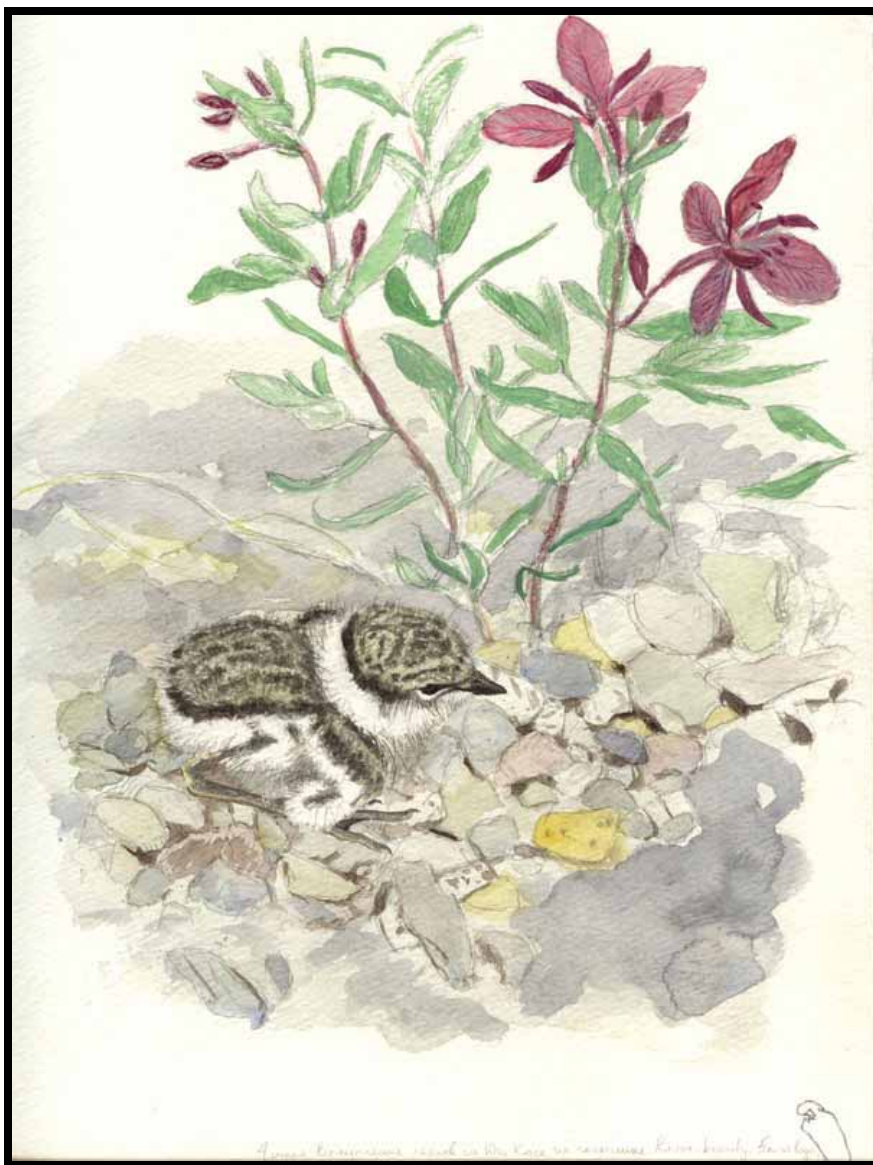


Summaries of ongoing or new studies of Alaska shorebirds during 2004



December 2004

Compiled and lightly edited by Bob Gill for the Alaska Shorebird Group. Anyone wanting more information about these studies should contact the individual(s) noted at the end of each project summary.

A note from the compiler: This marks the third annual summary of studies conducted on Alaska shorebirds. Summaries appear in geographical sequence from north to south.

This year we received reports for 30 projects, 4 fewer than last year. Despite fewer project—in part likely due to this year’s abbreviated reporting period (9 months vs. normal 12)—we still saw seven new projects initiated in 2004. Listed for the 30 project summaries are 61 different investigators, 20 that appear on two or more projects. Brian McCaffery earned distinction for leading the most projects (four), but Rick Lanctot was again involved with the most projects (eight). Women comprised 41% of all investigators (vs. 25% in 2003) and 23% of the lead investigators (same as 2003).

Again, most (59%) of the 61 different investigators were affiliated with government resource agencies, including U.S. Fish and Wildlife Service (18 investigators), U.S. Geological Survey (11), U.S. Forest Service (5), and Alaska Department of Fish and Game (2). Twenty-six percent of investigators were affiliated with academic institutions, including Brigham Young University (2), Max Planck Research Center (2), Montana State University (2), North Carolina State University (2), Simon Fraser University (1), University of Alaska (5), and University of Nevada, Reno (2). NGO scientists made up 7% of the investigators (down from 12% in 2003), with representation from ABR, Inc. (2), Manomet Center for Conservation Science (1), Point Reyes Conservation Science (1), Prince William Sound Science Center (1), and Wildlife Conservation Society (2). Cooperators included other Department of Interior agencies (Bureau Land Management, National Park Service), major oil companies (BP Exploration, ConocoPhillips, Exxon Mobil), Laskeek Bay Conservation Society of Canada, Alaska Native Corporations (Utqiagvik, Egegik), and the Barrow Arctic Science Consortium.

Much of the work in 2004 centered around three themes—two geographical and one species based. Existing and planned resource development on the North Slope continued to drive Alaska shorebird studies (eight summaries), with focus on topics such as disturbance, nest survivorship, mating systems, and resource selection. The Yukon Delta was also a site of increased shorebird studies (four), where topics included nesting ecology of Dunlin, migration physiology of Sharp-tailed Sandpipers, and population demographics of Bar-tailed Godwits. And for the third straight year the number of reported studies on Black Oystercatchers increased—to six this year—with emphasis placed on understanding breeding biology and population structure. But lest you think our basic knowledge of shorebird distribution is fairly complete for the state, consider that three separate studies helped extend the breeding ranges of Pacific Golden-Plover and Black-bellied Plover throughout most of the north side of the Alaska Peninsula and a major post-breeding staging site of Hudsonian Godwits—hosting the third largest concentration throughout the species’ range—was discovered on the Yukon Delta NWR.

Most of the artwork used in this report, including the cover, was done by Maksim Dementyev, Moscow State University. George West’s hand can be seen in the drawings of the Black Oystercatcher and Ruddy Turnstone. The drawing of the Buff-breasted Sandpiper is by D. Otte as taken from the Birds of North America account. All works copyrighted by the artists.

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Project: Distribution and abundance of breeding shorebirds on the coastal plain of the Arctic National Wildlife Refuge

Investigators: Jim Johnson, Jay Johnson, Steve Kendall, Dave Payer, Joel Reynolds and Richard Lanctot, U.S. Fish and Wildlife Service; and Stephen Brown, Manomet Center for Conservation Science

As part of a multi-year study to document the abundance, distribution, and habitat use of shorebirds on the Arctic coastal plain of Alaska, personnel from the U.S. Fish and Wildlife Service and Manomet Center for Conservation Science surveyed areas within the 1002 Area of the Arctic National Wildlife Refuge (ANWR) in June and July of 2004. These surveys augmented prior work conducted on ANWR and adjacent lands (west to the Colville River) in 2002 that included 38 rapid survey sites (each site consisting of 3, 16-ha plots) and 4 intensive plots (16-ha plots located within walking distance of a base camp on the Lower Canning River; (see 2002 summary). Because survey sites were selected randomly in 2002, a large portion of the plots occurred in upland habitats. To ensure survey sites were located in other rarer habitats in 2004, we used data collected between 1982 and 1985 at eight dispersed study sites within the 1002 Area (Garner and Reynolds 1986) to identify important bird-habitat relationships that could assist us in the placement of survey plots in 2004 (see 2003 summary). The primary goal of this study was to gather sufficient data on bird use of habitats to create predictive maps of shorebird and waterbird abundance and distribution for the 1002 Area. This information will be combined with data collected in other portions of the Arctic Coastal Plain to produce a coast-wide map depicting the distribution and abundance of breeding shorebirds.

To describe habitat availability on the 1002 Area, we used a landcover classification developed by Jorgenson et al. (1994) from which we combined the original 17 landcover classes into 4 composite habitat classes. These included riparian, flooded, very wet, and upland habitats. Next, we created a grid of 400- x 400-m cells (same size and shape as plots surveyed during 2002, hereafter referred to as rapid plots) over the coastal plain and calculated the cover of the composite classes within each. We restricted our surveys to rapid plots that contained >60% of one of these four composite habitat classes, and allocated our sampling effort based on the density of shorebirds detected within these classes during surveys in the 1980s (i.e., habitats where a high density of birds were detected in the early 1980s were sampled proportionately more). We reduced sampling effort in habitats based on our effort in these habitats in 2002. Plots were chosen randomly but restricted by the need to have them in clusters of three, located approximately 3–5 km from each other in a triangle formation. Locating plots in this manner made for efficient placement of three surveyors operating from a Robinson 44 helicopter.

A total of 135 rapid plots was selected and surveyed. Of these, 46 were in riparian habitat, 36 in flooded, 46 in very wet, and 7 in upland habitats. Four plots were eliminated from subsequent analyses because when relocated they did not meet the >60% restriction. Our base camp was located 3 km west of the Jago River and included 7, 16-ha intensive plots within 3 km of the camp, each consisting of >60% of each composite habitat class. We surveyed shorebirds using a double sampling method (Bart and Earnst 2002), consisting of “rapid” and “intensive” surveys. Plots are visited only once during a 7–10 day window of peak shorebird display (typically the 2nd to 3rd weeks of June across the 1002 Area of ANWR). After searching the area, rapid surveyors

estimated the total number of pairs that appeared to be nesting on the plot. Intensive plots were searched repeatedly during the nesting season (5 June–6 July) using both area searches and rope dragging—the latter by four surveyors independent of the rapid surveyors. Each rapid surveyor conducted a rapid survey of each intensive plot once between 7 and 14 June. We determined detection rates for each species as the ratio of the “true” number of pairs detected by the intensive surveyors to the number of “estimated” pairs detected by the rapid surveyors. These detection ratios allow extrapolation of shorebird abundance across the coastal plain.

Rapid surveys recorded a total of 569 individuals of 17 shorebird species on 135 plots (total area surveyed = 21.5 km²) within the 6,000-km² study area. This generated an uncorrected density of 26.5 individuals/km². The most common species were Pectoral Sandpiper (25% of all individuals recorded; seen on 49% of all plots), Red-necked Phalarope (25% and 41%, respectively), Semipalmated Sandpiper (17% and 43%), and American Golden-Plover (11% and 37%). The remaining 13 species were infrequently detected—abundance for these species was <25 individuals. On the seven intensive plots, we located one or more nests of Long-billed Dowitcher, Pectoral Sandpiper, Red-necked Phalarope, Semipalmated Sandpiper, and Stilt Sandpiper. For one species, the American Golden-Plover, we could not locate any nests, although we concluded that the species maintained a territory within the plot based on behavioral cues. We found between zero (plot predominately upland habitat) and eight (plot predominately flooded habitat) (mean = 3.3) nests per plot. We calculated detection ratios for all species, although the number of nests or territories was low and made these results suspect: American Golden-Plover (0.50, number of nests or territories $n=1$), Long-billed Dowitcher (0.25, $n=1$), Pectoral Sandpiper (0.44, $n=5$), Red-necked Phalarope (0.32, $n=4$), Semipalmated Sandpiper (0.92, $n=2$), and Stilt Sandpiper (0.33, $n=4$). The mean detection ratio for all species combined was 0.46 ($n=17$).

Currently, we are undertaking a multi-step approach to map the distribution and abundance of shorebirds breeding across the entire Arctic Coastal Plain of Alaska. The first step will be to describe the distribution of species based on the presence or absence of birds on each of our plots. The second step will involve the development of shorebird habitat models using digital elevation models (and other spatial parameters) and a landcover classification developed by The Nature Conservancy. The final step will be to use these models to predict the distribution and abundance of shorebirds across areas not visited during our surveys.

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Project: Nest survivorship of tundra-nesting birds in relation to human development on the North Slope of Alaska—Kuparuk and Prudhoe Bay field sites

Investigators: Joe Liebezeit and Steve Zack, Wildlife Conservation Society

In 2002, the Wildlife Conservation Society, along with cooperators including the U.S. Fish and Wildlife Service, BP Exploration (Alaska), ConocoPhillips Alaska, Inc., Exxon Mobil, Inc., and the Manomet Center for Conservation Sciences initiated a study at multiple sites on the North Slope of Alaska to investigate the potential impact of predators on the nest survival of tundra-nesting birds in human-developed and undeveloped areas. Six study sites occur from northeastern NPR-A east to the Jago River—an area stretching over 300 kilometers.

The impetus for this research stems from the growing concern that the abundance of nest predators has increased in developed regions of the North Slope. These increases are believed to be due to the presence of human infrastructure that, in turn, has provided artificial nest and den sites. The presence of anthropogenic food subsidies is also thought to be a contributing factor to the reported increase in nest predators. A number of studies support these claims but this is the first large-scale effort to determine if avian nesting success may be adversely affected. The need to investigate this issue is three-fold: 1) the North Slope is an important breeding area for shorebirds and waterfowl, 2) nest predation is believed to be a major factor regulating populations of North Slope nesting birds, and 3) human development is increasing in this region.

In this summary, we report results from the 2004 field season at the study sites established in the Kuparuk and Prudhoe Bay oilfields (see other summaries, this document). At these 2 sites alone, we established 48, 10-ha study plots that were systematically placed in a region covering approximately 600 km². Along with the other cooperators we are following a standardized protocol to collect data on nest survival, nest density, predator abundance, small mammal abundance, climate (snow melt), and habitat. We are also using remote camera systems in an attempt to record the identity of nest predators.

In 2004, we discovered and monitored 389 nests of 21 species from 6 June to 26 July. At both sites, nests of Semipalmated Sandpiper, Pectoral Sandpiper, and Lapland Longspur accounted for the majority (>60%) of those found. Among all species, 245 nests successfully hatched/fledged, 120 failed, and the fate of 24 nests went unknown. Nest predation was the most important cause of nest failure (>95%); other sources of failure included abandonment for unknown reasons and trampling (likely due to caribou). Among the three most common species, Mayfield estimates of nesting success ranged from 0.364 for Lapland Longspurs at Prudhoe Bay ($n = 31$) to 0.924 for Semipalmated Sandpipers at Kuparuk ($n = 17$). Overall nest densities were very similar between sites: 51.7 nests/km² at Kuparuk and 52.9 nests/km² at Prudhoe Bay.

Ten species of potential nest predators were detected during timed predator abundance surveys. At both sites, the most numerous were Glaucous Gulls and Parasitic and Long-tailed jaegers. Abundance of these species was higher at the Prudhoe Bay site than at Kuparuk. Two predation events were captured on tape at the Kuparuk site, both involving Arctic fox and single nests of Long-billed Dowitcher and Lapland Longspur.

We used landform type (as defined by Walker et al. 1980) as a surrogate classification method for habitat type. Nests were found in 9 of 15 landform types. At both sites, most nests were located in three landform types: Unit 7 (strangmoor and disjunct polygon rims), Unit 1 (high-center polygons, center-trough relief >0.5m), and Unit 2 (high-center polygons, center-trough relief ≤0.5m). As in previous years, lemming numbers were low with no apparent boom in their population. Mean snow cover dropped from over 30% on 6 June to <10% the following week.

We plan to continue field work for this project at some of the sites for another field season. We are currently pooling the data into a standardized database. In the final analysis we will estimate the relationship between nest survivorship and a number of covariates including “distance to human infrastructure” using a Cox proportional hazards model/information theoretic approach.

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Project: Nest survivorship of tundra-nesting birds in relation to human development on Alaska's North Slope (Arctic Refuge Study Site)

Investigator: Steve Kendall, U.S. Fish and Wildlife Service

Several partners have been investigating the survival and fate of shorebird nests in relation to human infrastructure on the Arctic Coastal Plain of Alaska. This region is an important breeding area for several bird species, some of which have experienced recent population declines. Anthropogenic factors on the breeding grounds may have contributed to these declines, particularly through enhancement of predator populations. Availability of human food sources and man-made structures for use as nest, den, or surveillance sites may influence predator populations. Increased numbers of predators may have deleterious consequences for productivity of breeding birds via increased predation on eggs and young. The dynamics of this predator-prey system are poorly understood, however. The Arctic National Wildlife Refuge joined several partners in 2002 in a multi-year, multi-site study of nest survival and predation of tundra-nesting birds on the Arctic Coastal Plain in an effort to determine anthropogenic influences on this relationship. Cooperators include: U.S. Fish and Wildlife Service, the Wildlife Conservation Society, BP Exploration (Alaska), Inc., ConocoPhillips, Exxon Mobil, Inc., Alaska, and Manomet Center for Conservation Sciences.

In 2004, we collected data from two locations on the Arctic Refuge—the Canning River Delta and the Jago River. This was the third season of data collection at the Canning River Delta. The Jago site was part of a separate study testing predictive habitat models created to map distribution and abundance of shorebirds on the Refuge's coastal plain. However, the nest survival study protocols were followed at this site, and we were able to include data from the Jago area.

In 2004, at the Canning River Delta, we located and monitored 148 nests of 12 species. The most abundant shorebird species were: Pectoral Sandpiper, Semipalmated Sandpiper and Red-necked Phalarope. For most species the nest success rates were between the lower rates found in

2002 and the higher rates found in 2003. However, success rates were higher than previous years for Semipalmated Sandpipers and Red-necked Phalaropes. Nests of Buff-breasted Sandpipers, Baird's Sandpiper, and Long-billed Dowitchers were found at the Canning River Delta for the first time during this project. At the Jago River site, 25 nests of 7 species were monitored. The most abundant species at this site were Pectoral Sandpipers and Red-necked Phalaropes. Nest success rates were lower for Pectoral Sandpipers, but higher for Red-necked Phalaropes at the Jago site compared to the Canning site.

We have data from >1,700 nests from all of the sites and years combined. During winter 2004- we will pool these data for analysis by an independent statistician. Prior to that analysis we will have the statistical methods reviewed by an external reviewer. We plan to use a spatially adjusted proportional hazards survival model with covariates for distance to and density of infrastructure, predator abundance, nest site habitat, and climate conditions to compare nest survival relative to areas of human development. The results of the analysis will determine whether we conclude the study or continue with more field data collection.

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Project: Nest survivorship of tundra-nesting birds in relation to human development on the North Slope of Alaska—NPRAs study site

Investigators: Ann M. Wildman and Charles B. Johnson, ABR, Inc., Environmental Research and Services

ABR, Inc., Environmental Research and Services was funded by ConocoPhillips, Alaska, Inc. in 2002–2004 to identify factors affecting nesting success of tundra-nesting birds in the Northeast Planning Area of the National Petroleum Reserve–Alaska (NPRAs) as part of a region-wide collaborative study (with USFWS, Wildlife Conservation Society, Manomet Center for Conservation Sciences, and BP Exploration [Alaska], Inc.). Twenty-four, 10-ha plots were sampled in the NPRAs each year using rope-dragging and single-person search methods. Nests were visited every 3–6 days to find and monitor nests and to acquire nest age data by floating eggs (for shorebirds) or by aging nestlings (for passerines).

Nest densities were similar in the NPRAs during the three years of study (78.3–82.9 nests/km²) with nest densities of shorebird ranging from 38.3 to 50.0 nests/km². The most common breeding shorebirds on the study plots in each of the three years of study were Pectoral Sandpiper (10.0–13.3 nests/km²), Semipalmated Sandpiper (7.9–11.7 nests/km²), Red-necked Phalarope (2.9–7.5 nests/km²), Long-billed Dowitcher (3.3–6.3 nests/km²), and Red Phalarope (2.9–4.2 nests/km²). Other shorebird species nesting in the study area included Black-bellied Plover, American Golden-Plover, Bar-tailed Godwit, Dunlin, Stilt Sandpiper, and Buff-breasted Sandpiper. Buff-breasted Sandpipers nested on plots only in 2002 (2.5 nests/km²).

Nest densities of passerines (25.4–38.3 nests/ km²) were lower than nest densities of shorebirds in the NPRAs during the three years of study. Of the four species of passerines that occurred in the study area, Lapland Longspurs made up ≥84% of the nests found on plots each year. Nest densities of waterfowl were relatively low in all three years (4.6–5.0 nests/km²).

Daily survival rates (DSR) during the incubation period in 2002 and 2003 (2004 analysis in progress) were quite variable both among and within groups of birds (i.e., shorebirds, waterfowl, passerines) in the NPRAs. Shorebird nesting success was 64% in 2002 and 60% in 2003. Among shorebirds, Long-billed Dowitcher and Red-necked Phalarope had the highest survival rates (≥78%) in both years and Black-bellied Plovers had the lowest (≤26%). Overall, shorebirds had the highest DSR, followed by passerines and waterfowl.

Jaegers and gulls were the most abundant and widespread nest predators observed during surveys on the study plots. Potential nest predators seen incidentally while working on plots included Long-tailed, Parasitic, and Pomarine jaegers, Glaucous Gulls, Common Ravens, raptors, Arctic and red foxes, Arctic ground squirrels, and caribou.

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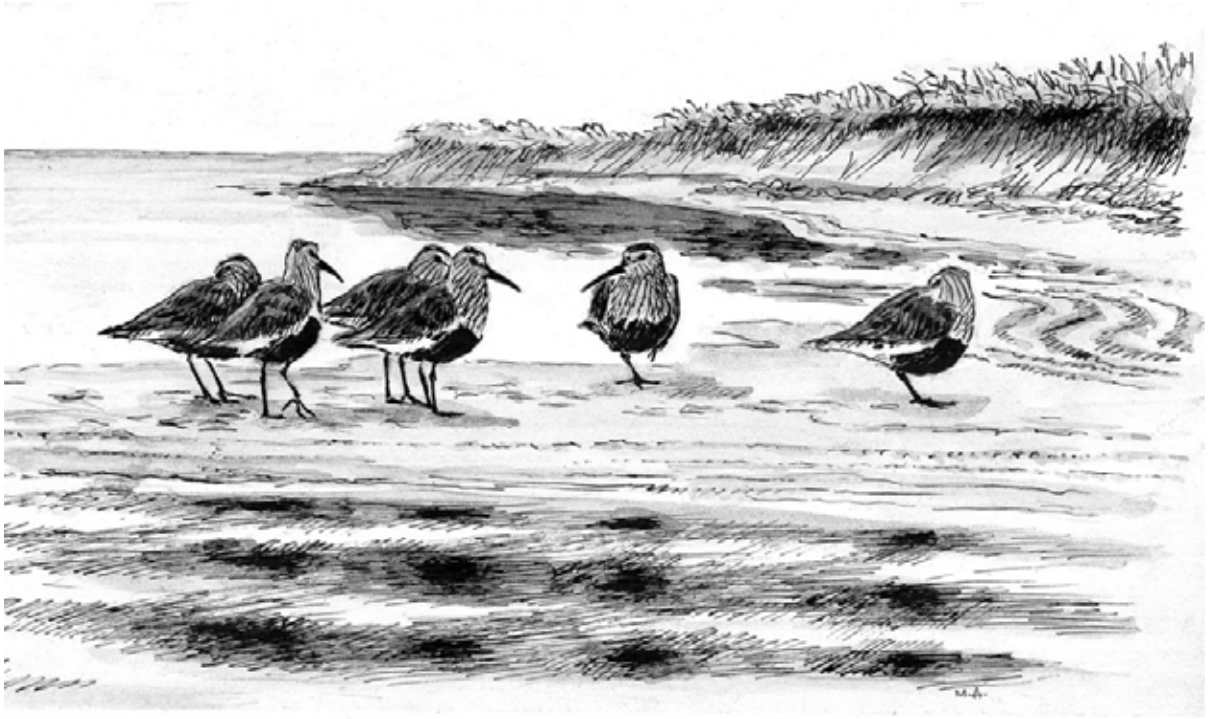
Project: Distribution, movements, and physiology of post-breeding shorebirds on Alaska's North Slope

Investigators: Audrey Taylor and Abby Powell, University of Alaska Fairbanks; Richard Lanctot, U.S. Fish and Wildlife Service

Work conducted at Barrow, Alaska, in the 1970s indicated that coastal areas along that section of the Arctic Coastal Plain (ACP) were critical for several species of Arctic-breeding shorebirds during the post-breeding period. It is less clear how shorebirds use littoral habitats elsewhere along the Beaufort Sea coast of the ACP, especially the size and distribution of pre-migratory populations, the extent of their intra-area movements, and their residency time at particular sites. Such information is critical given proposed energy development across the ACP and the fact that populations of several species of shorebirds that stage on the North Slope are declining. Across the ARC we will: 1) assess the abundance, distribution, and species composition of shorebirds prior to southward migration, 2) quantify movement patterns (both within the staging period and relative to breeding location) and tenure times of pre-migratory shorebirds at staging sites, and 3) examine how physiological factors (fattening rates and stress levels) of shorebirds vary among staging sites. Variation in these physiological parameters may be indicative of site quality and therefore provide another measure of the importance of staging sites in preparing birds for migration.

In 2004, we conducted a pilot study at Barrow to test methods and predictions proposed for a larger-scale study across the North Slope to be conducted in 2005 and 2006. We investigated the location of staging sites, the phenology of staging among different species prior to southward migration, and the residency time of individual birds captured during the staging period. We also collected data on shorebird density along historical transects last surveyed for staging shorebirds during the OCSEAP program in the late 1970s. We found that numbers of birds at prominent staging locations and on the historical transects varied widely throughout the staging period. The most abundant species included Red and Red-necked phalaropes, Semipalmated Sandpipers, Western Sandpipers, Dunlin, and Long-billed Dowitchers. Adult shorebirds were recorded through July and the first few days of August; thereafter all birds seen were juveniles (with the exception of adult Dunlin). Staging shorebirds generally used saline tundra, the shores of small brackish ponds and lagoons, and the Barrow sewage lagoon as foraging habitats. We captured 204 birds during August and recorded 182 resightings of banded or painted birds within the study area, including several adult Dunlin that had been banded in the Barrow area since 2001. The longest interval between banding and subsequent resighting of birds marked in 2004 was 17 days (Red Phalarope). The longest residency time of a radio-marked bird was 13 days (Dunlin) and the shortest <1 day (3 radio-tagged Red Phalaropes were never heard after they were marked). Preliminary examination of shorebird movements in the area indicates that marked or radio-tagged birds moved widely on a daily basis. Additional analyses on site tenure and movements are underway. We also collected blood for stress hormone and fat metabolite analysis from individuals of four species: Red Phalaropes ($n = 84$), Semipalmated Sandpipers (23), Western Sandpipers (40), and Dunlin (26). Lab work and analysis of the physiological data from these blood samples will be conducted during fall and early winter 2004.

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Project: Reproductive ecology of shorebirds: studies at Barrow, Alaska

Investigators: Richard Lanctot, U.S. Fish and Wildlife Service and Audrey Taylor, University of Alaska, Fairbanks

In 2004, we conducted the second year of a long-term study of nesting shorebirds at Barrow, Alaska (71.29°N, 156.64°W). The objectives of this study are to: 1) collect baseline data on arrival date, nest initiation and effort, clutch and egg size, and hatching success of arctic-breeding shorebirds, 2) to establish a marked population of as many shorebird species as possible that would allow us to obtain estimates of adult survival, mate and site fidelity, and natal philopatry, and 3) relate weather and predator and prey abundance to shorebird productivity. Data on demographic parameters are vitally needed to understand why many shorebird populations are declining.

To increase the sample sizes of nests and banded birds, we sampled 6, 36-ha plots in 2004 (vs. 4 plots in 2003). One of the plots sampled in 2003 was abandoned and three additional plots were staked out. As in 2003, two of the original plots were surveyed in the 1970s and 1990s. One of the new plots established in 2004 was located where a new landfill will be built this winter so that we can document how shorebirds respond to landfill construction and general disturbance.

We also allowed nest searchers to share information in 2004 (see 2003 summary) and increased the frequency with which they visited plots. The species composition on or near our plots was similar to that in 2003, although the number of nests detected was higher in 2004 (total nests was 218 compared to 88). Nests located on plots included those of Red Phalarope ($n = 79$), Dunlin (25), Pectoral Sandpiper (18), Semipalmated Sandpiper (10), American Golden-Plover (5), Long-billed Dowitcher (3), and Red-necked Phalarope (1). Two additional species nested on plots in 2004—White-rumped ($n = 2$) and Western ($n = 1$) sandpipers. Nests located on the periphery of our plots included Red Phalarope (25), Dunlin (21), Pectoral Sandpiper (15), Semipalmated Sandpiper (6), American Golden-Plover (4), White-rumped Sandpiper (2), and Long-billed Dowitcher (1). We believe the increase in nests detected in 2004 was due to the increased number of plots, more intense nest searching, and higher levels of renesting due to high nest predation.

This year the first clutch was initiated on 3 June and the last on 3 July (1 day earlier for both dates than 2003). Median and peak initiation dates were 16 June (2 days later than 2003). The first nests initiated were by Dunlin, Red-necked Phalarope, White-rumped Sandpiper, and Semipalmated Sandpiper (median laying date = 9, 12, 13, and 15 June, respectively), followed by Red Phalarope, Pectoral Sandpiper, Western Sandpiper, and American Golden-Plover (17, 18, 19, and 19 June, respectively), and finally Long-billed Dowitcher (27 June). This pattern resembled that in 2003. Nest density, calculated as the number of nests found divided by the study area size (= 6 plots of 36 ha each) was 0.66/ha (compared to 0.51/ha in 2003). Nest density per plot varied from 0.47–1.0 nests/ha. Predators destroyed 68% of the nests in 2004 compared to 43% in 2003. A comparison of nesting success across species indicated hatching success (# hatching at least one young/total number of nests) was highest in Dunlin (21.7%, $n = 46$), followed by Pectoral Sandpiper (20%, 20, after eliminating manipulated nests), Semipalmated Sandpiper (12.5%, 16), and Red Phalarope (10.6%, 104). A similar comparison across study plots indicated plots 1, 2, and 3 had extremely low hatching success (3.2, 4.2 and 11.1%, respectively) compared to 52.6, 46.2 and 38.8%, respectively, in 2003). The three new plots in 2004 had higher hatching success, ranging from 11.1 to 23.7%. All values of hatching success are considerably lower than found in 2003, likely due to predators switching to shorebirds in what appeared to be a very low lemming year.

In 2004, we captured and color-marked 158 adults and 143 young. Adults captured included 60 Dunlin, 57 Red Phalarope, 19 Pectoral Sandpiper, 11 Semipalmated Sandpiper, 4 American Golden-Plover, 3 White-rumped Sandpiper, and single birds of four other species. Chicks banded on our plots included 56 Red Phalarope, 40 Dunlin, 18 Pectoral Sandpiper, 15 Semipalmated Sandpiper, 3 White-rumped Sandpiper, and 2 American Golden-Plover. We documented several instances of renesting by American Golden-Plover, Dunlin, Semipalmated Sandpiper, and Pectoral Sandpiper in 2004, and we recaptured 10 Dunlin, 2 Semipalmated Sandpiper, and 1 Red Phalarope that were initially marked in 2003.

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Project: Behavioral ecology of Pectoral Sandpipers

Investigators: Bart Kempenaers and Kim Teltscher, Max Planck Research Centre for Ornithology, and Richard Lanctot, U.S. Fish and Wildlife Service

The mating system of the Pectoral Sandpiper has been described as polygynous, serially polygynous, or promiscuous (Holmes and Pitelka 1998). Males of this sexually dimorphic species defend territories, which range between 4 and 10 ha in size (Holmes and Pitelka 1998). Females visit these areas for mating and may or may not breed within a male's territory; males provide no parental care (Pitelka, Holmes et al. 1974; Holmes and Pitelka 1998). Because females have been observed associating with a number of males in close succession (Pitelka, Holmes et al. 1974; Ehrlich 1988), the question arises whether multiple paternity might also occur in this species (i.e., multiple males father offspring in one nest). To date, the lack of marked individuals (especially males) and the absence of genetic analyses have precluded determining the paternity and thus mating system of this species.

In 2004, we began a study in Barrow, Alaska, to investigate the breeding system of the Pectoral Sandpiper. We captured 26 adult males opportunistically using mist nets, sampled blood, and marked them with unique color bands. The territory location of these males and their behavioral interactions with females were monitored. Forty nests were also found, and in most cases the females were captured and blood sampled. Because nest predation was extremely high, we replaced eggs with dummy eggs and artificially incubated the real eggs. Unfortunately, in most cases, predators took even the dummy eggs, requiring us to euthanize the growing embryos. In the end, we were able to gather DNA material from 125 chicks belonging to 35 broods. We recently developed microsatellite primers for this species, and hope to conduct genetic analyses this winter to investigate paternity. Depending on these results, additional studies into the species may be conducted in 2005.

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Project: Behavioral ecology of Semipalmated Sandpipers

Investigators: Bart Kempenaers and Kim Teltscher, Max Planck Research Centre for Ornithology, and Richard Lanctot, U.S. Fish and Wildlife Service

Matings between close relatives often have negative fitness consequences, probably because homozygosity leads to the expression of recessive deleterious alleles. Recent studies of birds and mammals have shown that reproductive success is negatively related to genetic similarity between parents, and that fitness-related traits correlate with individual levels of genetic diversity. These studies strongly suggest that selection favours avoidance of matings with genetically similar individuals. Yet, constraints on social mate choice, such as a lack of alternatives, may lead to pairing with genetically similar mates. It has been suggested that females might then seek extra-pair copulations with less related males, but evidence is weak or lacking. In a prior study (Blomqvist et al. 2002), we showed that extra-pair paternity and maternity (quasi-parasitism) in three wader species was strongly related to genetic similarity between social pair members. We suggested that extra-pair parentage in many non-passerine birds may represent adaptive behavioural strategies to avoid negative effects of pairing with a genetically similar mate. To further test this hypothesis, we continued studying the paternity of Semipalmated Sandpipers at Barrow in June and July 2004. This represents the second year of this study. A total of 93 nests (compared to 51 in 2003) were located and 108 adults and 17 chicks (plus 21 embryos) were sampled for genetic material. Despite finding nearly twice the number of nests in 2004, we were able to sample only a small proportion of the chicks due to extremely high rates of predation. We have tested a limited number of not so variable microsatellite primers and are continuing to test new primers to determine the genetic similarity of adults within a pair and the likelihood of that pair having extra-pair offspring.

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Project: Ruddy Turnstone and plover studies near Nome, Alaska

Investigators: Phil and Andrea Bruner, Brigham Young University, Hawaii

Our 2004 field season (5–18 June) focused primarily on marking Ruddy Turnstone pairs and their chicks using distinct combinations of colored leg bands in order to look at site fidelity, mate retention, and natal philopatry in the Woolley Lagoon population. Secondary tasks at Woolley Lagoon included locating active nests of marked Pacific and American golden-plovers and Black-bellied Plovers. We also compiled a photographic record of known nest sites used by these three species between 1996 and 2004.

When we arrived at Woolley Lagoon, Ruddy Turnstones were starting to hatch with the season apparently advanced by 2–3 weeks. We eventually marked three pairs of turnstones and five of their chicks. Nests were placed close to small water features in habitat occupied by Black-bellied Plovers. One Ruddy Turnstone female we trapped was missing two toes on each foot and had difficulty walking. On 25 September one of our marked Ruddy Turnstone males was seen and photographed by Reginald David at Kona on the Big Island of Hawaii and has been seen subsequently in this area on several occasions.

We also remarked a female Black-bellied Plover that we first captured and marked in 1993. After her initial capture she retained the same mate for nine subsequent years but has paired with a different mate each of the last three years. We have marked her chicks in 4 of the past 12 years. The 2004 season also marked the 12th year we observed one of our banded American Golden-Plover males, thereby establishing the longevity record for the species.

Our photographic record of known-age nest cups of Pacific and American golden-plovers and Black-bellied Plover documents their persistence and rate of reuse. We have recorded reuse by all three species with our most dramatic example being that of a Pacific Golden-Plover that reused a cup that had sat empty the previous five years!

In 2005, we will return to Woolley Lagoon from late May through early June to continue our studies of nesting Ruddy Turnstones.

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Project: Alaska hosts international shorebird expedition

Investigators: Brian J. McCaffery, U.S. Fish and Wildlife Service, and Robert Gill, U. S. Geological Survey

Bar-tailed Godwits and Sharp-tailed Sandpipers are both extraordinary migrants. The godwit is thought to undertake the longest single-flight, over-water migration in the bird world, up to 11,000 km from Alaska to New Zealand. Juveniles (but not adults) of the Sharp-tailed Sandpiper perform a bizarre "dog-leg" migration, heading east from the nesting grounds in the central Siberian arctic to staging grounds of western Alaska, presumably before turning back to the southwest en route to wintering areas in Australia. In September 2004, we moved a step closer to addressing our questions on the biology and physiology of these migrations, through hosting an international team of shorebird biologists on a joint reconnaissance expedition on the Yukon Delta, Alaska.

In 2005, the Swedish Polar Research Secretariat (SPRS) will sponsor a major international expedition to Beringia. The expedition's shorebird biologists, led by Ake Lindström of Lund University, Sweden, will be collaborating with the U.S. Geological Survey's Alaska Science Center (ASC) and the Yukon Delta National Wildlife Refuge (YDNWR) on migration studies of the Bar-tailed Godwit and Sharp-tailed Sandpiper.

To maximize the efficiency of fieldwork in 2005, shorebird ecologists and conservationists from Sweden, The Netherlands, New Zealand, Australia, Canada, and the United States gathered on the Yukon Delta Refuge's Bering Sea coastline from 2–13 September 2004 for reconnaissance and pilot studies. This expedition enabled our international guests to understand shorebird habitats across the Delta and evaluate logistic requirements, study sites, and field protocols in anticipation of the 2005 expedition. The reconnaissance was partially funded through a U.S. Fish and Wildlife Service Challenge Cost Share Memorandum of Agreement between the Service and Lindström and Martin Green of Lund University. In addition, the Alaska Science Center provided substantial financial, logistic and personnel support.

Participants joining us in the reconnaissance included Lindström and Green, Marcel Klaassen from The Netherlands Institute of Ecology and Anne Dekinga from The Netherlands Institute for Sea Research, Phil Battley from New Zealand's University of Otago, Nils Warnock from Point Reyes Bird Observatory in California, Sarah Jamieson from Canada's Simon Fraser University, and Warren Lee Long from Wetlands International. Pilots and boat drivers from the YKDNWR very ably transported the group and equipment to the mouth of the Tutakoke River for a 10-day field program, with overnights at the refuge's two permanent coastal field stations. Anne Dekinga was also able to visit and assess shorebird research potential at Egegik Bay on the Alaska Peninsula—the site of a likely satellite camp in 2005.

Highlights of the reconnaissance included the unseasonably pleasant weather over the full duration of fieldwork, though we're confident that our foreign colleagues didn't mind having to wait until 2005 to get a more representative sample of fall conditions in the eastern Bering Sea. The mild weather allowed Phil Battley to locate two of his individually color-marked godwits from New Zealand, and three others were spotted 135 km farther south by a second refuge crew

working on our ongoing study of godwit productivity (see summary, this document). The Tutakoke River team successfully captured and flagged 5 juvenile godwits during nocturnal mist-netting, and well over 100 Sharp-tailed Sandpipers were captured and sampled as part of a collaborative investigation of their migration physiology. Expanding the taxonomic scope of the fieldwork, Anne Dekinga conducted preliminary sampling of benthic invertebrates, and found the flats to be more productive than any he had ever encountered. The overall goal of the reconnaissance was met, and the ambitious effort planned for 2005 appears feasible and potentially very productive, hopefully leading to many years of further collaborative work.

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Project: Breeding biology of Dunlin nesting on the YK Delta, Alaska

Investigators: Sarah Jamieson, Simon Fraser University, and Brian McCaffery, U.S. Fish and Wildlife Service

We studied the breeding ecology of Dunlin at Kanaryarmiut Field Station on the Yukon Delta National Wildlife Refuge from April 27 to July 16, 2004. This was the first field season of a Ph.D. project investigating parental care in Dunlin.

We surveyed three wet meadows totaling 72 ha in area. Each site was visited, at a minimum, every three days. Nests were found primarily through behavioral observations, although each site was rope-dragged at least once during peak incubation. Once found, we attempted to trap and color band both adults (total = 67 adults). Later in the season we also banded chicks ($n=55$) if we located them while they were still in the nest cup.

The first Dunlin was observed on April 30, first nest found was initiated on May 12, and last nest found was initiated on June 30. A total of 59 Dunlin nests was found and monitored. We estimate that 42 of these were first nesting attempts, 14 were first renesting attempts, and 3 were second renesting attempts. The average incubation period was 22.1 days. The overall Mayfield estimate for nesting success was 36% and fledgling success was 73% (probability of chicks that hatched eventually fledged). We documented double brooding for the first time in North American Dunlins. On two occasions we had a female successfully hatch a clutch with one male then desert the brood and lay another clutch with a second male, both of which happened to be the nearest neighbor of the first nest.

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Project: Reproductive ecology of Bar-tailed Godwits on the Yukon-Kuskokwim Delta

Investigator: Brian J. McCaffery, U.S. Fish and Wildlife Service

Recent studies have found very low percentages of juveniles (i.e., young of the year) among Bar-tailed Godwits staging each fall on the outer Yukon-Kuskokwim Delta (YKD; see summary, this document). In the last 2–3 years, anecdotal observations of godwit flocks on the nonbreeding grounds in New Zealand have also found very few juveniles arriving in the fall. In addition, the clutch sizes in godwit nests located during the last two decades were significantly lower than those found in 1924. These findings prompted Yukon Delta National Wildlife Refuge, in cooperation with the National Park Service's Natural National Landmark program, to conduct a pilot study on breeding godwits in 2004 in the hopes of identifying the factor(s) contributing to the apparently low productivity.

The pilot study had two primary objectives: 1) to determine if breeding densities were high enough to support more detailed breeding ecology studies in subsequent years, and 2) to collect a single godwit egg from each of 8–10 nests for preliminary contaminant screening. To achieve these objectives, 2–4 people conducted field work at Old Chevak, along the Kashunuk River on the outer central YKD, from 14 May to 2 June, and from 9 June to 28 June, 2004. Godwits were observed, and godwit nests were searched for, in a 4-km² study area surrounding the Old Chevak field camp. The study area was characterized by a diversity of wetlands either embedded in, or surrounding, extensive patches of level uplands. Wetlands included tidal sloughs (which made up >80% of the plot's borders), tidal meadows, freshwater meadows, fresh water marshes, and steep-sided lake basins. The upland tundra was dominated by dwarf shrubs, *Carex* sedges, lichens and *Sphagnum* moss. Nest searching efforts included focal observations of breeding godwits as well as two rounds of rope-dragging in which >80% (late May) and 100% (mid-June) of the study area was dragged, respectively. With one exception, egg collections occurred once clutches were complete. All eggs in a clutch were removed from the nest bowl, moved 20–50 m away, and processed out of sight of the nest. All eggs were handled with latex gloves while mass, length, width, and float angle data were collected. Eggs not being collected were returned immediately to the nest bowl. During incubation, nests were checked every few days by walking near, but not to, the nests, where the incubating adult could be detected from 5–10 m away.

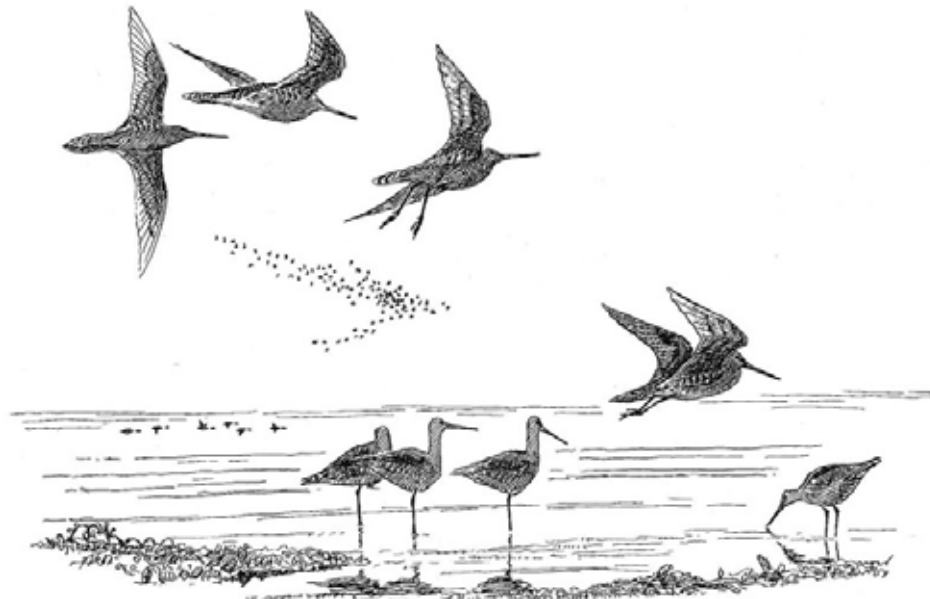
We discovered 12 godwit nests, 10 during focal observations and 2 during rope-dragging. Incubating adults at both nests discovered during rope-dragging flushed <2 m from the observer at one end of the rope; it was unclear whether the person or the rope was the proximate cause of flushing. Seven of 12 were found during laying, 2 were found with complete clutches, and 3 were of unknown status because they were found during or immediately after predation events. We were able to confirm clutch size in only six nests; all had four eggs. Nest initiations ranged from 14 to 30 May; the mean initiation date was 23 May. Because birds were not marked, we could not distinguish between first and second clutches. As in other parts of their range, godwits occasionally nested very near (i.e., <100 m from) the nests of other large tundra charadriiforms. Two different pairs of godwit nests were active simultaneously within 47 and 88 m of one another, respectively. Two other godwit nests were 52 and 51 m from nests of Black-bellied Plovers and Long-tailed Jaegers, respectively. We collected one egg from each of nine godwit nests, and recorded mass, length, and width for samples of 28, 30, and 30 eggs, respectively.

Seven of those nine nests were discovered prior to depredation. Following egg collection, the adults returned to incubate the clutches at \geq five of those nests.

None of the 12 godwit nests hatched. Among those nests that were found during, or survived until incubation, the mean length of survival after clutch completion was only 4.8 d. The nest surviving the longest lasted only until day 11 of incubation. Arctic fox and Sandhill Crane were each observed depredating one nest; a third nest was apparently depredated by either or both of these species. We also observed mink, short-tailed weasel, and Parasitic Jaeger depredating nests of other species. Additional potential nest predators observed on the study site included Glaucous Gull, Long-tailed Jaeger, and least weasel. A single godwit brood with \geq 3 chicks was located on the study area on 22 June. As of our departure on 28 June, the tending male was still present with \geq 1 chick.

In 2005, we hope to increase both the size of the study area and the size of the field crew. Because of the relative effectiveness of focal observations vs. rope-dragging, rope-dragging will not be continued. By combining these modifications, we suspect this will allow us to find 2–3 times as many nests as were found this year. In order to reduce the probability that nest mortality is related to our activities, we plan to develop a protocol that will allow nest-checking from a distance of 5–10 m from the nest. Additional collection of eggs for contaminants screening will be considered pending the results from the 2004 collections.

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Project: Juvenile proportions in Bar-tailed Godwits staging on the Yukon-Kuskokwim Delta

Investigators: Brian J. McCaffery, Sarah Connors, and Heather Swensen, U.S. Fish and Wildlife Service

The Yukon-Kuskokwim Delta is an important staging area for the Alaska-breeding race of the Bar-tailed Godwit. In 1999, surveys were initiated to determine the proportion of juveniles present in staging flocks along the Delta's outer coast near Tern Mountain. Such estimates are being increasingly used around the world as indices of annual shorebird productivity. The proportion of juveniles in staging flocks at Tern Mountain in 1999, 2001, 2002, and 2003 never exceeded 3%. A similar effort at the mouth of the Tutakoke River (>100 km to the north) in 2001 yielded similar results. We and our colleagues have used these estimates of productivity to generate a preliminary population model which indicated an annual population growth rate of –10%. In 2004, we continued our efforts at Tern Mountain; these were supplemented by observations from our colleagues at USGS (Robert Gill and Dan Ruthrauff) and members of the Beringian Expedition Reconnaissance team at both Tutakoke and at Egegik Lagoon along the Alaska Peninsula (see summaries, this document).

At Tern Mountain, minimum daily counts of godwits exceeded 2,000 on 19 of 26 field days between 17 August and 12 September. The highest minimum daily count of 10,000 godwits occurred on 24 August; the next highest of 7,500 occurred on 12 September. After the latter date, daily high counts never exceeded 165. Our field crew surveyed 37 flocks on 38 days between 16 August and 24 September. Of 24,546 godwits sampled, 545 juveniles were detected, for a juvenile proportion of 2.2%. In 2003, the comparable values were 41 flocks surveyed, 37,000 godwits sampled, 1,076 juveniles detected, and a juvenile proportion of 2.9%.

This consistent pattern of very low juvenile proportions at Tern Mountain was not corroborated at the other two sites. A large roost observed near the mouth of the Opagyarak River (17 km south of the Tutakoke River) was comprised overwhelmingly of adults (3.5% juveniles among flock of 3,160), but a second roost of about 1,000 godwits on a sand island 6 km off the mouth of the Tutakoke River included >80% juveniles. At Egegik, tidal conditions precluded detailed flock observations until a single day late in the season; the 700 godwits in this flock were all juveniles. The limited sampling in space and/or time at these two additional sites precludes confident inferences about the patterns observed. Based on observations in 2004, however, it is clearly premature to apply productivity estimates from Tern Mountain to the overall population. The confusing spatial patterns detected in 2004 highlight the need to more rigorously evaluate hypotheses about spatial and temporal variation in the proportion of juveniles across the staging grounds.

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Project: Major staging site for Hudsonian Godwits discovered on Yukon-Kuskokwim Delta

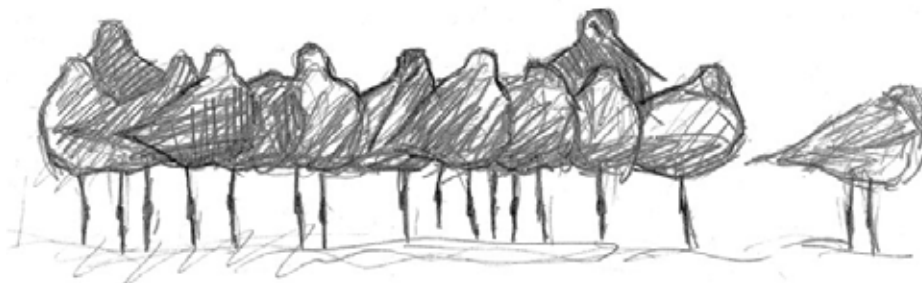
Investigators: Brian J. McCaffery and Jesse Conklin, U. S. Fish and Wildlife Service

During fall migration, sizeable concentrations of Hudsonian Godwits have been located at just a handful of sites in North America. Along the coastline of James and Hudson bays, Canada, upwards of 10,000 have been documented; in Saskatchewan, concentrations of between 2,000 and 4,000 have been confirmed at Luck, Quill, and Porter lakes. In Alaska, post-breeding aggregations of this size have not been reported previously. Autumn concentrations of >100 individuals are rare in the state, and most have occurred in western Alaska. In summer, 2004, a significant concentration of post-breeding Hudsonian Godwits was located in the middle of the Yukon-Kuskokwim Delta.

Field work was conducted in the vicinity of Aropuk Lake, a shallow (2–3 m max. depth) 85 km² lake about 80 km inland from the Bering Sea on Yukon Delta National Wildlife Refuge (61° 07' N, 163° 53' W). A waterfowl research crew was present at Aropuk Lake from 26 May through 12 August. On 28 July 2004, we were notified that a large flock of Hudsonian Godwits was present at the camp site. We conducted a preliminary reconnaissance that afternoon, and then detailed a four-person crew to the site to focus on godwits from 30 July to 6 August. Observations of Hudsonian Godwits occurred at camp every day, and on 1–2 and 4–5 August, at two very shallow lakes nearby where the godwits fed regularly. Numbers were estimated at all sites on each visit; during counts at camp, adults and juveniles were enumerated separately.

Nearly 1,000 godwits were detected at a regular early morning roost site ~150 m from the camp. This flock contained >95% juvenile birds. Godwits from this roost regularly flew west to forage in the two large shallow lakes. Nearly 2,000 godwits were counted simultaneously at the foraging lakes, indicating that there must have been one or more undiscovered roosts supporting up to 1,000 godwits somewhere else in the vicinity. The waterfowl researchers indicated that the number of godwits present in early July (when most of the birds must have been adults) was about two times higher than during our survey in the first week of August. Depending on the assumptions made, we estimate that 3,000–6,000 post-breeding Hudsonian Godwits used this area during the summer of 2004. The higher estimate exceeds the maximum numbers known to use any of the Saskatchewan sites. During fall staging, therefore, Aropuk Lake may support the third largest concentration of Hudsonian Godwits in North America.

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Project: Pre-migratory behavior and demographics of Bar-tailed Godwits staging at Egegik Bay, Alaska

Investigators: Dan Ruthrauff and Robert Gill, U.S. Geological Survey, and Brian McCaffery, U.S. Fish and Wildlife Service

Biologists were present on the southern spit of Egegik Bay between 10 and 24 September 2004 in continuation of work conducted in 2003 to monitor temporal annual variation in the proportion of juveniles in the population of Bar-tailed Godwits. In contrast to our visit between 2 and 6 September 2003, when we monitored up to 5,000 godwits at high-tide roosts, the number of godwits utilizing the bay in 2004 was lower, typically fewer than 1,000 individuals. Additionally, low daytime high tides enabled godwits to feed throughout the tidal cycle or roost well offshore on extensive mudflats, out of reach to observers. As a result, we were able to assess the proportion of juveniles present in a roosting flock on only one occasion, 22 September, when one adult was observed in a flock of about 550 individuals. Since most adults appear to precede juveniles on southward migration, the extremely high proportion of juveniles present in this flock is likely due to the fact that most adults had already initiated migration and not because of unusually high productivity on the breeding grounds (but see other accounts, this document). That adult godwits staging on the Alaska Peninsula had already departed on southward migration was further indicated by results from an aerial survey flown on 23 September from Egegik Bay south to Nelson Lagoon when fewer than 500 Godwits were detected. Arrival chronology reported by colleagues in New Zealand further indicated the early September departure of godwits from Alaska in 2004. Surveys flown near this time along the Yukon-Kuskokwim Delta likewise demonstrated relatively few godwits present during the third decade of September.

In addition to the aforementioned work, we collected invertebrate samples from sites within the bay. Dutch colleagues are currently processing the samples to assess the density, composition, and age structure of the infaunal samples for comparison to sites on the Yukon-Kuskokwim Delta.

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Project: Status of the Marbled Godwit on BLM lands on the Alaska Peninsula, May 2004

Investigators: Robert Gill and Lee Tibbitts, U. S. Geological Survey

Between 9 and 14 May 2004, personnel of USGS's Alaska Science Center and Alaska Peninsula/Becharof National Wildlife Refuge conducted an avifaunal inventory of birds on selected Bureau of Land Management (BLM) lands on the north side of the Alaska Peninsula. The investigation was funded by BLM as part of its evaluation of critical natural resources, particularly special-status species occurring on BLM lands for which title might be conveyed to other federal, state, or Native interests. The lands inventoried in this investigation occur within

or just outside the suspected breeding range of the Marbled Godwit and include three in-holdings along the central Alaska Peninsula between Becharof Lake and Port Heiden. Plots ranged in size between 23 and 62 km² and occurred inland from the Bristol Bay coast between 0.4 and 35 km.

We used two survey techniques during the effort, each tailored to specific land cover types and/or the complexity of bird assemblages encountered in a particular area (see also report by Kaler and Savage, this document). To obtain general information such as presence/absence and relative numbers we laid out walking transects over each plot such that all major land cover types would be sampled. Then, while walking at a moderate but steady pace, observers noted numbers of each species of bird seen—regardless of distance from the observer, but usually within 200 m either side of the observers—and behaviors indicative of nesting, e.g., flight displays, singing males, territorial interactions, and nests or nest building. In portions of plots more suitable for godwits, other shorebirds, and potential shorebird predators, we used line transect sampling with distance estimation (Buckland et al. 2001, Borchers et al. 2002) to obtain estimated density. Transect routes were selected to cover representative features within specific land cover types within each plot. Observers walked a straight line and noted all shorebird and shorebird predators as well as the perpendicular distance of each bird from the transect centerline at time of detection. The latter was determined with optical range finders. Birds noted beyond the limits of the range finder (about 500 m) and those that were flying were assigned distances usually based on intervals of 100 m. For each detection, we also recorded a GPS waypoint, the type of initial detection (audio or visual), the bird's behavior and vocalization, associated vegetation type (after Viereck et al. 1992), and whether or not the observer felt the bird was responding to their presence. During these transects we also recorded numbers of all other species within a fixed distance of centerline (usually 50–100 m), but did not record the other data parameters we noted for shorebirds. A helicopter was used to access all plots and move personnel within plots. We also used the helicopter to conduct low level aerial transects over suspected godwit nesting areas between Port Heiden and Pilot Point. These were flown at 50-m elevation above ground level (AGL) and at an air speed of 100–120 km/h. The pilot, right front observer, and right rear observer recorded birds and estimated a perpendicular distance between a bird and the helicopter when the bird was first observed. A GPS waypoint was taken for all sightings.

For the entire ground effort we recorded godwits on 5 of 18 (28%) transects. These represented 11 different detections totaling 15 different birds over the 63 km of transects hiked. On 14 May, we conducted two, low-level aerial transects between Port Heiden and Pilot Point. The transects were 10- to 15-km inland from the coast and roughly parallel but separated by 2 to 5 km—only coming within a few hundred meters of each other at a single location just inland from Cinder Lagoon. Along these transects we found Marbled Godwits (12 detections totaling 18 birds) distributed from about opposite Hook Lagoon to Ugashik Bay, with most observations in two clusters—one east of Cinder Lagoon and one southeast of Cape Menshikof. Godwits at these sites were generally associated with large expanses of standing water and emergent vegetation, with 6 of 12 detections occurring in marsh/wet bog land cover class, followed by 3 in wet bog/wet meadow, 1 in open low ericaceous/marsh, 1 in open low shrub graminoid, and 1 on mudflats.

During this effort we encountered strong circumstantial evidence of nesting (flight displays, wing-flutter and broken-wing behaviors) by both Pacific Golden-Plovers and Black-bellied

Plovers on all three plots, but especially ones near Port Heiden. Nesting was later confirmed for both taxa (see reports this document by W. Johnson et al. and Kaler and Savage). In terms of general avifauna, we recorded 55 species of birds during the five days we spent on plots. Shorebirds (Charadriidae and Scolopacidae) and songbirds (Passeriformes) comprised about half of all species seen with 14 noted for each group.

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Project: Alaska Peninsula shorebird inventory project

Investigators: Robb Kaler and Susan Savage, U.S. Fish and Wildlife Service

Between 13 May and 1 June 2004, personnel of Alaska Peninsula/Becharof National Wildlife Refuge conducted an avifauna inventory of lowlands (<100 m asl) on the Alaska Peninsula. The primary goal of this work is to establish baseline information on abundance, distribution, and habitat associations of breeding shorebirds in the region. A secondary goal is to collect sufficient data to track population changes over time. Using a stratified random sampling design and survey protocols developed by the USGS, Alaska Science Center, we systematically selected 64 sample plots (5- x 5-km in size) within 2 strata (prime shorebird habitat vs. marginal shorebird habitat) in lowlands throughout the Peninsula south of the Naknek River. We surveyed 13 plots in 2004, including 3 about 15 km northeast of Pilot Point, 3 plots along the Meshik River, 3 plots along the Ugashik River, 1 plot North of Egegik Bay, 1 plot west of Becharof Lake, 1 plot east of Lower Ugashik Lake, and 1 plot near Cinder River lagoon. Within each plot we conducted 10–14 point counts using variable circular plot methodology with distance estimation (total points = 156). During each 10-minute count we recorded details for all shorebirds and shorebird predators and recorded presence (within or outside of 50 m) for all other birds.

We recorded 11 shorebird species during the 26 hr of survey time. The most commonly detected were Dunlin (1.13 pairs/point), Wilson’s Snipe (1.08 pairs/point), and Least Sandpiper (0.81 pairs/point). Using Program DISTANCE 4.1 (Thomas et al. 2003) we produced preliminary density estimates (pairs/hectare) for Dunlin, Greater Yellowlegs, Least Sandpiper, Marbled Godwit, Short-billed Dowitcher, and Wilson’s Snipe. Dunlin (0.27 pairs/ha), Least Sandpiper (0.25 pair/ha), and Short-billed Dowitcher (0.20 pairs/ha) occurred in the highest densities.

This study produced new information on the distribution and nesting status of Black-bellied Plover and Pacific Golden-Plover (see other summaries, this document). Black-bellied Plovers were seen on seven plots, ranging from 25 km north of Egegik Bay to 2 km south of the Ugashik River; Pacific Golden-Plover was detected on five plots. Observations of Pacific Golden-Plovers included one nest with four eggs found on 18 May and one observation of a male doing a “broken wing” distraction display. These observations ranged from about 25 km north of Egegik Bay to 50 km inland from Port Heiden on the Meshik River.

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Project: Pacific Golden-Plover: nesting confirmed on the Alaska Peninsula

Investigators: Wally Johnson, Department of Ecology, Montana State University; Susan Savage, U.S. Fish and Wildlife Service; Mark Johnson, Bozeman, MT; Paul Brusseau, Anchorage, AK

Over the past several years, workers have reported observations suggesting Pacific Golden-Plovers were nesting on the Alaska Peninsula. Nesting in this region is further supported by numerous "hits" of radio-tagged plovers between King Salmon and Port Heiden. However, conclusive evidence went lacking until 2004 when we searched likely habitat in two areas: one between King Salmon and Naknek (3–7 June) and the other in the vicinity of Port Heiden (8–10 June).

In the first area, we found one nest near Naknek and another near King Salmon (both about 58° 44' N). In addition, we observed a number of plovers foraging and loafing on the tundra. These birds gave no nest-related behaviors and their status was unclear. Possibilities include failed breeders, nonbreeders (probably least likely), or birds with incomplete clutches (either first clutches or replacement clutches). Subsequent nest-checking on 25 June indicated probable hatching (from agitated parental behavior) of the clutch near King Salmon, and possible infertility of the Naknek clutch.

We were rewarded with a plover "bonanza" at Port Heiden where a relatively modest search effort between periods of wind and rain produced eight nests. All of these were located at about 57°N, in areas north of town and in the vicinity of the airport. Hatching was underway at one nest on the day we departed (10 June). A local resident continued to visit four of our marked nests daily and reported hatching at all of them by 17 June. This period of hatching is substantially earlier (by at least 2–3 weeks) than we have documented in earlier studies on the Seward Peninsula near Nome. Notably, we also found a nest of Black-bellied Plovers at Port Heiden—far removed from the previously known southern limit of breeding at Chagvan Bay.

Previous to our fieldwork last season, the southern edge of the known nesting range of Pacific Golden-Plover was to the north of King Salmon in the Nushagak River drainage. The data reported here extend the range southward by about 300 km. Based on our findings plus other evidence from the '04 season (Bob Gill noted displaying *fulva* at two sites between Port Heiden and King Salmon in early May, and displaying and distracting Black-bellied Plovers near Port Heiden on 13-14 May; a Pacific Golden-Plover nest was also found in June by summer technicians near a field camp about 50 km south of King Salmon), we conclude that Pacific Golden-Plovers are breeding in suitable habitats along the Alaska Peninsula from King Salmon to at least Port Heiden.

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Project: Inventory of montane-nesting birds in Lake Clark National Park

Investigators: Lee Tibbitts, Dan Ruthrauff, Robert Gill, and Colleen Handel, U.S. Geological Survey

As part of a three-year study to inventory montane-nesting birds within the National Park Service's Southwest Alaska Network, we conducted surveys within Lake Clark National Park and Preserve during 14–29 May and 9–12 June in 2004. We deployed three, two-person crews to survey a total of 22, 10- x 10-km random plots allocated throughout Lake Clark in proportion to ecoregion type. Crews conducted a total of 379 point counts in May and replicated 36 of the point counts in June. To assess bird abundance and distribution we used variable circular plot methodology that incorporated distance estimation. To maximize and standardize detections we surveyed in early spring when birds were expected to be at the peak of their courtship and singing activity. Data from the surveys will be used to: a) estimate detection probabilities of species by habitat, observer, and time of day (using distance sampling and removal methods), b) predict presence/absence of species by ecoregion and habitat (using multivariate habitat models and GIS), and c) calculate park-, ecoregion-, and habitat-specific bird densities (using distance sampling methods).

Local spring conditions varied within Lake Clark during the survey period; plots in the western portion were minimally covered with snow and “green-up” was well advanced whereas plots on the eastern slope of the Alaska Range were nearly completely covered with snow and the emerging vegetation was just beginning to “leaf out” (except along rivers and creeks). Preliminary examination of the data revealed 190 detections of 14 shorebird species on point counts. The most commonly detected shorebirds were Lesser Yellowlegs (26% of shorebird detections), Wilson's Snipe (21%), and American Golden-Plover (12%). The shorebird assemblage of Lake Clark was composed of familiar Alaska species including the boreal forest associated species (both yellowlegs, Solitary Sandpiper, Short-billed Dowitcher, and Red-necked Phalarope), upland and alpine associated species (American Golden-Plover, Surf-bird, Wandering Tattler, Baird's Sandpiper), riparian corridor species (Spotted Sandpiper, Semipalmated Plover), and the more generalist species (Whimbrel, Least Sandpiper, Wilson's Snipe). As expected, shorebird detection rates were lower on the replicate point counts conducted in June.

In 2005, we will complete the assessment of Lake Clark by surveying four remaining plots and initiate similar surveys in Katmai National Park and Preserve and Aniakchak National Monument and Preserve. These data will serve as a basic avifaunal inventory of these parks and, given the repeatable nature of the methodology, will allow for population monitoring over time.

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Project: Pacific Golden-Plover—telemetry studies of the Hawaii-Alaska migratory link

Investigators: Wally and Patricia Johnson, Montana State University; Lee Anne Ayres, U.S. Fish and Wildlife Service; Mary Anne Bishop, Prince William Sound Science Center; Susan Savage, U.S. Fish and Wildlife Service; Jack Whitman, Alaska Department of Fish & Game

In previous studies (spring 1996, 1999, and 2001–2003), we radio-tagged 115 Pacific Golden-Plovers on nonbreeding grounds in Hawaii. Following their northward migration, 28 of these birds were located by aerial monitoring in Alaska. All of the findings have been published, most recently in the June 2004 issue of *Wilson Bulletin*.

In April 2004 we radio-tagged an additional 20 plovers on Oahu. Of these, six were detected in Alaska: two on the Alaska Peninsula near Port Heiden, one on the western tip of the Seward Peninsula near Tin City, and three in the Kotzebue Sound region. These findings, together with earlier records, indicate a major mid-Pacific migratory pathway between nonbreeding grounds in Hawaii and breeding grounds in Alaska. Furthermore, it appears that plovers wintering on Oahu nest throughout the known Alaska breeding range.

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Project: Pacific Flyway Shorebird Migration Program—spring Western Sandpiper migration between Baja Norte, Mexico, and the Copper River Delta, Alaska

Investigators: Nils Warnock, Pt. Reyes Conservation Science; John Takekawa, U.S. Geological Survey; Mary Anne Bishop, Prince William Sound Science Center

Over the past decade, The Pacific Flyway Shorebird Migration Program has built a network of cooperators to examine the importance of coastal habitats used by shorebirds during the spring migration. These studies have revealed the complexity of migration strategies used within and among shorebird species along the Pacific Flyway.

From March to May 2004 we organized and coordinated the efforts of a team of 15 partners to examine the northward migration ecology of shorebirds at 17 sites spanning three countries along the Pacific Flyway from Baja Norte, Mexico; California, Oregon, and Washington; British Columbia, Canada; to western Alaska. We successfully radio-marked 47 Western Sandpipers at Punta Banda, Baja California, Mexico, and 41 Western Sandpipers at San Francisco Bay, California.

Away from the banding site, we relocated 57% of the birds banded at Punta Banda and 61% of the birds banded at San Francisco. We relocated significantly more adult birds (83%) than first year birds (42%). We found no significant differences in relocations between male and female Western Sandpipers or in relocations of birds radio-marked at Punta Banda vs. San Francisco. Mean length-of-stay of Western Sandpipers at sites beyond their banding site ranged from 1.0–7.9 days, with the longest stopovers recorded at Pt. Mugu, CA ($\bar{x} = 7.9 \pm 5.4$ days, $n = 6$).

The recovery rates of radio-marked Western Sandpipers was highest at Copper River Delta, AK, where 38% of birds were detected (51% from San Francisco and 26% from Punta Banda), followed by San Francisco Bay, CA (21%), Pt. Mugu, CA (13%), Willapa Bay, WA (9%), Grays Harbor, WA (9%), and Elkhorn Slough, CA (9%). To reach the Copper River Delta, Western Sandpipers banded at Punta Banda traveled on average $311 \pm 162 \text{ km d}^{-1}$ ($n = 12$ birds), while birds leaving San Francisco Bay traveled $887 \pm 471 \text{ km d}^{-1}$ ($n = 21$ birds).

Public outreach included our project being showcased on the list serve and web site of the Sister Shorebird Schools, an environmental education program sponsored by the U.S. Fish and Wildlife Service.

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Project: An integrated regional ecological assessment of the Black Oystercatcher in Alaska

Investigators: David Tessler, Alaska Department of Fish and Game; Verena Gill and Richard Lanctot, U.S. Fish and Wildlife Service; John Piatt, Marc Romano, and Sandra Talbot, U.S. Geological Survey; Michael Goldstein, U.S. Forest Service; Brian Guzzetti, Julie Morse, Abby Powell, and Douglas Schamel, University of Alaska, Fairbanks

This project aligns and expands the research objectives and methodologies of several previously unrelated studies of the Black Oystercatcher at six sites in the heart of this species' range: Glacier Bay National Park, Kenai Fjords National Park, Prince William Sound, Middleton Island, Kodiak Island, and the Queen Charlotte Islands in British Columbia. By promoting the adoption of a core set of shared methods among current projects, we address several key aspects of oystercatcher ecology critical to the conservation of this poorly understood species. The principal aims of the project are to: 1) assess the size of several important breeding populations throughout the range, and determine nesting density in each; 2) determine breeding chronology in different parts of the range; 3) assess regional differences in nesting effort, breeding success/productivity, and local threats or limitations to productivity; 4) elucidate levels of population structuring and the degree of connectivity between regional breeding populations; 5) estimate adult survival; 6) identify locations of important wintering areas; 7) identify movement patterns between various breeding and wintering areas.

Summer 2004 was the first season of this expanded three-year project, although Julie Morse began her work in Kenai Fjords in 2003. Breeding season fieldwork at study sites in Prince William Sound, Kenai Fjords, Glacier Bay, and Middleton Island commenced with surveys of the local study areas to enumerate Black Oystercatchers and identify the locations of territorial pairs. We searched all actively defended territories for nests, and recorded their locations. Once a pair was identified as territorial, we initiated efforts to capture adult birds using a variety of techniques (noose mats with decoys and recorded territorial calls, nest traps, nest nooses, long handled dip nets, and mist nets). We banded each captured adult with metal and colored plastic bands to identify both the individual and breeding location, and recorded the weight, the length of the wing, culmen, head-bill, and tarsus. From each bird we collected 100 microliters of blood

for subsequent genetic analyses. Broken eggshells with attached membrane were collected opportunistically for inclusion in the population genetics dataset. Collaborators with the Laskeek Bay Conservation Society in the Queen Charlotte Islands, B.C., also contributed eggshell membrane for the population genetics work.

We visited all nests and defended territories at roughly five-day intervals to monitor the fate of nests, eggs, and chicks. Eggs were individually marked, measured, weighed, and floated to estimate laying/hatching dates. We tracked egg loss and cause, as well as relaying effort. Hatched chicks were hand captured and color banded to identify location and cohort, and blood samples were collected (except in Glacier Bay National Park which did not permit handling of chicks in 2004).

This winter we will begin work on identifying important wintering concentrations and possible movement patterns. We intend to conduct aerial surveys of Kenai Fjords National Park, Prince William Sound, parts of the Aleutian Islands, Yakutat Bay, and Glacier Bay National Park to locate concentrations of oystercatchers and estimate their numbers. In Prince William Sound and Glacier Bay these surveys will be used to target boat-based efforts to resight banded birds and enumerate flocks. Flock location, enumeration, and band resighting efforts will be conducted by boat on Kodiak Island, and via ground based surveys on Middleton Island. These winter efforts will be repeated the following year.

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Project: Productivity, paternity, and mate and site fidelity in Black Oystercatchers nesting on Middleton Island, Alaska

Investigators: Brian Guzzetti, University of Alaska, Fairbanks; Verena Gill, U.S. Fish and Wildlife Service; Douglas Schamel, University of Alaska, Fairbanks

The number of Black Oystercatchers nesting on Middleton Island has increased dramatically since uplifting from the 1964 earthquake created a significant amount of new nesting habitat. This study entails a banding and DNA collection program to look at paternity and mate- and site-fidelity within this expanding population. We will also assess seasonal attendance patterns and continue to monitor nesting productivity.

In summer 2004, we captured and banded 62 adults from 48 nests and collected an additional 92 DNA samples from chicks and eggs. Most adults were captured on the nest using noose mats. Chicks were bled on hatch date and recaptured a minimum of 10 days later for banding. Seventeen chicks were banded, three outside the study area. The banding program will allow us to assess mate fidelity, site fidelity, and natal philopatry. We will determine sex and paternity using microsatellites beginning in January 2005.

The entire island was censused monthly between April and August. The June census, conducted at the peak of hatching, yielded 285 territorial pairs and 211 non-breeders for a total of 781

oystercatchers on the island's roughly 29 km of shoreline. We will conduct an additional survey in February 2005 to assess winter attendance.

The field aspect of this study is scheduled to conclude in winter 2006.

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Project: Inventory and apparent nest success of Black Oystercatchers in Prince William Sound

Investigators: Aaron Poe, Bridget Brown, and Mike Goldstein, U.S. Forest Service

Black Oystercatchers have been designated as a *Management Indicator Species* under the preferred alternative of the 2002 Revised Chugach National Forest Plan. This status requires that a plan be developed to monitor their population and distribution. In other parts of its range the species has been shown to be sensitive to disturbance caused by recreational use of shorelines. Given that human use in Prince William Sound is projected to increase significantly, it is important for U.S. Forest Service managers to identify areas key to the persistence of this species and better understand the potential effects of shoreline recreation.

This year's inventory focused on the large islands of western Prince William Sound, including the Knight and Naked Island groups, and Perry Island. We conducted ~430 km of shoreline surveys and identified a total of 43 nesting and feeding areas being used by Black Oystercatchers. A single return visit was conducted to each nest to evaluate apparent nest success. Many of these nesting territories were monitored previously during studies to evaluate impacts from the Exxon Valdez Oil Spill, thus allowing for some limited assessment of territory occupation over time. We also conducted a series of aerial surveys to collect data on human use in the same areas inventoried for oystercatchers. The information collected during these initial inventories will help in the selection of index sites for future oystercatcher population monitoring as well as refine information on habitat associations and the potential for human disturbance of nesting grounds. This year marks the completion of a five-year inventory to identify shorelines used by oystercatchers and characterize human use within nesting and feeding areas in western Prince William Sound.

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Project: Assessing the effect of recreational disturbance on productivity of Black Oystercatchers in Kenai Fjords National Park

Investigators: Julie Morse and Abby Powell, Alaska Cooperative Fish and Wildlife Research Unit, University of Alaska, Fairbanks

In recent years increasing recreational use in coastal habitats of Alaska has led to concern for Black Oystercatcher populations breeding in these habitats. Concern over the impact of human disturbance has highlighted the need for a better understanding of breeding ecology in order to prescribe appropriate management options. Our primary objective in this study is to identify factors, both natural and anthropogenic, that affect the daily survival rates of oystercatcher nests and chicks.

In 2004, we conducted our second of three field seasons in Kenai Fjords National Park. We surveyed over 150 km of shoreline in Aialik Bay and Northwestern Fjord and monitored survival of all nests found from mid-May to mid-August. Productivity in 2004 was considerably lower than the previous year. In 2003, 26 of the 48 nests monitored hatched at least one egg, resulting in a total of 19 chicks being fledged from the study area. In contrast, only 12 nests hatched and 6 chicks fledged from the study area in 2004, despite finding more nests this year. In both years predation was the primary cause of nest failures. However, in 2004 considerably more nests failed due to flooding. Human disturbance has not been a significant direct cause of nest mortality. Levels of human use in Kenai Fjords are very low, especially during May and early June, which is the primary incubation period for Black Oystercatchers in Alaska.

Of the 45 adults we captured and color banded during our first season, all but 2 returned to breed in the study area in 2004, with most pairs returning to the same breeding territory used in 2003. Interestingly, rare incidences of polygyny were observed in this population each year. None of the 31 chicks banded in 2003 has been resighted. Banding efforts in 2004 were limited due to poor reproductive success and consistently bad weather.

In 2004, we also initiated behavioral experiments to assess the resilience of Black Oystercatchers to human disturbance. Nest attendance was recorded during one-hour experimental disturbance periods and compared to a paired observation period on the same nest with no disturbance. On average, birds spent 26.7% less time incubating eggs during disturbance periods than during undisturbed periods. However, oystercatcher pairs also quickly habituated to the presence of humans, with 18% less time spent off the nest during subsequent disturbance periods. No nest failures were caused by decreased nest attendance during disturbance observations.

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Project: Testing for oil exposure in Black Oystercatchers in Prince William Sound

Investigators: David Irons, Kelsey Sullivan, Alison McKnight, and Richard Lanctot, U.S. Fish and Wildlife Service; Aaron Poe and Bridget Brown, U.S. Forest Service; James Bodkin, Brenda Ballachey, and Daniel Mulcahy, U.S. Geological Survey; and Laurel Degernes and Terra Kelly, College of Veterinary Medicine, North Carolina State University

Black Oystercatchers are obligate users of the intertidal zone where much of the oil from the T/V Exxon Valdez spill was deposited in Prince William Sound (PWS), Alaska. In 1993, Brad Andres documented direct evidence of hydrocarbon exposure in the feces of oystercatcher chicks residing in territories previously oiled. Chicks and presumably adults were thought to have acquired hydrocarbons through the ingestion of mussels (*Mytilus trossulus*) and other invertebrates residing in sediments burdened with oil residue. Recent analyses of other intertidal avian consumers such as Harlequin Ducks, Barrow's Goldeneyes, and Pigeon Guillemots have revealed elevated levels of enzymes indicative of hydrocarbon exposure (Trust et al. 2000, Golet et al. 2002). These results prompted the EVOS Trustee Council in 2004 to evaluate whether Black Oystercatchers were being exposed to hydrocarbons.

To determine oystercatcher exposure to hydrocarbons, we took liver biopsies from captured adults and analyzed these samples for levels of hepatic cytochrome P450 1A (CYP1A). This liver enzyme is produced rapidly, yet transiently, when vertebrate species are exposed to hydrocarbons. Forty-four adult Black Oystercatchers were captured on Knight (12), Green (12) and Montague islands (20) within PWS, between 21 May and 4 June 2004. We captured one or more adults on nests using manual and self-tripping bownets, or by placing a single string noose around the rim of the nest bowl and pulling the noose taut when the adult returned to the nest. When nests could not be found, adults were captured by attracting them with decoys and territorial calls and entangling them in mist nets and noose mats. Captured birds were measured and marked, and then quickly moved to a large boat where two veterinarians were standing by to surgically remove a small portion of the liver. One egg was also removed from eight nests in each of the oiled and unoiled study areas for an assessment of organochlorine and heavy metal contaminants (see summary, this document). After recovery from anesthesia, the birds were placed in transport boxes for a minimum of one hour and then brought back to their territories to be released. U.S. Forest Service (USFS) personnel also visited territorial birds and nest sites on two occasions to determine the activity status and reproductive success of each pair. These visits were restricted to sites on Knight Island.

Of the 44 adults we captured, 8 were non-reproductive but territorial, while 36 were associated with nests with at least one egg. In six cases, we captured both members of a pair. No mortality of adults occurred during anesthesia or surgery and we returned all birds to their breeding territories. In most cases, released birds were immediately joined by their partner who typically was standing or flying around their territory. Based on subsequent visits to capture locations by USFS personnel, at least one adult remained on its original territory in six of the nine territories where at least one adult had been captured. Three of the nine pairs successfully hatched at least one chick, three pairs either abandoned or lost their nest to predators (our visitation frequency did not allow us to differentiate this), and two pairs where adults had been captured prior to laying eggs never attempted to nest after surgeries were performed. Finally, one pair lost its one-

egg nest due to our removal of the egg for contaminant analysis. There were three instances where we captured both members of a pair and their territories were revisited. In all three cases, one of the adults was not seen again during subsequent visits. In at least two cases the one member of the pair that was resighted appeared to have paired with an unmarked adult. In all three cases, none successfully nested.

Analyses to detect oil exposure will be conducted on the liver biopsies during the winter of 2004/2005. If these results indicate oystercatchers are still being exposed to oil, we plan to initiate additional fieldwork to determine where and when this exposure is occurring.

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Project: Black Oystercatcher surveys of eastern Prince William Sound

Investigator: Jason Fode and Paul Meyers, U.S. Forest Service

We surveyed 65 km of shoreline on southeastern and southwestern Montague Island for Black Oystercatchers and other waterbirds during 9–18 June 2004. We encountered 20 bird species (totaling over 4,000 individuals) and found 24 Black Oystercatcher nests. Highest density of oystercatcher nests occurred in Hanning Bay. In the past five years, we have surveyed nearly 700 km of shoreline in eastern Prince William Sound. Future plans call for completing surveys of Montague, Green, Hinchinbrook, and Hawkins Islands.

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Project: Assessment of contaminants in Alaskan shorebird eggs

Investigators: Angela Matz and Richard Lanctot, U.S. Fish and Wildlife Service

Analyses of shorebird eggs collected in 2002 (see 2002 summary) revealed very low or non-detectable concentrations of persistent organic contaminants (including organochlorine pesticides and PCBs), heavy metals (e.g., cadmium) and metalloids (e.g., arsenic). Small sample sizes among all species prevented us from testing for differences between species or areas and from concluding that the contaminants we measured were unlikely to be affecting populations. To address this problem, we collected shorebird eggs again in 2004. Eggs were obtained by many collaborators, including those from the Yukon-Kuskokwim Delta NWR, North Slope (Arctic NWR, Barrow), Seward Peninsula, Alaska Peninsula (Naknek, Port Heiden, Izembek NWR), and Prince William Sound (Knight, Green and Montague islands). Seventy-two eggs from 15 different species were sampled, including Black Oystercatcher (16), Bar-tailed Godwit (9), Semipalmated Sandpiper (6), American Golden-Plover (5), Black-bellied Plover (5), Pacific Golden-Plover (4), Red Phalarope (4), Red-necked Phalarope (4), Rock Sandpiper (4), Western Sandpiper (4), Semipalmated Plover (3), Dunlin (3), Pectoral Sandpiper (2), Stilt Sandpiper (2),

and Buff-breasted Sandpiper (1). Eggs were collected from eight additional species in 2004 relative to 2002. Depending on funding, laboratory analyses of all or a portion of these eggs will begin in 2005. Widespread sampling of different shorebird species will hopefully allow us to evaluate contaminant exposure to shorebirds that rely on different migration routes and non-breeding areas.

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Project: Buff-Breasted sandpipers in Brazil: numbers, movement, and fidelity

Investigators: Juliana Bose de Almeida and Lewis Oring, University of Nevada Reno, and Richard Lanctot, U.S. Fish and Wildlife Service

Between October 2003 and March 2004, we conducted our second field season studying the nonbreeding ecology of Buff-breasted Sandpipers in southern Brazil (see 2003 summaries). The goals of this project were to document within and between season site-fidelity and density of Buff-breasted Sandpipers at three major nonbreeding sites in Brazil. Secondary objectives were to monitor molt and changes in body mass of captured Buff-breasted Sandpipers throughout the austral summer. Surveys were conducted at Lagoa do Peixe National Park (Nat'l Park), Ilha da Torotama (Torotama), and Taim Ecological Station (Ecol. Station)—all located in Rio Grande do Sul State, Brazil. Buff-breasted Sandpipers were captured, color-banded, and equipped with radio-transmitters at the Nat'l Park and Ecol. Station sites.

Double-observer censuses yielded detection probabilities between 0.63 and 1.0, depending upon the observer and pasture surveyed. An average detection probability of 0.92 was used to calculate sandpiper density. At the Nat'l. Park, density of sandpipers stayed near 5/ha for most of the 2003–2004 field season. The exceptions were two peaks of approximately 20/ha during early December 2003 and 15/ha during late February 2004. The density of sandpipers at Torotama varied from about 2–20/ha, and at the Ecol. Station from 0–2/ha. Throughout the austral summer, densities decreased at the Ecol. Station and increased at Nat'l. Park and Torotama. The explanatory variables of date, site, and their interaction explained, respectively, 28.6%, 25.4% and 12.8% of the total variation in the data, while the remaining 33.2% was not explained by our variables.

Eighty-seven Buff-breasted Sandpipers were captured between 27 October 2003 and 18 February 2004; 85 and 2 were captured within the Nat'l. Park and Ecol. Station, respectively. Banding activities at the Ecol. Station were discontinued after failing to find roosts of sandpipers. These captures are in addition to the 30 and 25 birds captured in the 2001–2002 and 2002–2003 austral summers, respectively, and the 39 birds captured so far during the 2004–2005 field season. To date, 2 of 30 birds (6.6%) banded in 2001–2002 were resighted in 2002–2003, 3 of 11 (27.3%) banded in 2002–2003 at the Nat'l. Park were resighted in 2003–2004, and 40 of 85 (47.1%) banded in 2003–2004 at the Nat'l. Park have been sighted to date. Only one bird, banded at the

Nat'l Park, has been resighted in more than one subsequent year, always at the same site. There have also been four between-country resightings. One bird banded at Prudhoe Bay, Alaska, in June 2002 was resighted at the Nat'l Park in December 2003. Three of 18 birds banded in Paraguay during early September were resighted at the Nat'l Park in October and November 2004.

Radio transmitters were attached to 32 sandpipers at the Nat'l. Park and 2 at the Ecol. Station during the 2003–2004 field season. At the Nat'l. Park, 87.5% of the radio-marked birds were subsequently detected within the same year, whereas 58.8% of the color-marked birds were subsequently detected. Neither of the two radio-equipped birds at the Ecol. Station was subsequently resighted. The mean length of residency at a site was $55.9 \text{ days} \pm 36.5 \text{ SE}$; range = 2–188 days); residency times were 54.8 ± 25.4 days for females and 57.0 ± 46.7 days for males in 2003–2004.

Resighting data within and between years suggest that the Nat'l Park may serve as a final nonbreeding staging area, whereas the Ecol. Park may simply be a stopover site used by birds as they travel to more southern nonbreeding areas.

Based on body plumage, only 5 of the 87 birds captured during the 2003–2004 field season were classified as hatching year birds. Body size measurements used in a discriminant function analyses indicated there were 48 females and 25 males among the adult birds (sex could not be determined for hatching year birds). For eight birds where the discriminant function analysis failed to give a clear result, the spotting pattern on the 10th primary indicated six were females and two were males. One bird could not be sexed accordingly because it lacked its 10th primary. Body mass differed between males and females, with the former being larger. However, average weight for both sexes was constant throughout the season. Female and male sandpipers had similar molt pattern, with nearly completed wing molt by mid-February. Tail molt was more variable for both females and males.

Further fieldwork during the remaining of the 2004/2005 austral summer will allow us to document more accurately between and within year site fidelity. This last field season will also allow us to calculate the first survival rates for this species.

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Project: The 2004 meetings of the International Wader Study Group and the East Asian-Australasian Shorebird Working Group and information pertinent to Alaska

Investigator: Robert Gill, U.S. Geological Survey

Twice each year, as a member of the administrative body of the International Wader Study Group and the East Asian-Australasian Shorebird Working Group, I subject myself to days of jet lag by attending their respective annual meetings. This year both occurred within a 10-day period, one in Germany and the other in the Republic of Korea. At both meetings several topics of interest to Alaska shorebird biologists were discussed that I share with you here.

East Asian-Australasian Shorebird Working Group: A daylong workshop was held on 17 November in Seosan, Korea, to finalize the flyway's Dunlin Science Action Plan. The following countries were represented at the meeting: Australia, China, Japan, Republic of Korea, Russia, Taiwan, and the United States. The day was spent reviewing the five major segments of the plan (population sizes, breeding ranges, nonbreeding distribution, migration, and threats), identifying action items from each, and assigning individuals or groups to address each action item. Over a dozen actions were identified, five of which were deemed priority for which funding should be sought and work initiated. These include: 1) an expanded effort to identify the breeding ranges of subspecies nesting in the Russian Far East, 2) analysis of existing band recovery and flag resighting information from throughout the flyway, 3) analysis of existing information from the North Slope of Alaska that would produce an assessment of the distribution and size of the *C. a. arcticola* breeding population, 4) expansion of marking efforts in China, particularly on the Yangtze River flood plain, and 5) creation of a Web Site where Dunlin-related materials could be posted and accessed. A Dunlin Science Group (for want of an agreed upon name at this time) was formed with Mark Barter, Australia, as chair. Fourteen other members were identified, representing all countries within the ranges of subspecies of Pacific-basin Dunlin, including from Alaska Rick Lanctot and me. Anyone else with a strong desire to become involved is welcome to become a part of the group—please contact me.

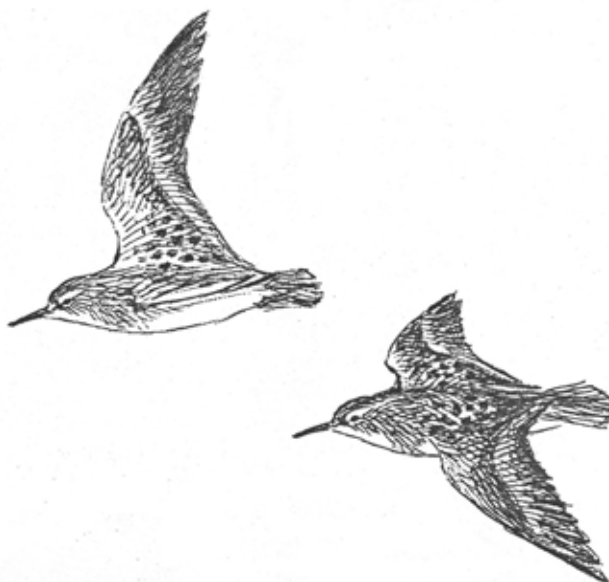
At the end of the Dunlin meeting I gave an hour-long summary of the planned Beringian Expedition in 2005 (see summary, this document) during which I outlined the concept of a flyway-wide working group for the Bar-tailed Godwit. The initial idea was developed by Brian McCaffery and built upon by Phil Battley (Miranda Naturalists' Trust, New Zealand) and me. The attending country representatives recognized the need to contribute human resources and funding towards both species of concern as well as towards those with apparent healthy populations. The godwit group, like that for Dunlin, will be responsible for coordinating flyway-wide interests in godwits and developing standardized protocols for such tasks as censusing, assessing annual productivity through age-ratio scans, and collecting samples for genetic and stable isotope analyses.

For anyone wanting an excuse to visit New Zealand, the Australasia Wader Studies Group will hold its bi-annual meeting in Nelson (north of the South Island) during the second week of December 2005.

International Wader Study Group: The annual meeting was held in Papenburg, Germany, 4–7 November 2004. This year saw the largest participation by North Americans (Colleen Handel, Falk Huettmann, Sarah Jamieson, Rick Lanctot, Audrey Taylor, and myself) since I began attending in the mid-1990s. Four special workshops were offered this year: 1) Monitoring Arctic-breeding shorebirds in their breeding areas, 2) Turnover issues at migration stop-over sites—how many individual birds use a site, when do they arrive, and how long do they stay?, 3) Monitoring Arctic-breeding shorebirds in their nonbreeding areas, and 4) Coastal saltmarshes throughout the world: significance and mechanisms in life histories of waders. Our very own Rick Lanctot chaired the breeding areas workshop along with Misha Soloviev of Moscow State University. During the afternoon following the workshop a breakout group convened to discuss a formal compilation of protocols used to collect demographic, habitat use, predator-prey abundance, and environmental data associated with studies of breeding waders throughout the Arctic. Each of these types of data was discussed vis-à-vis the length of time—ranging from a portion of a single day through an entire season—an investigator might have on a given study area. Rick is taking the lead on compiling and revising this information in time for inclusion in the April 2005 issue of the *Wader Study Group Bulletin*. Many of you can expect to hear directly from Rick on this topic.

The next meeting of the IWSG will be held in County Cork, Ireland, 6–10 October 2005. The 2006 meeting will be in Lund, Sweden, and the 2007 meeting either in France or England, most likely in early autumn as has become the custom. I would encourage anyone with even a passing interest in waders to attend an IWSG meeting. You will not experience a more knowledgeable or friendlier group of folks than those attending IWSG meetings.

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Alaska Shorebird Group

Avian taxa mentioned in this summary. Common and scientific names follow *The A.O.U. Check-list of North American Birds* (7th ed., 1998) and supplements.

<u>COMMON NAME</u>	<u>SCIENTIFIC NAME</u>
Harlequin Duck	<i>Histrionicus histrionicus</i>
Barrow's Goldeneye	<i>Bucephala islandica</i>
Sandhill Crane	<i>Grus canadensis</i>
Black-bellied Plover	<i>Pluvialis squatarola</i>
American Golden-Plover	<i>P. dominica</i>
Pacific Golden-Plover	<i>P. fulva</i>
Semipalmated Plover	<i>Charadrius semipalmatus</i>
Black Oystercatcher	<i>Haematopus bachmani</i>
Greater Yellowlegs	<i>Tringa melanoleuca</i>
Lesser Yellowlegs	<i>T. flavipes</i>
Solitary Sandpiper	<i>T. solitaria</i>
Spotted Sandpiper	<i>Actitis macularia</i>
Wandering Tattler	<i>Heteroscelus incanus</i>
Whimbrel	<i>N. phaeopus</i>
Hudsonian Godwit	<i>Limosa haemastica</i>
Bar-tailed Godwit	<i>L. lapponica baueri</i>
Marbled Godwit	<i>L. fedoa beringiae</i>
Ruddy Turnstone	<i>Arenaria interpres</i>
Surfbird	<i>Aphriza virgata</i>
Semipalmated Sandpiper	<i>Calidris pusilla</i>
Western Sandpiper	<i>C. mauri</i>
Least Sandpiper	<i>C. minuta</i>
White-rumped Sandpiper	<i>C. fuscicollis</i>
Baird's Sandpiper	<i>C. bairdii</i>
Sharp-tailed Sandpiper	<i>C. acuminata</i>
Pectoral Sandpiper	<i>C. melanotos</i>
Rock Sandpiper	<i>C. ptilocnemis</i>
Dunlin	<i>C. alpina</i>
Stilt Sandpiper	<i>C. himantopus</i>
Buff-breasted Sandpiper	<i>Tryngites subruficollis</i>
Short-billed Dowitcher	<i>Limnodromus griseus</i>
Long-billed Dowitcher	<i>L. scolopaceus</i>
Wilson's Snipe	<i>Gallinago delicata</i>
Red-necked Phalarope	<i>Phalaropus lobatus</i>
Red Phalarope	<i>P. fulicarius</i>
Pomarine Jaeger	<i>Stercorarius pomarinus</i>
Parasitic Jaeger	<i>S. parasiticus</i>
Long-tailed Jaeger	<i>S. longicaudus</i>
Glaucous Gull	<i>Larus hyperboreus</i>
Pigeon Guillemot	<i>Cepphus columba</i>
Common Raven	<i>Corvus corax</i>
Lapland Longspur	<i>Calcarius lapponicus</i>