 2010. Priority species are in bold font.

Species	Samples Taken	Field-pooled AI Positive	Prevalence
American Wigeon	7	0	0
Arctic Tern	1	0	0
Black Brant	212	0	0
Black Scoter	9	0	0
Black Turnstone	2	0	0
Bufflehead	2	0	0
Cackling Goose	587	14	0.024
Canvasback	11	0	0
Common Eider	8	0	0
Common Goldeneye	2	0	0
Dunlin	4	0	0
Emperor Goose	48	2	0.042
Great Blue Heron	1	0	0
Gray-cheeked Thrush	4	0	0
Glaucous Gull	3	0	0
Greater Scaup	154	0	0
Greater White-fronted Goose	929	42	0.045
Glaucous-winged Gull	5	0	0
Green-winged Teal	6	0	0
Harlequin Duck	1	0	0
King Eider	277	1	0.004
Lapland Longspur	8	0	0
Long-billed Dowitcher	3	0	0
Lesser Scaup	1	0	0
Long-tailed Jaeger	1	0	0
Mallard	15	0	0
Mew Gull	1	0	0
Northern Pintail	52	1	0.019
Northern Shoveler	8	0	0
Pectoral Sandpiper	45	0	0
Red-breasted Merganser	1	0	0
Red-necked Grebe	1	0	0
Red-necked Phalarope	6	0	0
Rock Sandpiper	3	0	0
Sandhill Crane	85	0	0
Sharp-tailed Sandpiper	11	0	0
Snow Goose	291	17	0.058
Steller's Eider	12	0	0
Trumpeter Swan	3	0	0
Tundra Swan	104	3	0.029
Wilsons Phalarope	6	0	0
Wilsons Snipe	3	0	0
White-winged Scoter	10	0	0
Grand Total	**2943**	**80**	

Seward Peninsula

The Seward Peninsula is located on the western coast of Alaska between Kotzebue Sound and Norton Sound. Moist and wet tundra communities are found at lower elevations and alpine tundra communities in the high mountains.

Results: A total of 716 samples was collected and analyzed from 21 different species, 8 of which were priority species. Twenty-two of the field-pooled samples tested positive for avian influenza (Table 61). Two Snow Goose samples were H5 positive. None of the samples were N1 positive.

Table 61. Avian influenza results for field-pooled cloacal and oral-pharyngeal swabs obtained from spring subsistence harvested birds on the Seward Peninsula, Alaska 2010. Priority species are in bold font.

Species	**Samples Taken**	**Field-pooled AI Positive**	**Prevalence**
American Green-winged Teal	1	0	0
American Wigeon	6	0	0
Black Brant	55	0	0
Cackling Goose	11	0	0
Canada Goose	143	5	0.035
Common Eider	2	0	0
Common Goldeneye	1	0	0
Common Merganser	1	0	0
Dunlin	2	0	0
Emperor Goose	1	0	0
Greater Scaup	9	0	0
Greater White-fronted Goose	141	8	0.057
Green-winged Teal	2	0	0
Lesser Scaup	2	0	0
Mallard	4	0	0
Northern Pintail	54	1	0.018
Northern Shoveler	12	1	0.083
Sandhill Crane	14	0	0
Snow Goose	228	7	0.031
Tundra Swan	12	0	0
Western Sandpiper	15	0	0
Grand Total	**716**	**22**	

St. Lawrence Island

St. Lawrence Island is located in the Bering Sea between northeastern Russia and west of Alaska's mainland. It has 580 km of coastline and the islands ponds, lakes and rivers provide productive nesting grounds for waterfowl and shorebirds. Some of the target species for avian influenza sampling can be found on St. Lawrence Island include Common Eiders, King Eiders, and Long-tailed Ducks.

Results: A total of 190 samples was collected and analyzed from 11 different species; 4 of which were priority species. Three of the field-pooled samples were positive for avian influenza (Table 62). None of the samples were H5 or N1 positive.

Table 62. Avian influenza results for field-pooled cloacal and oral-pharyngeal swabs obtained from spring subsistence harvested birds on St. Lawrence Island, Alaska 2010. Priority species are in bold font.

Species	Samples Taken	Field-pooled AI Positive	Prevalence
American Green-winged Teal	1	0	0
Black Brant	5	0	0
Common Eider	1	1	1.0
Common Murre	100	2	0.02
Crested Auklet	53	0	0
Greater White-fronted Goose	3	0	0
Harlequin Duck	2	0	0
King Eider	1	0	0
Long-tailed Duck	3	0	0
Pelagic Cormorant	6	0	0
Thick-billed Murre	15	0	0
Grand Total	**190**	**3**	

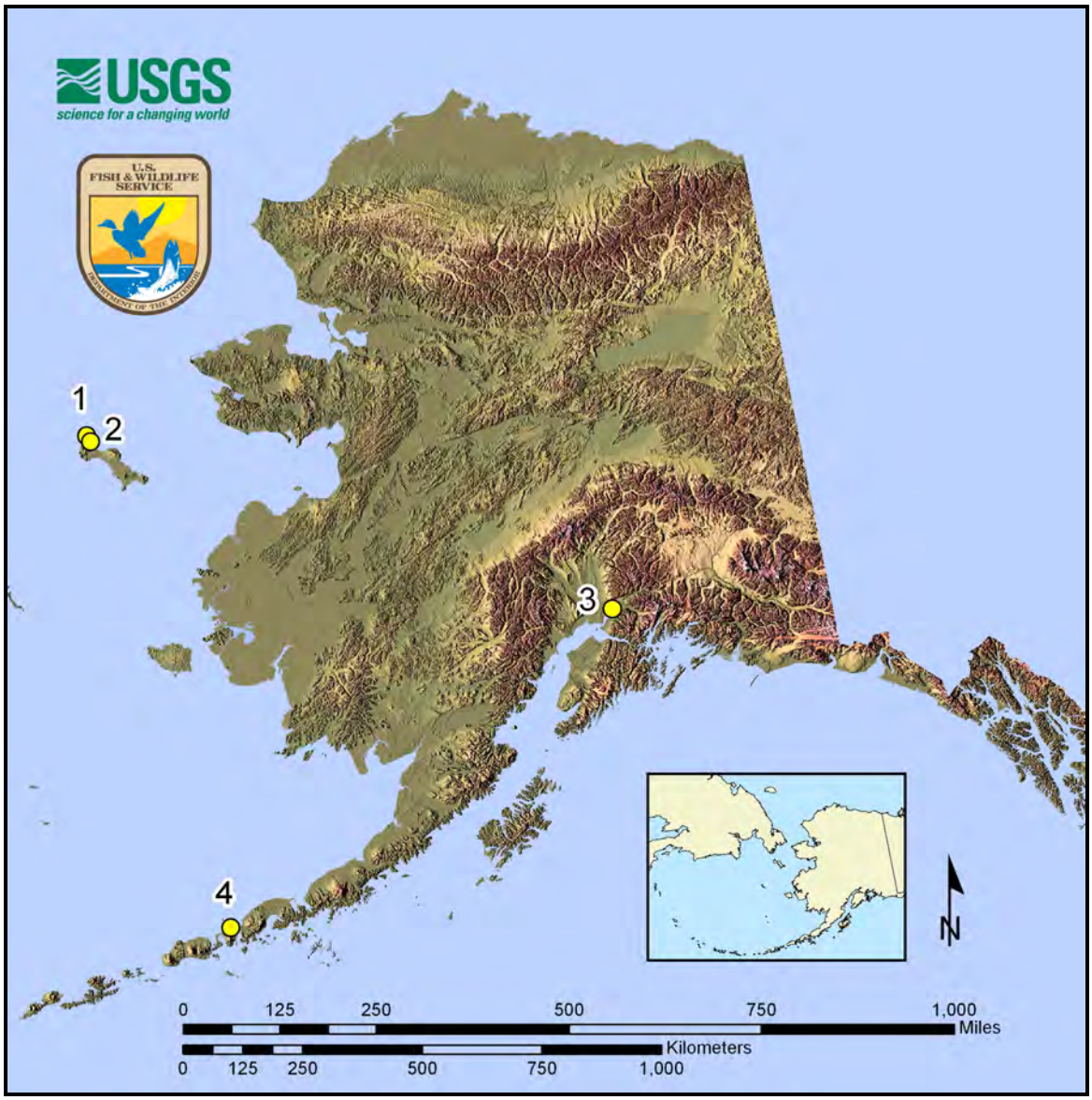
Fall Harvest Sampling

Methods

Fall Harvest Sampling—Sampling locations (Fig. 24) 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 sport hunting at Izembek NWR and Cook Inlet state game refuge. In addition, fall harvested birds were also sampled from two villages on St. Lawrence Island. Hunters were informed about AI sampling and asked for cooperation through agency media releases, local flyers, and brochures about the surveillance program. Hunters mostly were contacted in the field by agency personnel, but some (e.g., St. Lawrence Island) were contracted by USFWS to collect samples. Hunters were asked to voluntarily bring birds to a central location for sampling to be conducted by field technicians and village testing managers. Field-pooled 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 and testing managers 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 605 fall harvest samples were collected from three geographic locations, Cook Inlet, Alaska Peninsula (Izembek National Wildlife Refuge), and St. Lawrence Island (Gambell and Savoonga). Each location is discussed separately and final table presents analytical results below.

Abby Lawson

Figure 24. Fall harvest sampling locations in Alaska 2010. For specific location names see key following map.



Site #	Geographic Location	Specific Location
1	St. Lawrence Island	Gambell
2	St. Lawrence Island	Savoonga
3	Cook Inlet	Rabbit Slough, Jim Lake, Palmer Hay Flats SGR
4	Alaska Peninsula	Izembek NWR

Results

St. Lawrence Island

St. Lawrence Island is located in the Bering Sea between northeastern Russia and west of Alaska's mainland. It has 580 km of coastline, numerous large lagoons and is home to millions of auklets and cliff-nesting seabirds including Common Murres, Thick-billed Murres, Black-legged Kittiwakes, and Pelagic Cormorants. The islands ponds, lakes and rivers provide productive nesting grounds for waterfowl and shorebirds. Some of the target species for avian influenza sampling can be found on St. Lawrence Island include Common Eiders, King Eiders, and Long-tailed Ducks.

Results: A total of 74 samples was taken from harvested birds at two locations on the St. Lawrence Island (Table 63). None of the fall harvest samples were positive for avian influenza.

Table 63. Avian influenza results for field-pooled cloacal and oral-pharyngeal swabs collected from fall harvested birds on St. Lawrence Island, September 2010. Priority species are in bold font.

Species	Samples Taken	Field-pooled AI Positive	AI Prevalence
Black-footed Albatross	2	0	0
Black Guillemot	8	0	0
Common Eider	27	0	0
Common Loon	2	0	0
Fork-tailed Storm-Petrel	1	0	0
Glaucous-winged Gull	2	0	0
Northern Pintail	2	0	0
Pacific Loon	1	0	0
Pelagic Cormorant	14	0	0
Pigeon Guillemot	3	0	0
Red-necked Phalarope	12	0	0
Grand Total	**74**	**0**	

Cook Inlet

Palmer Flats State Game Refuge, within 48 km of Anchorage is one of the two most popular waterfowl hunting areas in Alaska. The refuge is 45 square miles of wetlands, forest, lakes and tidal sloughs that provides important resting and staging areas for water birds during spring and fall migration. Historically in the spring, this area annually receives tens of thousands of ducks, including pintails, mallards, green-winged teal and wigeon canvasback, lesser scaup and common goldeneye. In the fall, these same species move through the hay flats, stopping to feed on their way south.

In 2010, hunter success on Cook Inlet marshes was average. The majority of samples were obtained from the Cottonwood Creek and Rabbit Slough access area on Palmer Hay Flats State Game Refuge. The remainder of the samples was obtained from Jim Creek area off the Knik River. Approximately 60 hunters contributed birds for sampling and received information about the surveillance program.

Results: A total of 184 AI samples was obtained from the Cook Inlet refuge (Table 64). A total of 17 field-pooled samples collected from the Cook Inlet refuges birds tested positive for avian influenza. The field-pooled samples represent a prevalence of 9.2 % for avian influenza in the Cook Inlet fall hunter harvest birds. None of the samples were H5 or N1 positive.

Table 64. Avian influenza results for field-pooled cloacal and oral-pharyngeal swabs obtained from fall harvest birds on Cook Inlet coastal marshes, September 2010. Priority species are in bold font.

Species	Samples Taken	Field-pooled AI Positive	AI Prevalence
American Green-winged Teal	19	1	0.053
American Wigeon	41	1	0.024
Bufflehead	1	0	0
Blue-winged Teal	2	1	0.50
Canada Goose	1	0	0
Canvasback	2	0	0
Common Goldeneye	2	0	0
Gadwall	5	0	0
Lesser Scaup	9	0	0
Mallard	60	9	0.150
Northern Pintail	26	4	0.154
Northern Shoveler	16	1	0.062
Grand Total	**184**	**17**	

Alaska Peninsula - Izembek NWR

The Izembek National Wildlife Refuge and is located on the Alaska Peninsula between the Bering Sea and the Gulf of Alaska. Coastal lagoons, freshwater wetlands, and one of the world's largest eelgrass beds create spring and fall staging areas that provide food and shelter for millions of migratory waterfowl and shorebirds. Target species for avian influenza sampling such as Black Brant and Northern Pintails regularly move between Alaska and Asia and mix with high densities of Asian birds. Nearly the entire Pacific population of Black Brant (approximately 150,000 birds) and more than 20,000 Northern Pintails stage at Izembek Lagoon and adjacent areas during fall migration, allowing mixing amongst various populations.

Results: A total of 347 AI samples was obtained from Cold Bay during September and October (Table 65). Of those, 19 of the field-pooled samples collected from Izembek refuges birds tested positive for avian influenza. The field-pooled samples represent a prevalence of 5.5 % for avian influenza in the Izembek NWR fall hunter harvest samples. One of the samples collected from an American Green-winged teal tested positive for H5. None of the samples were N1 positive.

Table 65. Avian influenza results for field-pooled cloacal and oral-pharyngeal swabs obtained from fall harvest birds on Izembek National Wildlife Refuge, September and October 2010. Priority species are in bold font.

Species	**Samples Taken**	**Field-pooled AI Positive**	**AI Prevalence**
American Green-winged Teal	16	6	0.375
American Wigeon	10	0	0
Black Brant	138	0	0
Canada Goose	60	0	0
Emperor Goose	1	0	0
Eurasian Wigeon	1	0	0
Greater Scaup	3	0	0
Harlequin Duck	1	0	0
Mallard	5	0	0
Northern Pintail	112	13	0.116
Grand Total	**347**	**19**	

Morbidity and Mortality

In 2010, there were no morbidity or mortality events in Alaska.

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Appendix A: PHOTO CREDITS

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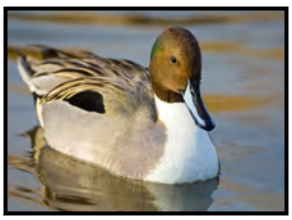
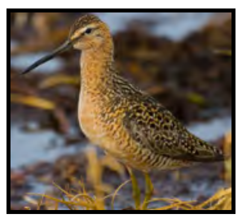
Black Brant	Steve Kaufman, USFWS	Back Cover

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