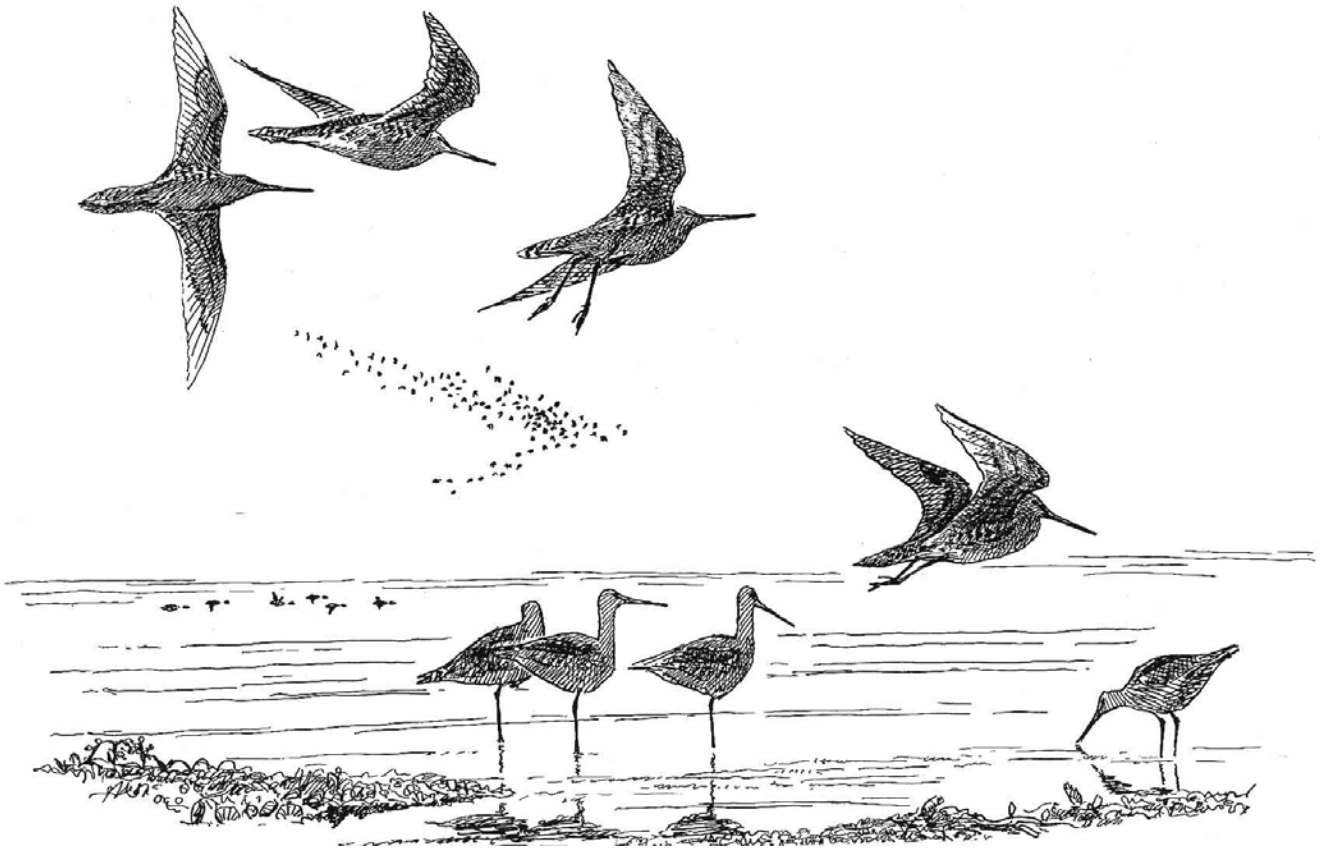
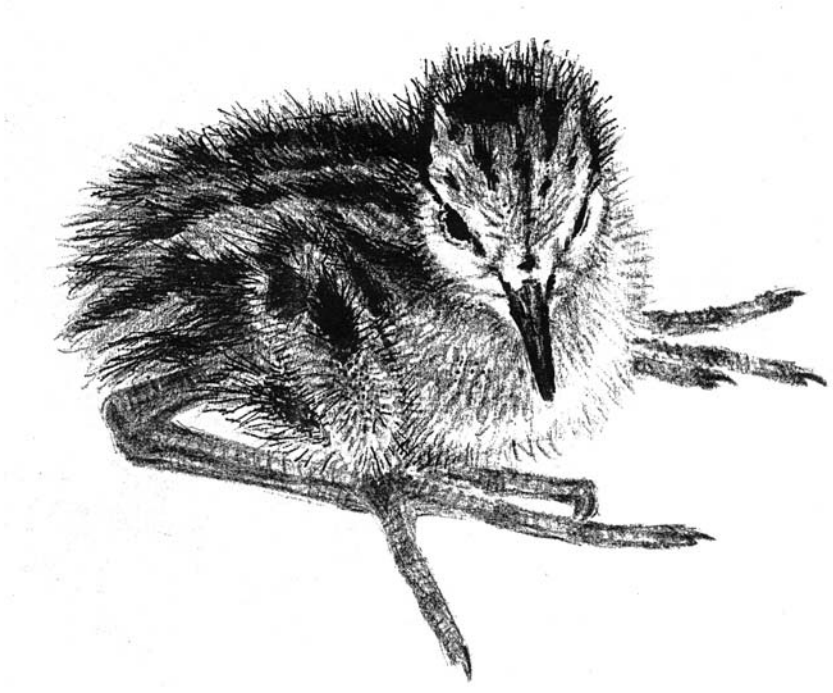
Summaries of ongoing or new studies of Alaska shorebirds during 2002



December 2002

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

A note from the compiler: Not since the OCSEAP era of the late 1970s—that's Outer Continental Shelf Environmental Assessment Program for those still long of tooth—have I seen shorebird studies in Alaska of such quantity, quality, and geographic scope as presented herein. I am continually amazed at how much we in the shorebird community get done with the relatively limited resources we garner compared to those of other biological disciplines. Our dedication and cooperative spirit have carried us far—and will hopefully continue to be our driving force for the immediate future. I am also heartened to see such a variety of studies. There is something here for everyone, ranging from Sandy Talbot's genetics study of curlews that requires proficiency in gene-speak to fully appreciate, to rigorously-designed efforts to enumerate distributions and populations, to sitting in an airplane once a month and counting Rock Sandpipers. And yes, most of our studies are based in Alaska and address local issues, but provincial we are not. This year's studies include several that were entirely or in part conducted outside of Alaska in nine countries distributed over four continents. The affiliations of investigators and cooperators are similarly diverse, being represented by two petroleum companies, four Department of Interior agencies, five universities, and an eye-opening eight NGOs. To those of you who contributed to this compendium, I thank you. To those reading this who for whatever reason did not submit a summary (and you know who you are), we look forward to your contribution next year. And to my dear friend, Maksim Dementyev, your artwork captures so vividly the subtle nuances of a group of birds special to us all.



Project: Inventory and monitoring of shorebirds on the Arctic National Wildlife Refuge and adjacent Lands

Investigator: Richard Lanctot, U.S. Fish and Wildlife Service

Personnel from the U.S. Fish and Wildlife Service and the U.S. Geological Survey conducted surveys on the Arctic National Wildlife Refuge and adjacent lands (west to Colville River) during June of 2002. These surveys were part of a larger effort (i.e., Program for Regional and International Shorebird Monitoring, PRISM) to (1) determine the distribution and abundance of breeding shorebirds, (2) collect information on shorebird-habitat associations, and (3) estimate population size and trends of shorebirds in arctic Alaska and Canada.

A base camp was established on the Lower Canning River from which 38 (30 random and 8 non-random) rapid survey sites (each rapid consisting of 3, 16-ha plots) and 4 intensive plots (16 ha plots located within walking distance of camp) were surveyed between 11 and 20 June. Rapid surveys were conducted at four additional intensive plots located within the Kuparuk Oil Field on 22 June. These sites were surveyed by the Wildlife Conservation Society group as part of their predator/prey study (see summary by Liebezeit and Zuck). All shorebirds (especially territorial males), other birds observed, and habitat characteristics of the plot were noted.

The surveys documented 786 individuals of 14 species of breeding shorebirds. The most numerous were Pectoral Sandpiper *C. melanotos* (221), Red Phalarope *P. fulicarius* (134) and Semipalmated Sandpiper *C. pusilla* (127). A total of 211 territorial pairs was recorded during double-sample surveys at 26 rapid survey sites (total 12.5 km^2) within the 14,237 km^2 study area. This generated an uncorrected density of 16.9 birds/km^2. On the eight intensive plots (four Canning River and 4 Kuparuk) we found eight different species of shorebirds breeding. and found between two and eight (mean = 5.2) nests found per plot, and found between one and four nests for a given species. For most species the low nest numbers made it difficult to determine a reliable detection ratio (i.e., number of estimated nests by rapid observers divided by number of suspected nests based on intensive surveys) for most species. Only the Pectoral Sandpiper (ratio = 0.81), Semipalmated Sandpiper (0.90) and Red-necked Phalarope (0.47) had sufficient numbers of birds to derive detection ratios. We have not extrapolated these numbers to the entire study area at this time to generate a population estimate for all or individual shorebirds.

We encountered several problems during our surveys. First, we arrived as most birds were completing egg-laying. Thus we missed the optimal display period during which rapid surveys should be conducted, and had little time to practice survey methods. Second, the study area had not been stratified by habitat type (e.g., wet versus dry) prior to sample plot selection. Thus all rapid plot locations were selected completely at random (as opposed to randomly within strata). Given the large amount of upland habitat in the Arctic National Wildlife Refuge, we ended up surveying mostly upland habitats and very little wetland habitats (where we suspected most of the birds to be). In future years, we need to sample a larger proportion of wet areas.

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Project: Predators and nest productivity on Alaska's North Slope

Investigators: Joe Liebezeit and Steve Zack, Wildlife Conservation Society.

In 2002, the Wildlife Conservation Society, along with collaborators (USFWS-Fairbanks; ABR, Inc.; LGL, Inc.; Phillips Petroleum; BP Alaska), initiated a long-term, multiple-site study to investigate the potential impacts of predators on the nest survival of shorebirds and other tundra-nesting species in oil-developed and undeveloped areas of Alaska's North Slope. Recent evidence suggests numbers of nest predators (including Glaucous Gull *Larus hyperboreus*, Arctic fox *Alopex lagopus*, and Common Raven *Corvus corax*) have increased in human-altered areas of the North Slope. Heretofore, little concerted effort has been made to investigate the potential impact of predators on nest survival of tundra-breeding birds in areas of disparate human use.

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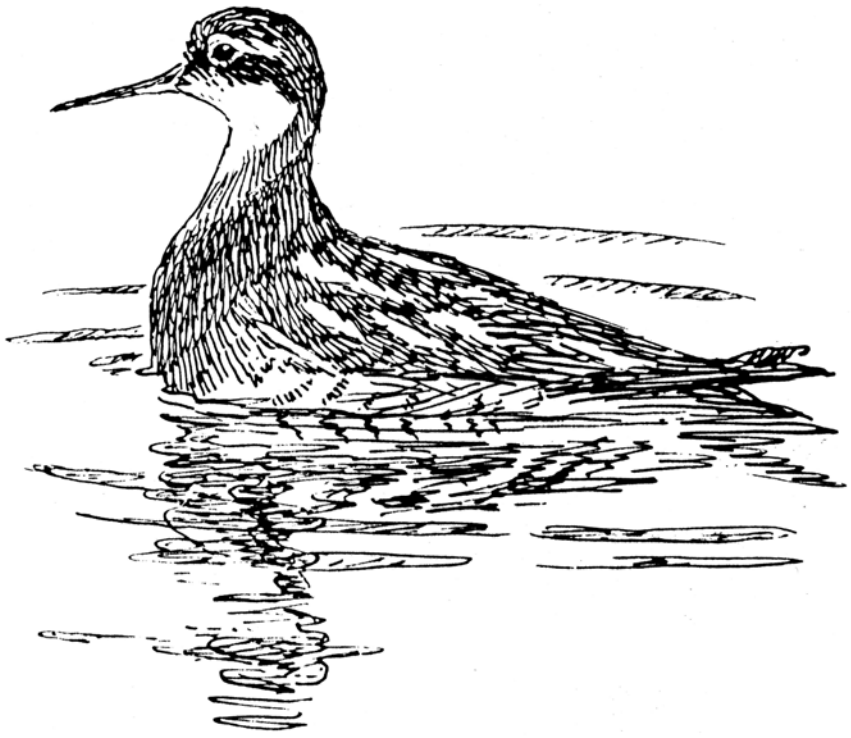

Project: Inventory of montane-nesting birds in national parks of northwest Alaska

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

Between 30 May and 9 June 2002 we completed the second of three field seasons allocated for an inventory of montane-nesting birds in Alaska's Arctic Network of national parks (Cape Krusenstern National Monument, Gates of the Arctic National Park and Preserve, Kobuk Valley National Park, and Noatak National Preserve). Because these park units are thought to provide important nesting habitat for several montane-nesting shorebirds, our surveys focused on this group, but all avian species were recorded. We conducted 24 point counts in each of 20 study plots in 2001 (5 plots in Cape Krusenstern, 15 in Noatak) and in 22 study plots in 2002 (8 plots in Kobuk, 14 in Noatak). Plots were 10 km x 10 km in size and randomly selected. Points within plots were spaced at least 500 m apart along transects and allocated in proportion to available habitat. At each point, we conducted a 10-minute count of shorebirds and potential predators, followed by a 5-minute count for all other birds. In 2001, these totaled 79 hours of actual survey time for shorebirds and 39 hours for other species; in 2002 the totals were 89 and 44 hours, respectively. We detected 1,410 shorebirds and potential predators during the 10-minute counts and 3,671 birds during the 5-minute counts. A total of 100 species of birds was detected on the plots (53 species in Cape Krusenstern, 54 in Kobuk Valley, and 87 in Noatak) of which 23 species were shorebirds. Thirteen species were potential predators of adult shorebirds or their eggs and young. The most commonly detected shorebirds and potential shorebird predators over the two years were Wilson's Snipe (*Gallinago delicata*), American Golden-Plover *Pluvialis dominica*, Whimbrel *Numenius phaeopus*, Common Raven *Corvus corax*, and Long-tailed Jaeger *Stercorarius longicaudus*, occurring on 81%, 79%, 57%, 90%, and 76% of all plots, respectively. To date we have documented five species of shorebirds in one or more of the parks that had not previously been reported but in which they could be expected to occur: Pacific Golden-Plover *P. fulva*, Hudsonian Godwit *Limosa haemastica*, Surfbird *Aphriza virgata*, Red Knot *Calidris canutus*, and Buff-breasted Sandpiper *Tryngites subruficollis*.

As we moved away from the coast and into the eastern Baird and De Long mountains the average number of shorebird species encountered per plot during 10-minute counts decreased markedly from 6.0 ± 0.32 SE in Cape Krusenstern to 3.4 ± 0.21 and 2.3 ± 0.41 in Noatak and Kobuk Valley, respectively. The mean number of shorebird predators (exclusive of gulls) mirrored this west-to-east gradient, being highest in Cape Krusenstern (6.0 ± 0.32 SE) but about the same in both Kobuk Valley (2.3 ± 0.36) and Noatak (2.8 ± 0.26).

In 2003 we will complete the inventory by surveying 1 additional plot in Kobuk Valley National Park, 6 additional plots in Noatak National Preserve and 26 new plots in Gates of the Arctic National Park and Preserve. Upon completion of this study we plan to continue the inventory into the eastern Brooks Range and Arctic National Wildlife Refuge (Philip Smith, Davidson, and Romanzof mountains) and would encourage Canadian colleagues to conduct similar inventories of the British and Richardson mountains of the Yukon. In 2003, we will also initiate multi-year inventories of montane-nesting birds in National Park units in southwest Alaska.

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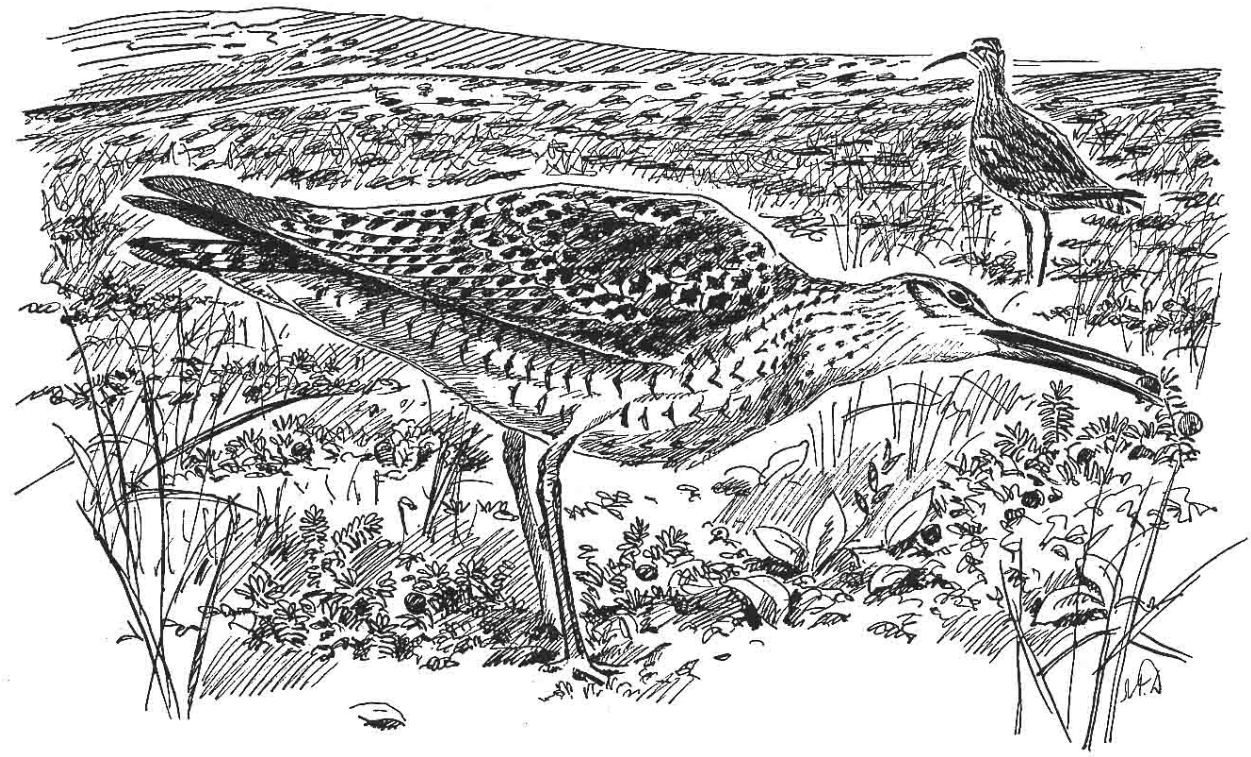
Project: Implementation of PRISM on Selawik National Wildlife Refuge – 2002

Investigators: Catherine Wightman and Jon Bart, U.S. Geological Survey, and Tina Moran, U.S. Fish and Wildlife Service

As part of the Program for Regional and International Shorebird Monitoring (PRISM), we conducted shorebird surveys on 42 plots on Selawik National Wildlife Refuge from 11–27 June 2002. Of the 11 species recorded, Semipalmated Sandpiper *Calidris pusilla*, Whimbrel *Numenius phaeopus*, and Western Sandpiper *C. mauri*, were the most common. Densities ranged from 0.13 territorial males/km^2 for Black Turnstones *Arenaria melanocephala* and Bar-tailed Godwits *Limosa lapponica* to 4.17/km^2 for Semipalmated Sandpipers. Field observations of habitat types corresponded approximately with the GIS land cover map for the study area, which suggests the accuracy of the GIS land cover map is adequate for assessing general habitat associations. Therefore, we evaluated habitat-based regression models for the five species with sample sizes greater than five. These models suggest that wet graminoid, wet mosaic, flood plain, and dwarf scrub lichen habitats are positively associated with shorebird densities for the species modeled. Field observations suggest that dwarf scrub tussock and moist graminoid habitats may be important for shorebirds in this study area as well. To illustrate the modeling process, we estimated the population size of shorebirds in the study area. However, we conducted surveys during the latter portion of the breeding season and feel that our reported population size is probably an underestimation.

Contact: Tina Moran, Wildlife Biologist, Selawik NWR, P.O. Box 270, Kotzebue, AK 99752. Phone: 907-442-3799 ext. 24; email: tina_moran@fws.gov



Project: Ongoing studies of Pacific and American Golden-Plovers in Alaska and Hawaii.

Investigator: Wally Johnson, Montana State University.

In June, I returned to our plover study sites near Nome with two fellow ploverphiles, my son Mark and friend Ron Kienholz. While there we captured and marked four nesting pairs of Pacific Golden-Plovers (*Pluvialis fulva*) and seven nesting pairs of American Golden-Plovers (*P. dominica*). Joanna Klima's recent findings concerning *P. dominica* nesting near Churchill suggest much higher female site- and mate-fidelity than we've observed with this species on the Seward Peninsula. Thus, I wanted to follow up with another group of marked pairs, especially *P. dominica*. We also collected eggs of *P. fulva* and *P. dominica* for contaminants analyses in collaboration with work being done by Angela Matz and Rick Lanctot (see summary). Finally, for both species we collected the usual suite of measurements from captured birds, but this year we also obtained detailed measurements of bill/eye relationships and of the unfeathered tibia. Byrkjedal and Thompson (in Tundra Plovers, 1998) described these metrics as useful for field identification of the two species and I wanted to test their validity. Our results (not in total agreement with B&T) will appear in a paper I'm currently writing on biometrics of *P. fulva* and *P. dominica*. As for next season, plans are underway for another round of *P. fulva* radio-tagging on Oahu in April, followed by monitoring in both Hawaii and Alaska. This is being done in conjunction with the "Kolea Watch" project that began in spring '02. Of 100 birds radio-tagged on Oahu since 1996, 27 have been located in various regions of Alaska, including on the Copper River Delta, Alaska Peninsula (south of King Salmon), and near Kotzebue. Only the findings through 1999 have been published thus far.

Contact: Dr. Oscar Johnson, Department of Ecology, Montana State University, Bozeman, MT 59717. Phone: 406-587-7305, e-mail: owjohnson2105@aol.com

Project: Nesting territories and nest site selection in Pacific and American Golden-Plovers at Nome, Alaska

Investigator: Phil Bruner, Brigham Young University, Hawaii

Breeding territories of Pacific Golden-Plovers *Pluvialis fulva* (*n* = 12) and American Golden-Plovers *Pluvialis dominica* (*n* = 9) located on the southern Seward Peninsula were quantitatively examined using line intercept transects. In each territory we measured percent cover of rocks, soil, water, non-vascular plants, and woody and herbaceous vegetation. Significantly more rock and less herbaceous cover were found in *P. dominica* than in *P. fulva* territories but percent cover of the other four variables were not significantly different between the territories of the two species. On a finer scale we looked at substrate and plant composition within 1-m^2 plots centered on each nest and found that both species placed nests in areas with significantly less vascular but more non-vascular cover than occurs elsewhere on their territories. On the other hand, the percent of non-vegetative cover was not significantly different between nest cup sites and elsewhere on territories. These data confirm that *P. fulva* are found in taller, more dense vegetation while *P. dominica* nest in habitat with more rock and shorter vegetation (Connor et al. 1993, Auk 110:9-20). The question of whether or not golden-plovers deliberately select the location of the nest cup based on a particular habitat type was answered affirmatively. In 2002, we also began to quantitatively assess the nesting territories of Black-bellied Plovers *P. squatarola* and will complete that work during the 2003 field season following the same sampling protocol used with the two species of golden-plover.

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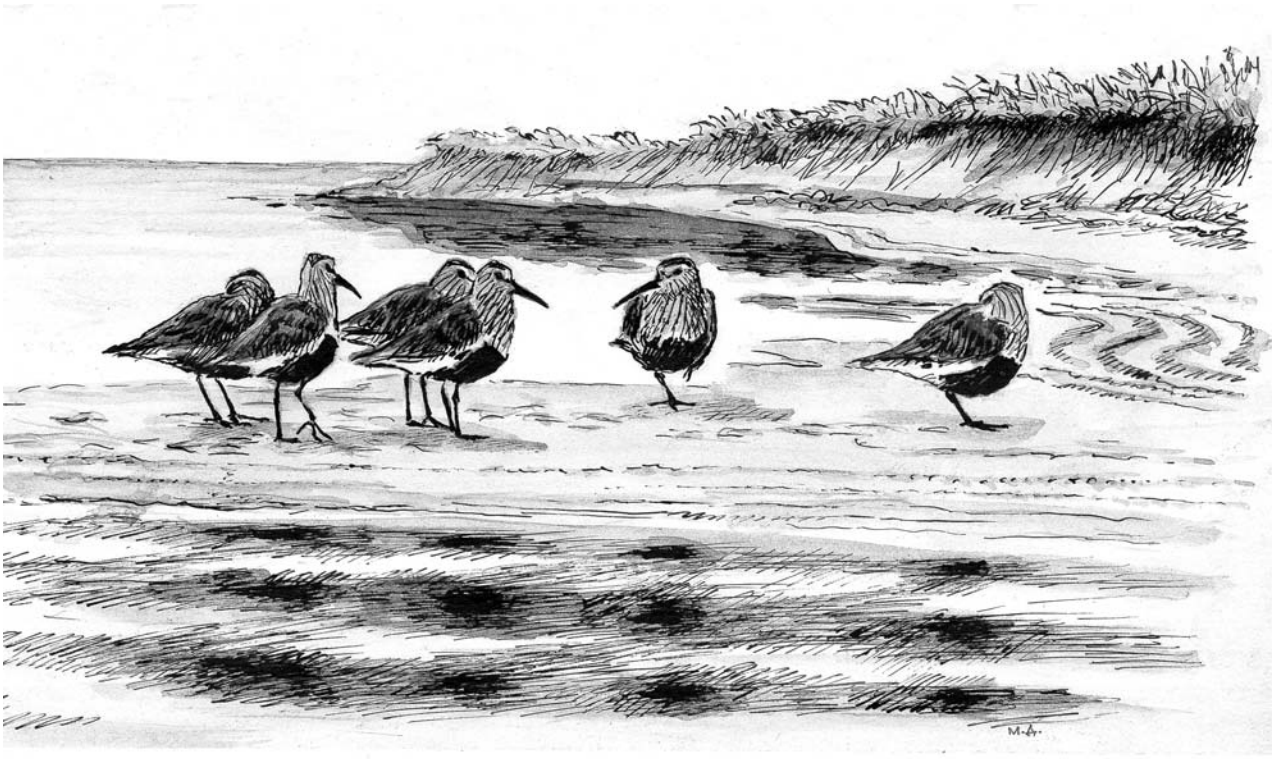
Project: Spring shorebird migration: Mexico to Alaska

Investigators: Nils Warnock, Mary Anne Bishop, and John Y. Takekawa

We organized and coordinated the efforts of a team of 30 partners to examine the spring migration ecology of shorebirds at over 30 migration sites spanning 3 countries (inclusive of five states and three Canadian Provinces) along the Pacific Flyway from Sinaloa, Mexico, to western Alaska. We successfully radio-marked 88 shorebirds in April 2002 at Bahía Santa María, Sinaloa, Mexico, including 59 Western Sandpipers *Calidris mauri* and 29 Long-billed Dowitchers *Limnodromus scolopaceus*. The mean length-of-stay for Western Sandpipers (16.4 ± 4.0 days, *n* = 59) and Long-billed Dowitchers (18.6 ± 4.8 days, *n* = 29) at Bahía Santa María did not differ significantly by age, sex, body mass, or capture date. We documented 50 locations used by the 27 Western Sandpipers that moved beyond their banding site – a detection rate half of that in previous years. Some of the birds we marked may have oversummered at Bahía Santa María, reducing our detections. San Francisco Bay was the single most important stopover site for Western Sandpipers where 22% of the marked birds were detected, followed by Willapa Bay and Grays Harbor (20%). We relocated 12% at the Copper River Delta, far below the 70–90% of previous years, but this may have been due to some batteries dying and radios falling off before birds reached Alaska. Two birds were relocated at Yukon-Kuskokwim Delta breeding areas. Western Sandpiper's mean length-of-stay past the banding site ranged from 1–5 days, and

their longest stopover was at San Francisco Bay (5.0 ± 3.2 days). Only one Long-billed Dowitcher was detected, at Carson Lake, NV, in the western Great Basin. On the basis of our results and earlier work on waterfowl, we suspect that Long-billed Dowitchers at Bahía Santa María may have migrated through the Interior Highlands of Mexico and up the far eastern side of the Pacific Flyway/west side of the Central Flyway. Our project was showcased on the list serve and web site of the Shorebird Sister Schools, an environmental education program sponsored by the U.S. Fish and Wildlife Service. Over the past decade, we have 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. We are preparing an integrated proposal to complete analyses on wetland quality, bioenergetics, and connectivity, and to conduct 2 more radio-telemetry field seasons (2004 and 2006), focusing on the Pacific Flyway.

Contact: Nils Warnock, Point Reyes Bird Observatory, 4990 Shoreline Highway, Stinson Beach, CA 94970. Phone: 415-868-0371, ext. 308; email: nils@prbo.org; Mary Anne Bishop, Prince William Sound Science Center, P.O. Box 705, Cordova, AK 99574; John Takekawa, U.S. Geological Survey, Western Ecological Research Center, San Francisco Bay Estuary Field Station, PO Box 2012, Vallejo, CA 94592.



Project: Shorebird studies on the Yukon Delta National Wildlife Refuge in 2002

Task: Reproductive ecology of Western Sandpipers

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

In 2002, we completed the fifth consecutive year of shorebird studies at our long-term study site (Kanaryarmiut Field Station) on the central Yukon-Kuskokwim Delta (62°13'N, 164°47'W). As in past years, Western Sandpipers *Calidris mauri* were the focus of our investigation. Spring break-up in this region was early compared to both 2001 and the long-term (15-year) average. Weather was cool, wet, and windy in the first half of May, but then generally drier and warmer through mid-June.

The first Western Sandpiper clutches were initiated on 17 May 2002, which was 8 days earlier than in 2001, and 2 days earlier than the previous early date at our site (19 May in 1999). In 2002, 50% of first nests were initiated as of 23 May. By comparison, in 2001, it was 5 June before 50% of first nests had been initiated. In past years, nest density has been calculated as simply the number of nests found divided by the study area size (= 16 ha). By this measure, nest density in 2002 was the lowest recorded to date, 2.63 nests/ha versus a mean of 3.01 nests/ha (range 2.95–3.06) for 1999–2001. The number of nests found, however, is at least partially a function of nest predation (i.e., fewer nests found when predation rates are high). Nest predation in 2002, probably primarily by mink *Mustela vison*, was very high; Mayfield nest success was only 0.11, compared to a mean of 0.34 (range 0.21–0.55) for 1998–2001. When rates of nest loss are considered, nest density in 2002 may have been as high as 4.56/ha.

High rates of nest loss led to high rates of re-nesting; 35% of pairs that lost nests eventually re-nested. The mean interval between the loss of a first nest and the initiation of a pair's second nest was 6.4 days. There was no correlation between the age of the nest when it was lost, and the interval required to initiate the second clutch. By eliminating second nests from consideration, we estimated the density of breeding pairs on the study area (i.e., number of pairs that initiated at least 1 clutch) to be 3.56 pairs/ha.

Among clutches that hatched, fledging success (defined as a clutch fledging one or more young) was only 39%, compared with 58% in 2001. Overall in 2002, only 4% of Western Sandpiper clutches initiated resulted in fledged young.

Task: PRISM surveys on the central Yukon Delta

Investigators: Jon Bart and Catherine Wightman, U.S. Geological Survey

In 2002, we continued participation in the PRISM program after our pilot field work in 2001. We started with a 3-person pre-break-up crew at the refuge's Old Chevak field station. Two of the crewmembers were each primary observers on 2, 10-ha intensive survey plots (total of four plots). We were hoping to conduct a double-observer study to estimate the proportion of nests actually detected by a primary intensive surveyor. To accomplish this, our third crewmember

was going to independently survey two of the four plots being surveyed by the primary observers. Unfortunately, our third crewmember sustained a serious ankle injury early in the season, and had to be removed from the field. The intensive surveyors remained in the field through mid- July, and studied brood movements in Western and Rock sandpipers *C. ptilocnemis* after the conclusion of the nest plot surveys in mid- to late June.

After several days of training at Kanaryarmiut Field Station in late May, our 2-person rapid survey crew moved to Old Chevak where they were based while completing rapid surveys during the first two weeks of June. They visited 8 randomly selected sites, and rapidly surveyed a total of 50, 10-ha plots. They also each conducted two rapid surveys on each of five intensive plots (four at Old Chevak, plus the Western Sandpiper demography plot at Kanaryarmiut Field Station). The six most abundant species in the study area were Black Turnstone *Arenaria melanocephala*, Semipalmated Sandpiper *C. pusilla*, Western Sandpiper, Dunlin *C. alpina*, Red Phalarope *Phalaropus fulicarius*, and Red-necked Phalarope *P. lobatus*. Overall shorebird densities exceeded 170 birds/km^2.

Task: Age ratios in autumn-staging Bar-tailed Godwits

Investigators: Brian McCaffery, U.S. Fish and Wildlife Service; Robert Gill, U.S. Geological Survey; and Adrian Riegen, Miranda Naturalists' Trust, New Zealand

We established two camps on the YKD's outer coast to determine the proportion of juveniles in flocks of staging Bar-tailed Godwits *Limosa lapponica baueri*. A two-person crew was at Tutakoke from 17–25 August, and a two- to three-person crew was at Tern Mountain from 18 August to 14 September. Field crews at both sites observed thousands of godwits and obtained age-ratio data on 11 and 53 flocks at the 2 sites, respectively. Juveniles made up 2.0% and 0.6% of the flocks at Tutakoke and Tern Mountain, respectively. These abysmal estimates of annual productivity are comparable to those obtained at Tern Mountain in 1999 and 2001, and similar to age ratios in flocks of Bar-tailed Godwits (*baueri* subspecies) arriving in New Zealand during October 2001 and 2002.

The two field crews in 2002 also made multiple observations of color-flagged godwits. At Tutakoke, there were 44 observations of >21 individual flagged godwits, with >13, 4, and 4 from southeast Australia, northeast Australia, and New Zealand, respectively. At Tern Mountain, there were 31 observations of >12 individual flagged godwits, with >8, 1, 1, and 1 from southeast Australia, New Zealand, Japan, and China, respectively. The twelfth bird was probably from northeast Australia.

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Project: Surveys of Greater Yellowlegs on Togiak National Wildlife Refuge

Investigator: Rob MacDonald, U. S. Fish and Wildlife Service

During our annual Harlequin Duck (*Histrionicus histrionicus*) breeding pair survey in late May I again (first begun in 2001) recorded all yellowlegs observed. We used a Robinson R-44 helicopter to survey 618 km of river course, including the mainstream Togiak, Goodnews, and Kanektok rivers, some of their tributaries, and other smaller drainages of the upper Bristol Bay and Kuskokwim Bay watersheds.

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Project: Implementation of PRISM and other shorebird studies on the Alaska Peninsula/Becharof National Wildlife Refuge – 2002.

Investigators: Susan Savage, U.S. Fish and Wildlife Service, and Catherine Wightman, U.S. Geological Survey

Between 15 May and 5 June 2002 a pilot study was undertaken to explore the feasibility of conducting PRISM-based surveys on the Alaska Peninsula. Objectives included determining distribution and abundance of breeding shorebirds, collecting information on shorebird-habitat associations, and assessing the accuracy of the available GIS land cover map. The ultimate goal of the work is to estimate the population size of the shorebird species breeding on the Alaska Peninsula from the Naknek drainage south to Port Moller. Biologists choose six areas that were accessible by float or wheeled plane and selected random plots within a 3-km-radius circle of the access points. Observers surveyed 54, 16-ha plots during the survey period, 49 distributed among five lowland locations and five at a single alpine site. All shorebirds (especially territorial males), other birds observed, and habitat characteristics of the plot were noted.

During the survey period we recorded 12 species on plots, with Dunlin *Calidris alpina* being the most frequently encountered, followed by Least Sandpiper *C. minutilla*, Wilson's Snipe *Gallinago delicata*, Short-billed Dowitcher *Limnodromus griseus*, Red-necked Phalarope *Phalaropus lobatus*, and Greater Yellowlegs *Tringa melanoleuca*. Three additional species were recorded during the period but not on plots. Observations of Pacific Golden-Plovers *Pluvialis fulva* in flight display suggest the species may nest father south than previously reported. The 1982 Bristol Bay land cover map was found to be useful in predicting the occurrence of many shorebird species. Biologists used the survey information to estimate a population of 6,330 shorebirds for the 127-km^2 area surveyed. Recommendations are forthcoming for future surveys including randomization of plots across the available habitat and the addition of intensive surveys to determine detection rates.

In addition to the PRISM effort, we conducted aerial radio-telemetry flights along the north side of the Alaska Peninsula in conjunction with the Pacific Flyway Project (see summary by

Warnock et al.) and the Pacific Golden-Plover Project (see summary by Johnson). This year's focus of the Pacific Flyway Project was on Western Sandpipers *C. mauri* and Long-billed Dowitchers *L. scolopaceus*. Refuge staff flew aerial tracking surveys on 8 days between 17 April and 22 May, most along the Bristol Bay coast from King Salmon south to Port Moller and when possible from King Salmon north to Clarks Point in Nushagak Bay. During this effort we detected one possible Western Sandpiper, no Long-billed Dowitchers, and three Pacific Golden-Plovers (plus a fourth likely detected). One Pacific Golden-Plover was documented to have made a record-breaking trip from Hawaii to Cinder Lagoon in less than 70 hours.

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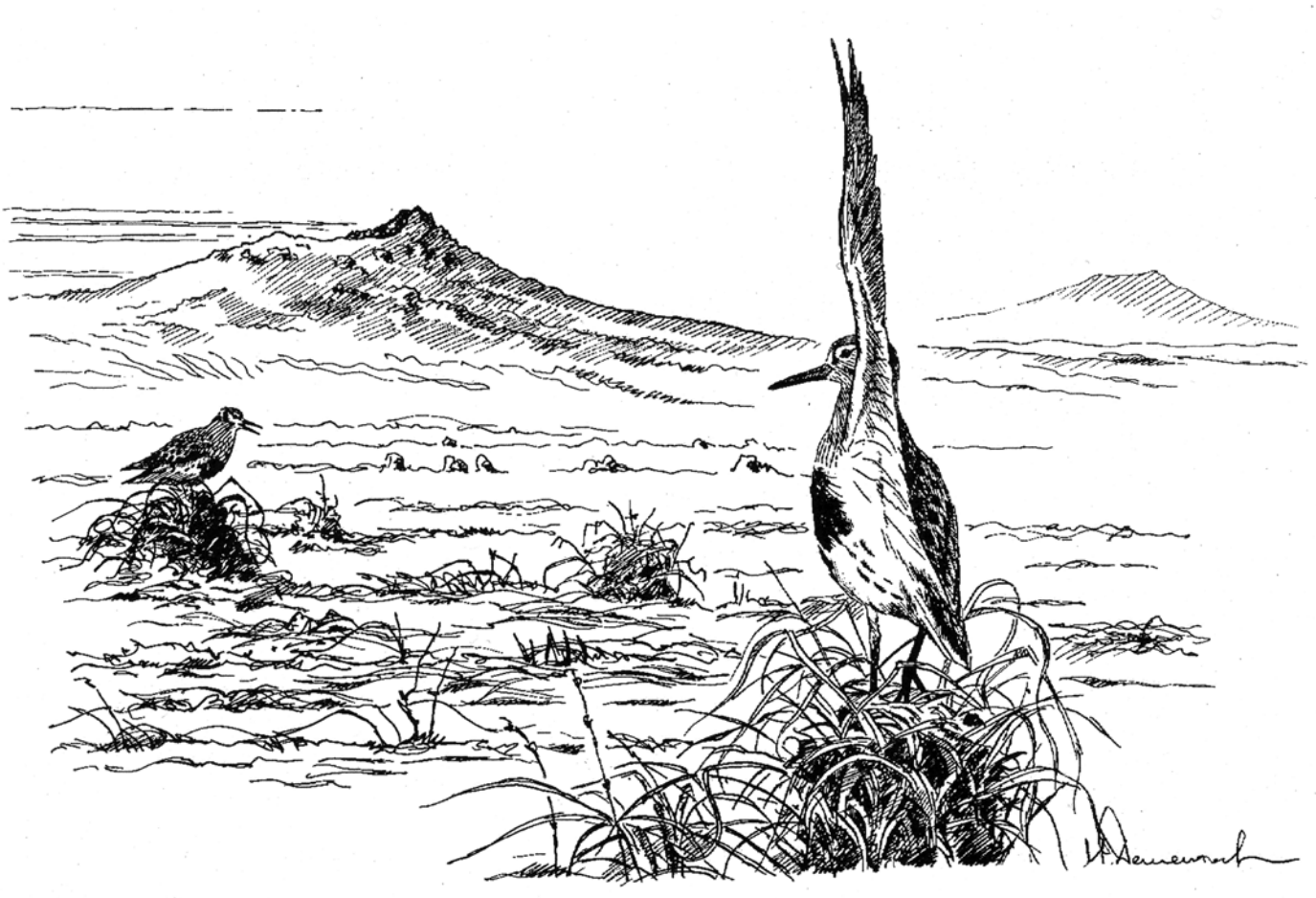

Project: Assessment of potential nesting habitat for Marbled Godwits on the Alaska Peninsula

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

Marbled Godwits (*Limosa fedoa*) breed in the northern prairies of the United States and Canada, but there is a small, isolated population (*L. fedoa beringiae*) breeding on the Alaska Peninsula. This population is thought to nest in wetlands from Ugashik Bay to Port Heiden, but little is known about their breeding range, habitat, and population size. The Marbled Godwit is listed as a "Species of High Concern" in the Alaska Shorebird Conservation Plan because of its small, isolated population that is restricted to a small area. To date, only one study has been conducted on the breeding biology of Marbled Godwits in Alaska, and it included only limited information on breeding habitat characteristics. In collaboration with Bob Gill (USGS) and Susan Savage (USFWS) we initiated a project in autumn 2002 to (1) Delineate potential breeding habitat for Marbled Godwits on the Alaska Peninsula, and (2) Determine potential survey routes/areas to estimate extent of breeding of Marbled Godwits on the Alaska Peninsula. Our efforts to delineate potential breeding habitat has been difficult given the limited amount of information available on both vegetative cover of the Alaska Peninsula and habitat requirements of godwits in Alaska. If funding is available, ground-truthing current data will be the logical next step in this process.

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Project: Shorebird studies on the Alaska Maritime National Wildlife Refuge

Investigators: David Krueper and Tony Godfrey, U.S. Fish and Wildlife Service, and staff of the Alaska Maritime NWR

In 2002, shorebird studies on Alaska Maritime NWR (Adak, Amlia, and Avatanak islands) included PRISM-based searches of plots for nesting Rock Sandpipers *Calidris ptilocnemis couesi* and shoreline surveys for Black Oystercatchers *Haematopus bachmani*. During the period 15 May–2 June a total of 20 territorial male Rock Sandpipers was recorded on the 59, 16-ha plots that could be surveyed. A single Black Oystercather was recorded on one of the five shoreline transects on Adak and between 3 and 15 oystercatchers were recorded on each of the three survey days on Avatanak Island. Biologists found no indication that any of the Black Oystercatchers they observed were nesting. Other shorebird studies on the refuge included the population assessment of Rock Sandpipers *C. p. ptilocnemis* being conducted on the Pribilof Islands by USGS personnel from the Alaska Science Center (see summary). Opportunistic observations of shorebirds were also collected by refuge staff or cooperators working on Attu (Univ. of Alaska), on Shemya (Mike Schwitters, Dept. of Agriculture), and on Buldir, Adak, Chowiet, and the Pribilofs Islands (Maritime Refuge staff and tour guides).

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Project: Wintering ecology of Rock Sandpipers in Cook Inlet

Investigators: Robert Gill, Lee Tibbitts, and Paul Flint, U.S. Geological Survey, and Theunis Piersma, Netherlands Institute for Ocean Science

In October 2002, we began our seventh season of monitoring the Rock Sandpiper *Calidris p. ptilocnemis* population that winters in Cook Inlet. This subspecies nests on the Pribilof, St. Matthew, and Hall islands, stages in autumn along the southern Bering Sea coast from the Yukon Delta to Izembek lagoon, and then moves to Cook Inlet to spend the winter. Our principal means of enumerating birds is from photographs taken of flocks during monthly (October to May) aerial surveys. The high mid-winter count over six complete seasons has averaged 15,583 ± 5,437 SD birds (range 9,050–21,640). The population during the first three winters (early 1997, 1997–1998, and late 1998) was fairly constant between about 18,000 and 22,000 birds but decreased dramatically to about 11,500 birds in January 1999 following a record-setting cold spell in late December 1998 that we suspect resulted in direct mortality. During the following three winters (1999–2000, 2000–2001, and 2001–2002) the population peaked at 10,150, 13,657, and 10,000 birds, respectively, but then this autumn we found almost 18,000 birds present on a mid-November survey. It remains to be seen if this number of birds will be present throughout the winter since it appears that during October–November, and sometimes into December, numbers of *C. p. couesi* are also using Cook Inlet. If the population of *ptilocnemis* has increased, we should learn to what extent during mid-winter surveys when only that subspecies is present. (See also the following summary by Tibbitts et al. regarding breeding population assessments for this subspecies on its Bering Sea breeding islands.)

Not all of this study has been conducted from the relative warmth of an airplane cockpit. On a few occasions we have ventured forth in winter to obtain samples of birds and benthos that have been analyzed to help determine how the subspecies has adapted to such a seemingly harsh existence. This winter we will be looking at time and activity patterns under various temperature and ice-cover regimes. Any volunteers?

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Project: Population size and habitat requirements of the Pribilof Rock Sandpiper

Investigators: Lee Tibbitts, Robert Gill, Dan Ruthrauff, and Colleen Handel, U.S. Geological Survey, and Maksim Dementyev and Pavel Tomkovich, Moscow State University

The nominate subspecies (*Calidris p. ptilocnemis*) of the Rock Sandpiper has one of the most restricted breeding ranges (see preceding summary) and smallest population sizes of any of the five subspecies. We studied *C. p. ptilocnemis* on St. Paul in 2001 and on St. George in 2002—two of the subspecies three principal breeding islands—to assess the population size and breeding habitat requirements of this subspecies. Fieldwork was timed to coincide with the period of peak breeding displays (about 1–20 May) so as to maximize detections of birds. At each island, we randomly located a systematic grid with N-S transect lines placed at 500 m intervals across the entire area. We then conducted variable distance line transects and recorded numbers and locations of all sandpipers detected. Total length of transects was 20.5 km at St. Paul (n = 38 lines) and 17.1 km at St. George (n = 39). Within a single suite of replicates, we detected 628 and 873 Rock Sandpipers on St. Paul and St. George, respectively. Most detections were of single birds (69%) or groups of 2 (26%). Behavior at the time of initial detection included birds engaged in breeding displays such as flight displays and stationary announcements (36%), standing/feeding (30%), flying (21%), and aerial chasing (13%). Rock Sandpipers were recorded in all the major habitat types on the islands, particularly forb tundra (34% of detections) and heath tundra (26%). Preliminary analyses suggest that breeding bird densities are about two times higher on St. George than on St. Paul. Future plans include: a) generating sex- and habitat- specific density functions using the distance data from transects; b) extrapolating density estimates to calculate island specific population sizes; c) refining the existing habitat map of St. Paul and creating a habitat map for St. George; and d) analyzing spatial data to assess bird use in relation to habitat and topography. In spring 2003, we hope to apply the same methodology on St. Matthew and Hall islands, thus completing our survey of the entire breeding range of this subspecies.

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Project: Effects of recreational disturbance on the 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, and Mike Tetreau, Kenai Fjords National Park

The Black Oystercatcher *Haematopus Bachmani* is entirely dependent on marine shorelines for its food and nesting. Given the fondness of humans for beach-associated recreation, the Black Oystercatcher is a species particularly susceptible to human disturbance. Numerous studies in Europe, South Africa, and California have shown oystercatchers are negatively impacted by human perturbations of shoreline habitat. In response to increasing recreational use in Alaska, and in need to develop a backcountry management plan for Kenai Fjords National Park, this study will investigate the effects of human activity on the productivity of Black Oystercatchers.

The study is an expansion of a pilot project begun in 1999 by staff of Kenai Fjords National Park. Field work will begin in 2003 and is currently funded through 2005. Preliminary studies found that productivity of Black Oystercatchers in Kenai Fjords was extremely low (28% apparent nest success, 41% fledgling success, Mike Tetreau, unpubl. data) and predation was the primary cause of nest mortality. Thus, our initial efforts will focus on documenting predation events and developing maps of predator densities and human use to determine if humans may be attracting predators to nesting areas thereby indirectly causing nest failures. Additional efforts in the first year of this study will focus on establishing a population of marked birds for analyses of territory quality and eventually survival analyses.

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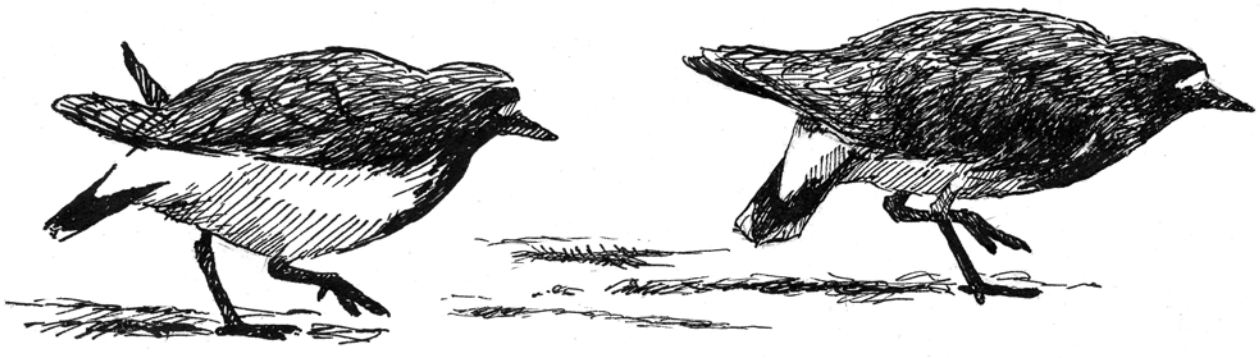

Project: Inventory and productivity of nesting Black Oystercatchers in western Prince William Sound

Investigators: Aaron Poe and Paul Meyers, U.S. Forest Service

Black Oystercatchers *Haemantopus bachmani* have been designated as a Management Indicator Species under the preferred alternative of the 2002 Chugach National Forest Plan. This 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. In 2000, we began an initial inventory of western Prince William Sound to characterize shorelines that are used by oystercatchers for nesting and feeding. Over the past three years we have surveyed more than 350 km of shoreline documenting nesting locations and have monitored 60 nests to estimate productivity of breeding pairs. Additionally, we have collected survey data on human use patterns at several locations in the Sound and hope to use this information to evaluate potential impacts to oystercatchers.

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Project: Genetic differentiation and population structure of Bristle-Thighed Curlews from the breeding and wintering ranges

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

Limited resightings of Bristle-thighed Curlews *Numenius tahitiensis* away from their breeding grounds on the Yukon Delta and Seward Peninsula suggest these two breeding populations have separate migration routes and possibly separate wintering areas. To better understand the links between breeding and wintering areas, we are developing molecular genetic markers to assess relationships between curlews (*Numenius* spp.) and to determine if the two breeding populations of *N. tahitiensis* have discrete wintering areas. To achieve these objectives, we plan to: 1) develop a genomic microsatellite library containing variable microsatellite repeats isolated from the Bristle-thighed Curlew; 2) screen Bristle-thighed Curlews at microsatellite loci using probes developed for other avian species, including microsatellite loci recently identified in the con-familial scolopacid species; 3) develop mitochondrial DNA (mtDNA)-specific, nuclear pseudogene-excluding probes that allow us to gather sequence information from two mtDNA genes: the protein-coding cytochrome *b* gene, and the more rapidly evolving control region; and 4) investigate the appropriateness of using internal transcribed spacers (ITS) associated with the nuclear rRNA gene families, nuclear pseudogenes and nuclear introns to complement information gathered using nuclear microsatellite markers and mtDNA sequence information. The high mutation rates of nuclear microsatellites, non-coding portions of the mtDNA such as domain I of the control region, and third positions of coding genes such as the cytochrome b gene, make these markers particularly amenable to examining genetic differences at both the population and phylogeographic levels, particularly for very recently-diverged taxa and

populations. Additional data from other appropriate markers will be used to further test hypotheses of population and phylogeographic relationships.

To date, we have extracted genomic DNA from at least 30 individual curlews sampled from each breeding population. Sampling from wintering populations is scheduled for March 2003. We have determined the sex of most individuals through sex-linked genetic markers and we have developed a genomic library containing microsatellite repeats isolated from Bristle-thighed Curlews. These include five perfect and one imperfect dinucleotide repeat $(CA)_n$ motifs. Among these, three are known to be variable in curlews from both breeding populations. The other two markers were not variable in the 10 individuals screened; however, we plan to screen a larger number of individual curlews from each breeding population at these two loci. In addition, we have begun screening of microsatellite loci developed for other species. We have also developed a set of primers that are specific to the curlew mtDNA cytochrome b gene, and are in the process of testing markers specific for the control region.

In early December 2002 we received funding through the USGS/USFWS Science Support Program to complete the development of microsatellite and mtDNA markers. After development of these markers, the remaining funding will be used to examine the population genetics and phylogeographic relationships among the aggregations across the species annual cycle.

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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

Population estimates of Buff-breasted Sandpipers *Tryngites subruficollis* indicate a decline from hundreds of thousands during the late 1800s (Forbush 1912, Hudson 1920) to a range of 15,000 to 25,000 individuals today (Brown et al. 2000, Morrison et al. 2001). Recent studies suggest that this neotropical migrant uses very restricted and predictable locations on its wintering range in southern South America (Myers and Myers 1979, Belton 1994, Lanctot et al. 2002). Lanctot et al. (2002) suggested, however, that large flocks of Buff-breasted Sandpipers might move frequently during the wintering season, hindering the interpretation of the survey results and the determination of important wintering sites. Therefore, a better understanding of seasonal change in Buff-breasted Sandpiper abundance and movement patterns within the wintering range is essential to determine timing and scale at which surveys must be conducted in the future. Information is also scarce on the wintering ecology of this sandpiper during the wintering season. The primary objective of this study is to understand change in Buff-breasted abundance and movement patterns within their wintering range by assessing site-fidelity within and between seasons at three wintering sites in Brazil. We will assess within-season site fidelity by relocating banded and radio-marked birds, and assess between-season site-fidelity by *i*) testing if densities at each site are equal on subsequent years and *ii*) determining return rates of color-marked birds. Additional objectives will include monitoring seasonal trends of molt and body mass of individual birds by sex and age classes, and collecting blood and feather samples for future collaborative studies on ecotoxicology and genetic structure of Buff-breasted Sandpiper subpopulations.

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Project: Assessment of contaminants in Alaskan shorebird eggs

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

Information on contaminant exposure in shorebirds is limited. Of the studies conducted, most have found detectable concentrations of DDE, PCBs, and other organochlorines (e.g. White et al. 1980, Custer and Myers 1990, Fair et al. 1994, Hui et al. 2001). Unfortunately, most of these studies were restricted to typically coastal areas of the continental U.S. and related to industrial complexes or other impacted areas. In Alaska, however, limited data from several shorebird species in 1984 (Lesser Yellowlegs *Tringa flavipes*, Solitary Sandpiper *T. solitaria*, Spotted Sandpiper *Actitis macularia*, Semipalmated Plover *Charadrius semipalmatus*, American Golden-Plover *Pluvialis dominica*, Red-necked Phalarope *Phalaropus lobatus*, Semipalmated Sandpiper *Calidris pusilla*, and Pectoral Sandpiper *C. melanotos*) indicated that shorebirds had higher body burdens of organochlorine contaminants such as p,p-DDE and dieldrin than non-shorebirds (e.g. American Robin *Turdus migratorius*, Violet-green Swallow *Tachycineta thalassina*) (Ambrose et al. 2000). Because shorebirds forage primarily in wetlands on invertebrates, a relatively direct

exposure pathway for sediment-associated persistent contaminants, they are potentially vulnerable to persistent contaminant exposure and effects. Also, as long-distance migrants, shorebirds may be exposed to contaminants in countries with varying histories of pollution control practices (e.g., Kunisue et al. 2002). Exposure to accumulation of persistent lipophilic contaminants could have toxic effects given the high rates of lipid mobilization experienced by most shorebirds during migration. Shorebirds also are primary prey for some avian predators including Peregrine Falcons *Falco perigrinus* (e.g., Ambrose et al. 2000, Johnstone et al. 1996, Banasch et al. 1992), so contamination of shorebirds can also have implications for predatory species. To begin to address these concerns, we arranged to have shorebird eggs collected during the 2002 breeding season since eggs are efficient indicator samples for analysis of persistent organic pollutants and mercury in birds. A suite of species was selected to include ones representing different wintering areas, and ones that spend varying amounts of time in migration and on the breeding grounds prior to egg-laying. From the 2002 breeding season we secured 45 total eggs from 13 different species. Laboratory analyses will begin in 2003. Our primary objective will be to determine if concentrations of heavy metal and organochlorine contaminants in eggs from shorebirds breeding in Alaska are at levels that may affect shorebird populations. Our secondary objective, should elevated contaminant concentrations be found, is to follow-up on residue studies of adult shorebirds, in order to establish potential risk to avian predators, including Peregrine Falcons.

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Project: Population estimate for Buff-breasted Sandpipers

Investigators: Richard Lanctot, U.S. Fish and Wildlife Service; Daniel Blanco, Wetlands International; Rodrigo Balbueno, Biolaw Consultoria Ambiental, Brazil; and Martin Oesterheld, University of Buenos Aires

Ground surveys conducted in Argentina, Brazil, and Uruguay in December 1999 and 2001 indicated densities of Buff-breasted Sandpipers *Tryngites subruficollis* were very low and, when compared to a small number of surveys conducted in the mid-1970s, indicated the species was declining (Lanctot et al. 2002, Wilson Bulletin 114:44-72). The Lanctot et al. (2002) paper describes the species' conservation status and its historic and contemporary distribution and abundance in South America. Biologists in Argentina and Brazil are currently using satellite images and image-analysis software to determine the amount and distribution of suitable habitat so that population density estimates from sample plots can be extrapolated to generate an overall population size for the species.

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