Alaska Shorebird Group

Annual Summary Compilation:

New and Ongoing Studies or Initiatives Focused on Alaska Shorebirds

November 2023

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Cover: Shorebirds forage in Controller Bay Alaska during spring migration. Photo by Blake Richard

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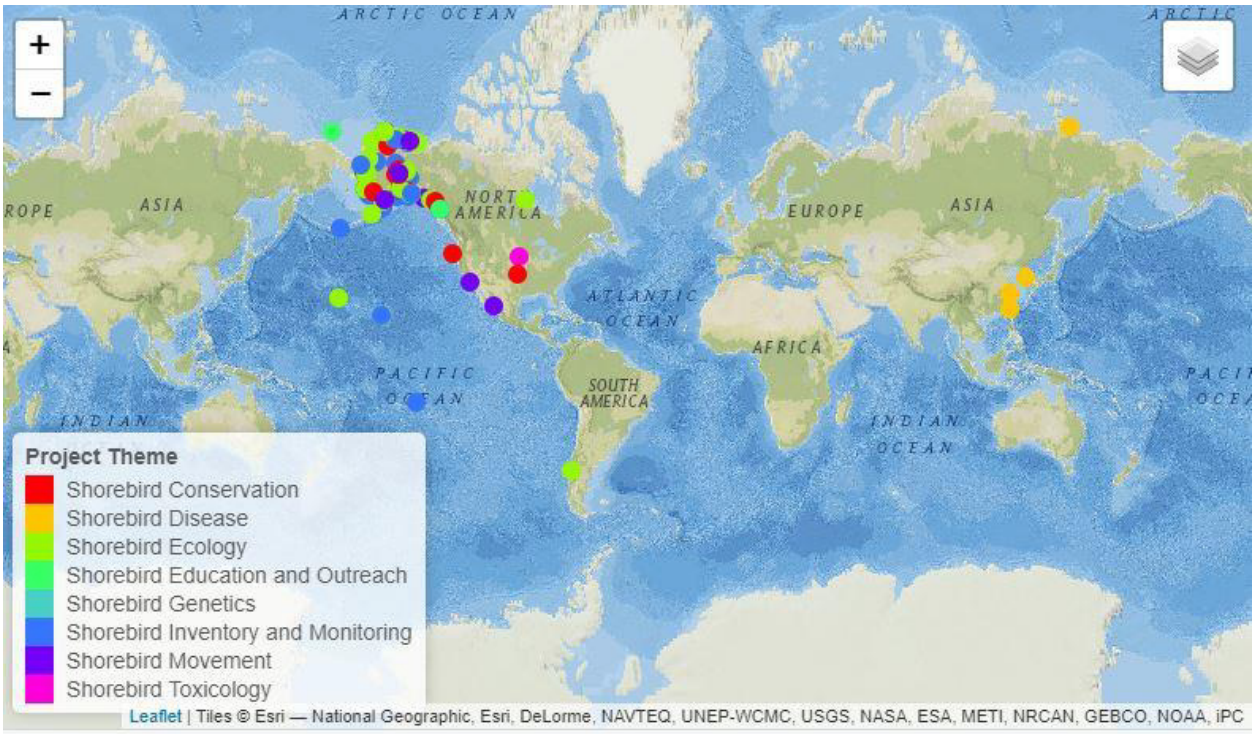
INTERACTIVE MAP

To visualize where projects have occurred since the Alaska Shorebird Group's inception in 1997, please check out the "ASG Leaflet Map". This interactive map allows for filtering projects by species and provides a baseline for identifying which species and topics have been researched in the past. This visualization also allows members to easily determine which Alaska Shorebird Plan objectives have been reached and where additional research may be needed, especially for Priority Species. Finally, this map is an excellent resource for graduate students, early-career professionals, and scientists who are new to the realm of Alaskan shorebirds.

[Alaska Shorebird Group Projects 1997-2023 Leaflet Map]



EXECUTIVE SUMMARY

Welcome to the Alaska Shorebird Group (ASG) 2023 annual summary. This is the 24th annual summary to document new and ongoing studies and initiatives focused on Alaska shorebirds. This document includes annual summaries for 22 studies/initiatives and highlights 8 recent publications, 2 unpublished reports, 3 articles in progress, 1 web document, 1 data release, and 1 presentation.

The Alaska Shorebird Group continues to be a highly collaborative organization with a large membership of productive principal investigators, early-professionals, and students both within and outside of Alaska. This annual compilation is the only written record that acknowledges the shorebird projects occurring in Alaska and provides a valuable timeline of shorebird activities in the state.

Thank you to all the principal investigators, graduate students, research technicians, and amateur photographers that contributed to this report. This valuable research takes lots of long hours, tricky logistics, and dedication within Alaska and beyond. I am honored to be part of a group with such a strong passion for shorebird conservation and management, especially as we continue to face challenges regarding population declines of many Arctic and sub-Arctic breeding shorebirds.

Arin Underwood

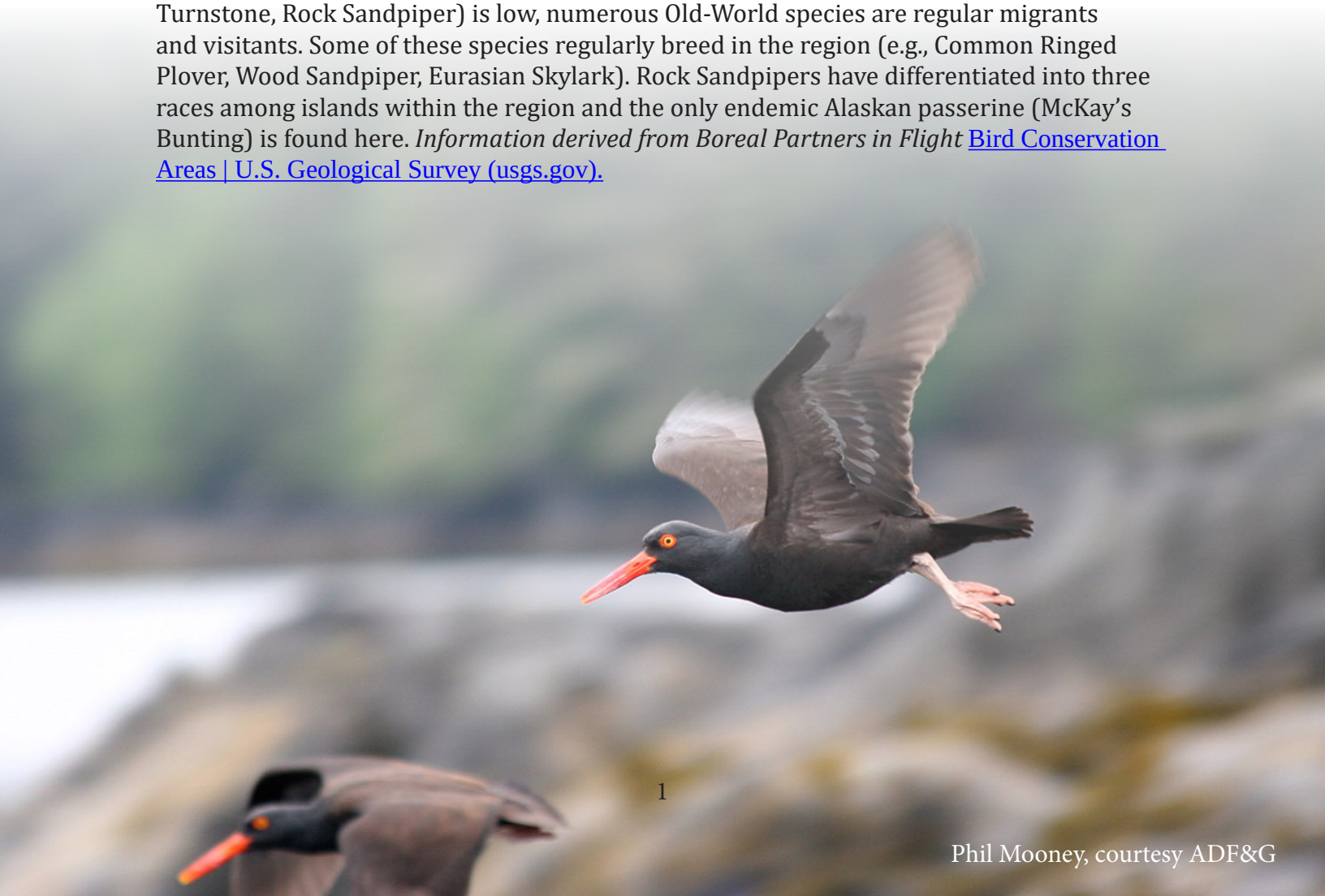
~Secretary, Alaska Shorebird Group (2023-2025)

Arin Underwood

ANNUAL SUMMARIES

BIRD CONSERVATION REGION 1

Aleutian and Bering Sea Islands-Includes portions of Western and Southwestern Alaska. Included in this region are the Aleutian Islands, that extend westward from the Alaskan mainland for 1,100 miles (1,800 km), and the Bering Sea islands (that include the Pribilofs, St. Matthew, Hall, St. Lawrence, and Little Diomede). The Aleutian chain is volcanic in origin. The climate is maritime and wind is ever present. Sea ice does not extend to the Aleutians and permafrost is generally absent; however, sea ice is an important feature of the Bering Sea. Vegetation at higher elevations consists of dwarf shrub communities, mainly willow and crowberry. Meadows and marshes of herbs, sedges, and grasses are plentiful, and some islands have ericaceous bogs. Seabirds are a dominant component of this region's avifauna, and several species breed only in this region (e.g., Red-legged Kittiwake, Least Auklet, Whiskered Auklet). Southern Hemisphere procellariforms occur regularly in the offshore waters of the southern Bering Sea and northern Gulf of Alaska during Alaskan summers. Although breeding diversity of passerines (mainly Lapland Longspur, Snow Bunting, and Gray-crowned Rosy-Finch), and shorebirds (e.g., Black Oystercatcher, Dunlin, Ruddy Turnstone, Rock Sandpiper) is low, numerous Old-World species are regular migrants and visitants. Some of these species regularly breed in the region (e.g., Common Ringed Plover, Wood Sandpiper, Eurasian Skylark). Rock Sandpipers have differentiated into three races among islands within the region and the only endemic Alaskan passerine (McKay's Bunting) is found here. *Information derived from Boreal Partners in Flight* Bird Conservation Areas | U.S. Geological Survey (usgs.gov).



Phil Mooney, courtesy ADF&G

#1 (BCR 1): Population reassessment of Rock Sandpipers breeding on Bering Sea islands

Study Species: Pribilof Rock Sandpiper

Study Location: St. Matthew and Hall islands (60.42 N, -172.76 W), St. Paul Island (57.18 N, -170.27 W), St. George Island (56.58 N, -169.58 W)

Principal Investigators: Rachel Richardson and Dan Ruthrauff (USGS Alaska Science Center)

Primary Contact: Rachel Richardson, USGS Alaska Science Center, 4210 University Drive, Anchorage, AK 99508, Email: rrichardson@usgs.gov

Study Objectives

- Estimate change in the population size of Pribilof Rock Sandpipers.
- Identify and map critical habitats and areas with population declines or increases.

Preliminary Results

- In May 2023, we replicated line transect surveys of Pribilof Rock Sandpipers on St. George Island originally conducted in 2002.
- We completed 22 transects totaling 102.8 km. We were unable to survey the remaining 17 transects due to weather and logistics.
- We detected a total of 248 sandpipers.
- These surveys complete recent efforts to replicate surveys across the entire breeding range of the Pribilof Rock Sandpiper. Surveys from 2023 will be combined with those from St. Matthew and Hall islands in 2018 and St. Paul Island in 2019 to reassess the population size of this Alaska endemic.

Alaska Shorebird Conservation Plan II Objectives Reached:

RESEARCH:

- Develop habitat-based models to predict the abundance and distribution of shorebirds and assess the adaptability of shorebirds to habitat changes.

POPULATION INVENTORY AND MONITORING

- Conduct long-term population monitoring efforts (e.g., PRISM).

HABITAT MANAGEMENT AND PROTECTION

- Apply abundance and distribution information to identify key shorebird habitats and sites.

View from a survey of Pribilof Rock Sandpipers on St. George Island in May.

Photo Rachel Richardson

A pair of Pribilof Rock Sandpipers.

Photo Dan Ruthrauff

ANNUAL SUMMARIES

BIRD CONSERVATION REGION 2

Western Alaska-Includes portions of Western and Southwestern Alaska: This region consists of the coastal plain and mountains of western and southwestern mainland Alaska. Sub-regions include A) Subarctic Coastal Plain and Seward Peninsula, B) Ahklun and Kilbuck Mountains and Bristol Bay-Nushagak Lowlands, and C) Alaska Peninsula Mountains. Permafrost is continuous except in southern parts of the region. Sea cliffs are present as are mountains that exceed 3,300 feet (1,000 m) in elevation. Volcanic peaks up to 8,500 feet (2,600 m) are found along the Alaska Peninsula. Wet and mesic graminoid herbaceous communities dominate the lowlands and numerous ponds, lakes, and rivers dot the landscape. Tall shrub communities are found along rivers and streams and low shrub communities occupy uplands; forests of spruce and hardwoods penetrate the region on the eastern edge. High densities of breeding waterfowl and shorebirds are found on the coastal plain of the Yukon and Kuskokwim rivers. Intertidal areas here and lagoons of the north side of the Alaska Peninsula supports millions of shorebirds during migration (e.g., Dunlins, Western Sandpipers, Red Knots, Bar-tailed Godwits). The coast of the Alaska Peninsula supports high concentrations of wintering sea ducks that include the: Steller's Eider, Harlequin, Oldsquaw, Surf Scoter, and Black Scoter. Western Alaska includes a unique Beringian breeding avifaunal element (e.g., Black Turnstone, Bristle-thighed Curlew) and several Old-World species are regular breeders or migrants in this region (e.g., Sharp-tailed Sandpiper, Red-throated Pipit, White Wagtail). Passerine diversity is greatest in tall, riparian shrub habitats (e.g., Arctic Warbler, Gray-cheeked Thrush, Blackpoll Warbler) and raptors (e.g., Gyrfalcon, Rough-legged Hawk) nest along the riverine cliffs. Mainland sea cliffs contain nesting colonies of, largely, Black-legged Kittiwakes, Common Murres, and Pelagic Cormorants. Information derived from Boreal Partners in Flight Bird Conservation Areas | U.S. Geological Survey (usgs.gov).

John Hyde, courtesy ADF&G

#2 (BCR 2): Shorebirds for Today and Tomorrow: Culture- and Place-Based Learning at Schools and Communities in the Yukon-Kuskokwim Delta

Study Species: Multiple

Study Location: Yukon-Kuskokwim Delta, several communities

Principal Investigators: Liliana C. Naves (Alaska Department of Fish and Game), Brenda L. Duty (Alaska Department of Fish and Game), Richard B. Lanctot (US Fish and Wildlife Service), Lara F. Mengak (Alaska Department of Fish and Game)

Primary Contact: Liliana C. Naves, Alaska Department of Fish and Game, Division of Subsistence, 333 Raspberry Rd, Anchorage AK 99518, liliana.naves@alaska.gov.

Study Objectives

- Use activities and materials centered on the Yup'ik culture and the environments of the Y-K Delta to support awareness of and stewardship about shorebird ecology and conservation.
- Support transmission of traditional knowledge and learning and use of Yup'ik language.
- Support youth interest in learning and in nature.

Preliminary Results

- Designed place- and culture- based youth outreach materials and activities that are focused on shorebirds, the Yup'ik culture, and the environments of the Y-K Delta;
- Developed collaboration with local educators and communities.
- In 2022–2023, the program reached 14 communities, about 1,800 students, and dozens of local educators.
- Awareness of local socio-economic contexts is key to ensure that nature outreach and education programs are relevant among the many priorities and needs that communities in rural Alaska face.

Alaska Shorebird Conservation Plan II Objectives Reached:

ENVIRONMENTAL EDUCATION AND PUBLIC OUTREACH:

- Raise the profile of shorebirds through public presentations, media outreach, support of shorebird festivals, and collaboration with education programs.
- Develop shorebird-related outreach and media materials.

- Host workshops and outreach events to engage the diverse communities of Alaska in shorebird conservation.
- Promote shorebird education to youth via the Shorebird Sister Schools Program.
- Incorporate principles of good governance in research and outreach efforts.

INTERNATIONAL COLLABORATIONS:

- Participate in partnerships to conserve migratory shorebirds and their habitats in the circumpolar Arctic (e.g., the Arctic Council's Conservation of Arctic Flora and Fauna working group and initiatives therein), North America (e.g., landscape conservation cooperatives, joint ventures, flyway councils), Western Hemisphere (e.g., Western Hemisphere Shorebird Reserve Network, Western Hemisphere Shorebird Group), Asia (e.g., East Asian-Australasian Flyway Partnership), and other partnerships as they arise.

In the field, classrrom outreach.
photo by Liliana Naves

#3 (BCR 2): Hawai'i Society's 2023 Kōlea Quest

Study Species: Pacific Golden-Plover

Study Locations: Nome

Principal Investigators: Dr. Oscar W. Johnson (Montana State University), Dr. Wendy Kuntz (University of Hawai'i), Susan Scott (President, Hawai'i Audubon Society)

Primary Contact: Susan Scott, Hawai'i Audubon Society; 850 Richards St. # 505 Honolulu, HI 96813; honu@susanscott.net

Study Objectives

- Locate Pacific Golden-Plover adults, eggs, and chicks in their Nome nesting habitat for several members of the Hawai'i Audubon Society's Citizen Science program, Kōlea Count: https://www.koleacount.org/
- Encourage the study of kōlea wintering in Hawai'i by three University of Hawai'i biology students who received Hawai'i Audubon Society funding for this Nome trip.
- Photograph kōlea habitat, nests, eggs, and chicks for educational presentations in Hawai'i.
- Encourage Hawai'i residents and visitors to join Hawai'i Audubon's Citizen Science projects.

Results

- Twenty Hawaii Audubon Society members, including three community college students, located several Pacific Golden Plover adults with nests.
- The group saw and photographed kōlea nesting habitat, eggs, and four newly hatched chicks.
- In partnership with the University of Alaska, Fairbanks Northwest Campus, Dr. Oscar W. Johnson and Susan Scott presented well-attended slide shows to the Nome community regarding migration studies and the kōlea citizen science program in Hawai'i.

Alaska Shorebird Conservation Plan II Objectives Reached:

RESEARCH:

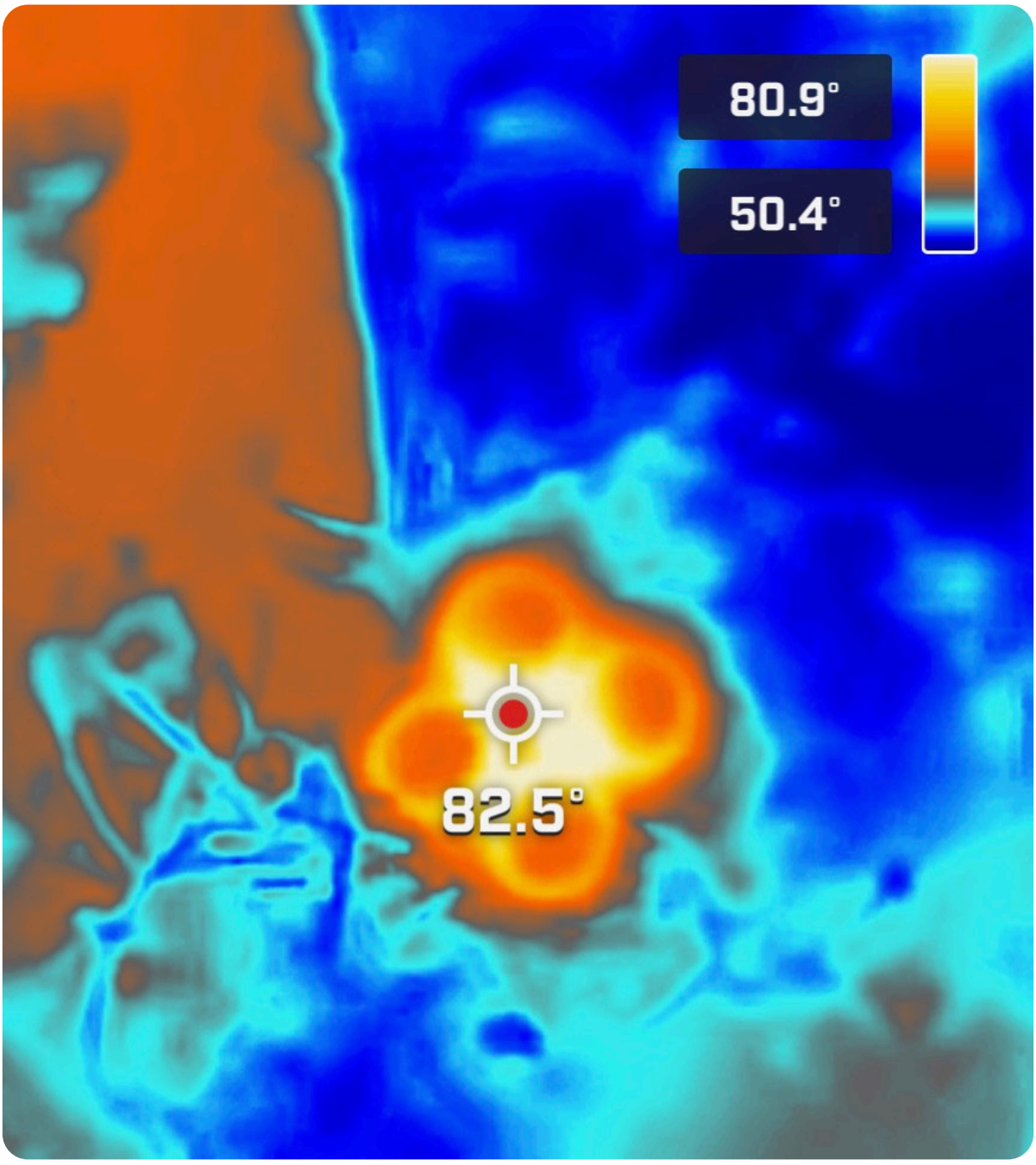
- Determine migratory timing, routes, and site use of shorebirds.

ENVIRONMENTAL EDUCATION AND PUBLIC OUTREACH:

- Raise the profile of shorebirds through public presentations, media outreach, support of shorebird festivals, and collaboration with education programs.
- Develop shorebird-related outreach and media materials.

- Host workshops and outreach events to engage the diverse communities of Alaska in shorebird conservation.
- Encourage the synthesis and reporting of results of Alaskan shorebird studies to scientific and general audiences.
- Identify and support ways to involve citizen scientists in shorebird monitoring programs.
- Incorporate principles of good governance in research and outreach efforts.

Four newly-hatched kōlea chicks
photo by Susan Scott



Infrared photo of 4 eggs in Pacific-Golden-Plover nest
photo by Susan Scott

#4 (BCRs 2, 4, 5): Long-term monitoring of Black Oystercatchers in the Gulf of Alaska

Study Species: Black Oystercatcher

Study Locations: Coastal regions of western Prince William Sound, Kachemak Bay, Kenai Fjords National Park and Katmai National Park and Preserve.

Principal Investigators: Heather Coletti (National Park Service); Dan Esler (USGS Alaska Science Center) and Brian Robinson (USGS ASC)

Primary Contact: Heather Coletti, Southwest Alaska Inventory and Monitoring Program, National Park Service, 240 W 5th Ave. Anchorage, AK, 907-382-0373, Heather_Coletti@nps.gov

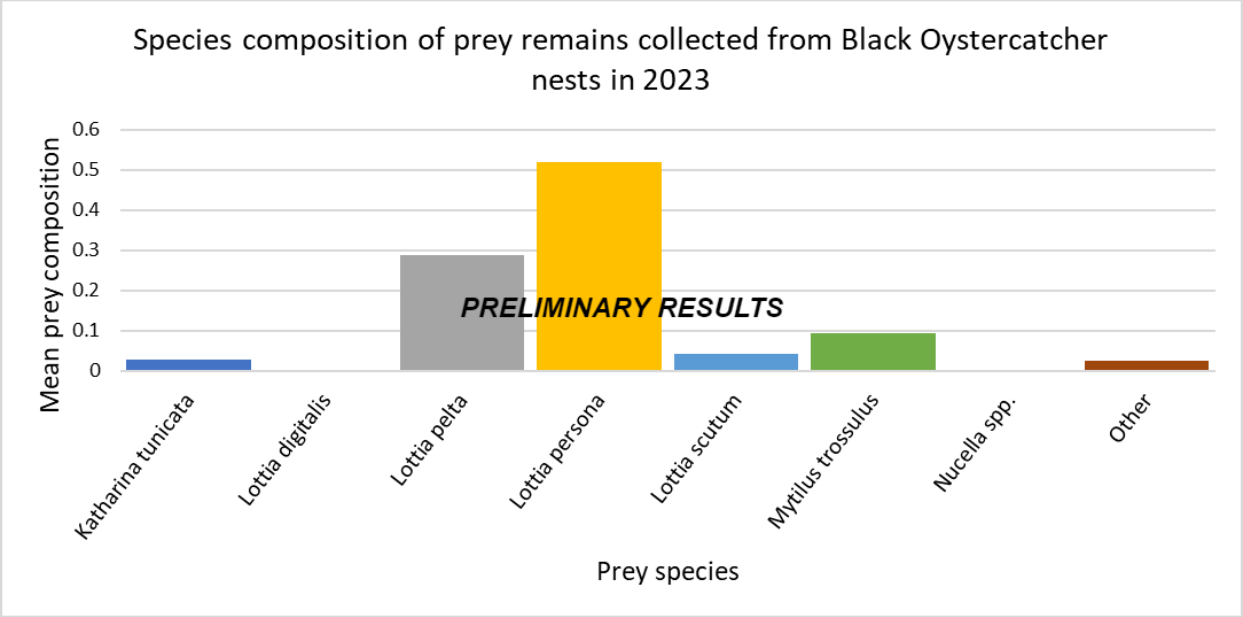
Study Objectives

- The Gulf Watch Alaska nearshore program monitors ecologically important species and key physical parameters in the nearshore marine environment. These species include sea ducks, sea otters, intertidal invertebrates, and Black Oystercatchers.
- Monitoring of Black Oystercatchers began in 2006 and has been done nearly yearly in three sampling blocks: Kachemak Bay (added later in 2018), Katmai National Park and Preserve, Kenai Fjords National Park, and western Prince William Sound.
- In each sampling block, surveys are conducted along four or five transects up to 20 km in length.
- We measure Black Oystercatcher nest density, productivity (number of eggs or chicks), float eggs to determine hatch date, and quantify chick diet.
- We quantify species composition and size distributions of prey fed to chicks by collecting and measuring all prey remains found near a nest, indicative of adults provisioning their offspring.

Results

- In 2023, we located a total of 47 nests in all four sampling blocks. Nest density varied by sampling block.
- Productivity (number of eggs + chicks / nest) was highest (1.72 ± 0.26; mean ± SE, n = 11) in Prince William Sound and lowest (0.967 ± 0.08; n = 12) in Katmai.
- We collected 846 prey items from 11 nests, representing 8 different taxa in Katmai and Kenai Fjords. No prey was observed or collected in Prince William Sound or Kachemak Bay. This may reflect the timing of surveys. Prince William Sound and Kachemak Bay are sampled earlier in the breeding season when it is more likely that eggs are present as opposed to chicks.

- While chick diet varied by block and transect, overall it was dominated by three species of limpets (Lottia pelta, L. persona. L. scutum); together they made up 85% of the diet in 2023 (see Figure below) and have dominated diet throughout the 18 years of sampling. The Pacific blue mussel (Mytilus trossulus) and black katy chiton (Katharina tunicata) represented much smaller proportions in the diet (10 % and 3%, respectively).
- Long-term monitoring of Black Oystercatchers provides an opportunity to understand how a top-level predator in the intertidal food web may respond to changes in a highly dynamic ecosystem.



Alaska Shorebird Conservation Plan II Objectives Reached:

POPULATION INVENTORY AND MONITORING:

- Conduct long-term population monitoring efforts (e.g., PRISM).

ENVIRONMENTAL EDUCATION AND PUBLIC OUTREACH:

- Raise the profile of shorebirds through public presentations, media outreach, support of shorebird festivals, and collaboration with education programs.
- Encourage the synthesis and reporting of results of Alaskan shorebird studies to scientific and general audiences.

INTERNATIONAL COLLABORATIONS:

- Foster and participate in cooperative research and monitoring efforts throughout species' ranges (e.g., Arctic Shorebird Demographics Network, PRISM, Migratory Shorebird Project, and Arctic Birds Breeding Conditions Survey).

#5 (BCRs 2, 4): Shorebird Tracking from DoD-owned sites across Alaska

Study Species: AMGP, PAGP, SBDO, LBDO, GRYE, LEYE

Study Locations: Beluga: 61.103177°, -151.003133°. King Salmon: 58.601619°, -156.478598° . Fort Yukon: 66.546589°, -145.231153°

Principal Investigators: Rozy Bathrick, PhD Student (UMass Amherst, Organismic and Evolutionary Biology), Nathan Senner, Assistant Professor (UMass Amherst, Environmental Conservation), Jim Johnson, Migratory Birds Management (US Fish and Wildlife Services), Dan Ruthrauff (USGS, Alaska Science Center)

Primary Contact: Rozy Bathrick - PhD Student, UMass Amherst, Organismic and Evolutionary Biology. rebathrick@umass.edu. 160 Holdsworth Way, Amherst, MA, 01063

Study Objectives

- Deploy GPS transmitters on two populations each of six shorebird species: SBDO, LBDO, LEYE, GRYE, PAGP and AMGP
- Track southbound migration of each population
- Compare migratory strategy within and between populations, species, and flyways
- Current project: investigating spatial overlap between tracked LEYE populations in the Prairie Pothole Region using ctmms and Bhattacharya's affinity index

Results

In 2023, we deployed transmitters:

- 14 Lesser Yellowlegs in Fort Yukon
- 5 Lesser Yellowlegs in King Salmon
- 10 Greater Yellowlegs in Beluga
- 6 Greater Yellowlegs in King Salmon

These transmitters resulted in complete or partial southbound tracks.

- GRYE from both populations migrated along the Pacific Coast to the west coast of mainland Mexico
- LEYE from both populations took the midcontinental flyway to the PPR, and then spread out through the Great Plains

Alaska Shorebird Conservation Plan II Objectives Reached:

RESEARCH:

- Determine migratory timing, routes, and site use of shorebirds.
- Conduct breeding ecology studies on species occupying alpine, boreal, or other rare or difficult-to-access habitats.
- Obtain better estimates of illegal and legal harvest levels for Alaska-breeding shorebirds within Alaska and when outside Alaska.
- Identify effects associated with energy production, mining, disturbance, and other anthropogenic activities on shorebirds.
- Identify and delineate potentially distinct populations of shorebirds breeding in Alaska.
- Develop habitat-based models to predict the abundance and distribution of shorebirds and assess the adaptability of shorebirds to habitat changes.

HABITAT MANAGEMENT AND PROTECTION:

- Apply abundance and distribution information to identify key shorebird habitats and sites.

ENVIRONMENTAL EDUCATION AND PUBLIC OUTREACH:

- Raise the profile of shorebirds through public presentations, media outreach, support of shorebird festivals, and collaboration with education programs.
- Develop shorebird-related outreach and media materials.
- Encourage the synthesis and reporting of results of Alaskan shorebird studies to scientific and general audiences.

INTERNATIONAL COLLABORATIONS:

- Foster and participate in cooperative research and monitoring efforts throughout species' ranges (e.g., Arctic Shorebird Demographics Network, PRISM, Migratory Shorebird Project, and Arctic Birds Breeding Conditions Survey).
- Participate in partnerships to conserve migratory shorebirds and their habitats in the circumpolar Arctic (e.g., the Arctic Council's Conservation of Arctic Flora and Fauna working group and initiatives therein), North America (e.g., landscape conservation cooperatives, joint ventures, flyway councils), Western Hemisphere (e.g., Western Hemisphere Shorebird Reserve Network, Western Hemisphere Shorebird Group), Asia (e.g., East Asian-Australasian Flyway Partnership), and other partnerships as they arise.

Fort Yukon, Alaska.

Photo Rozy Bathrick

#6 (BCRs 2-4): Shorebird Science and Conservation Collective

Study Species: The Shorebird Collective focuses on all shorebirds in North America, with particular focus in the Midcontinent. Contributed species data for Alaska-based studies include: AMGP, BBPL, BBSA, BLTU, DUNL, LBDO, LEYE, MAGO, PESA, REKN, REPH, SBDO, SESA, SOSA, UPSA, WESA, WHIM.

Study Locations: General deployment regions for contributed studies that gave us preapproval to share information include Colville River, Utqiagvik, Prudhoe Bay, Katakturuk, Canning River, Cape Krusenstern, Nome, Alpine, and Anchorage. Locations from other contributed studies based in Alaska cannot be disclosed at this time due to the privacy settings of the dataset(s).

Principal Investigators: Autumn-Lynn Harrison, Ph.D. (Research Ecologist at Smithsonian Migratory Bird Center), Rick Lanctot, Ph.D. (Alaska Shorebird Coordinator, U.S. Fish and Wildlife Service), Allie Anderson, Ph.D. (Quantitative Ecologist at Smithsonian Migratory Bird Center), Candace Stenzel (Regional Conservation Specialist at Smithsonian Migratory Bird Center)

Primary Contact: Autumn-Lynn Harrison, Ph.D., Smithsonian Migratory Bird Center, 3001 Connecticut Ave NW Washington DC 20008. harrisonal@si.edu

Study Objectives

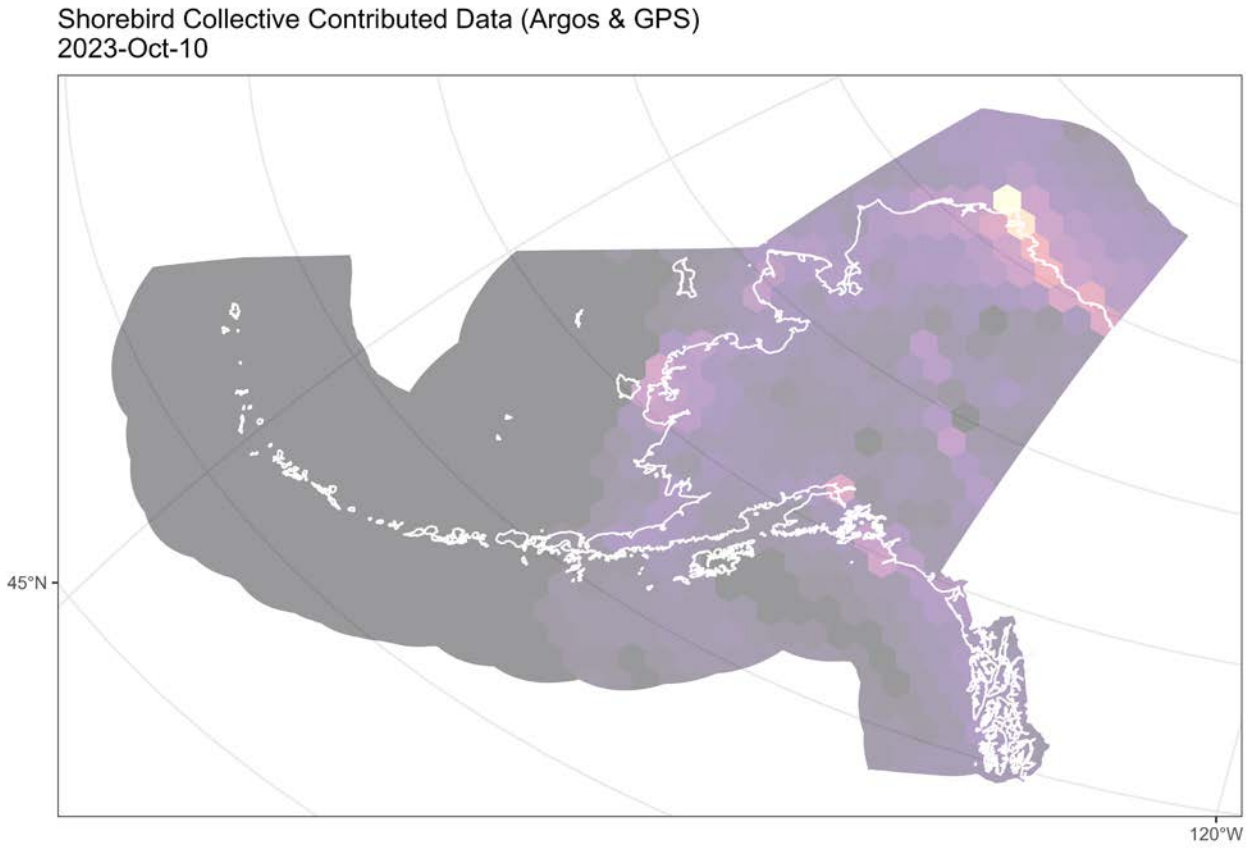
- Translate the collective findings of shorebird tracking and community science data into on-the-ground conservation to help reverse the decline of shorebirds in the Western Hemisphere.
- Provide hemispheric-scale analyses that can be down-scaled to identify important shorebird sites and gaps in knowledge.
- Provide scientific support to regional-scale initiatives focused on shorebird conservation in North America, with a focus on the Midcontinent flyway.
- Provide scientific support to local-scale conservation initiatives. These may include on-the-ground conservation projects, education, and outreach initiatives, and/or analyses needed for management decision-making.

Preliminary Results

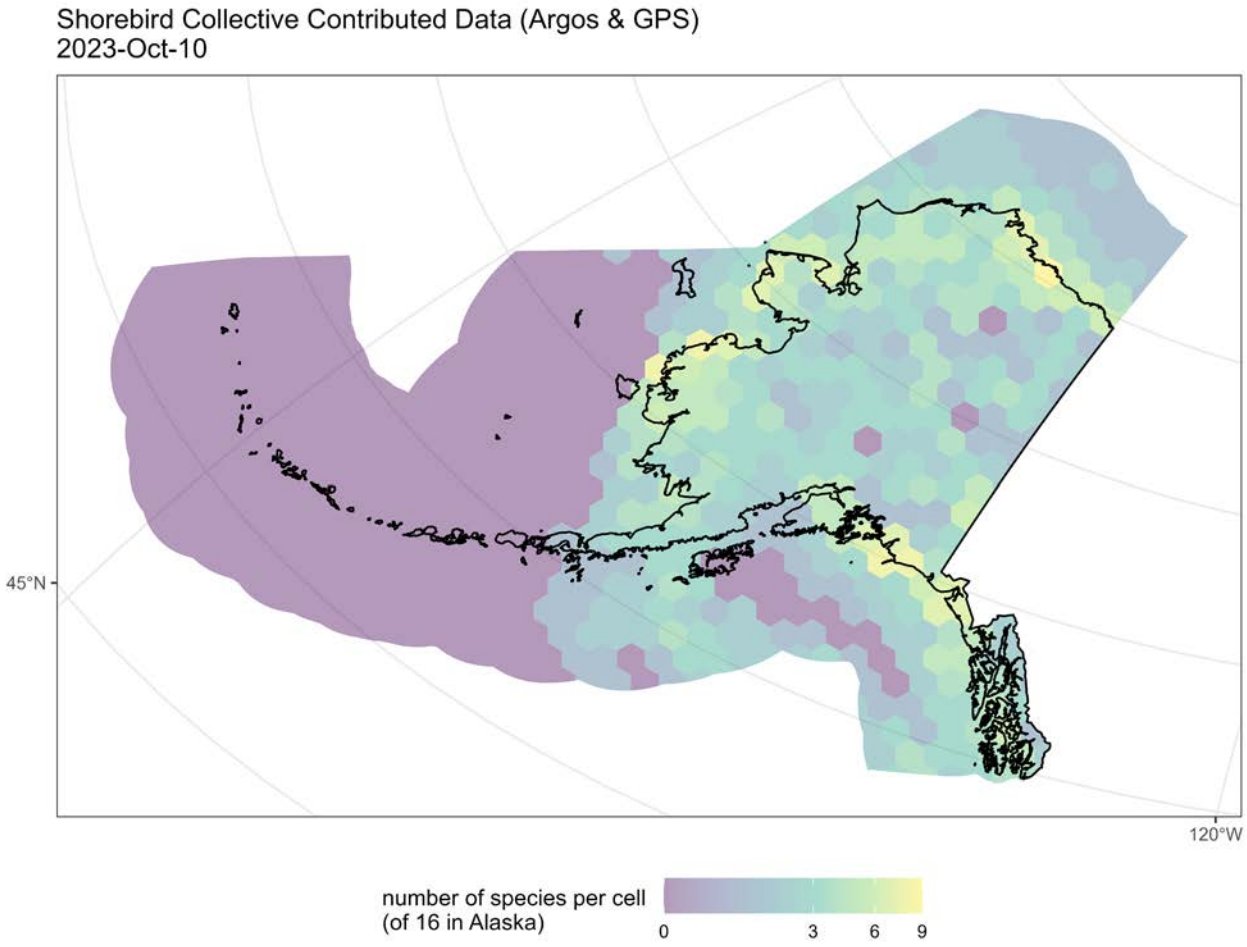
As of November 2023, the Shorebird Collective has received from Alaska:

- 25 contributed shorebird studies. Note that we defined a study as tracking data from a data contributor for a single species and originally hosted in a unique data repository.
- 600 individuals of 16 species tracked with Argos or GPS detected in the state and the Alaska Exclusive Economic Zone (Figure 1 and Figure 2). Of those, 534 individuals of 14 species were tagged in the state.

- Data from an additional 280 individuals and 3 species tracked with geolocators (8 species total tracked with geolocators).



Individual Bird Count



Species Count

Alaska Shorebird Conservation Plan II Objectives Reached

RESEARCH:

- Determine migratory timing, routes, and site use of shorebirds.
- Identify and delineate potentially distinct populations of shorebirds breeding in Alaska.

POPULATION INVENTORY AND MONITORING:

- Assess the utility of new technologies (e.g., Automated Recording Units, aerial drones, eBird) to determine shorebird presence and abundance.

HABITAT MANAGEMENT AND PROTECTION:

- Support land acquisitions, easements, restoration efforts, and conservation designations (e.g., the Western Hemisphere Shorebird Reserve Network, East Asian–Australasian Shorebird Reserve Network, Ramsar Convention on Wetlands, and Important Bird Areas Programs) for key shorebird sites.
- Minimize loss and degradation of critical shorebird habitats by participating in natural resource planning and management.

ENVIRONMENTAL EDUCATION AND PUBLIC OUTREACH:

- Raise the profile of shorebirds through public presentations, media outreach, support of shorebird festivals, and collaboration with education programs.
- Develop shorebird-related outreach and media materials.
- Encourage the synthesis and reporting of results of Alaskan shorebird studies to scientific and general audiences.
- Incorporate principles of good governance in research and outreach efforts.

INTERNATIONAL COLLABORATIONS:

- Foster and participate in cooperative research and monitoring efforts throughout species' ranges (e.g., Arctic Shorebird Demographics Network, PRISM, Migratory Shorebird Project, and Arctic Birds Breeding Conditions Survey).
- Participate in partnerships to conserve migratory shorebirds and their habitats in the circumpolar Arctic (e.g., the Arctic Council's Conservation of Arctic Flora and Fauna working group and initiatives therein), North America (e.g., landscape conservation cooperatives, joint ventures, flyway councils), Western Hemisphere (e.g., Western Hemisphere Shorebird Reserve Network, Western Hemisphere Shorebird Group), Asia (e.g., East Asian-Australasian Flyway Partnership), and other partnerships as they arise.
- Coordinate and participate in international, national, and other regional shorebird conservation planning efforts (e.g., Pacific Americas Shorebird Conservation Strategy, Atlantic Flyway Shorebird Initiative).

#7 (BCR 2): Determining vital rates of Red Knots (*Calidris canutus roselaari*) breeding in Alaska

Study Species: Red Knot (*Calidris canutus roselaari*)

Study Locations: Nome, Alaska (64.92 N, -164.84 W)

Principal Investigators: Zak Pohlen and Jim Johnson (USFWS Migratory Bird Program), Kelsi Hunt (Virginia Polytechnic Institute and State University, Department of Fish and Wildlife Conservation), Jan van Gils. Ph.D., and Tim Oortwijn (Royal Netherlands Institute for Sea Research)

Primary Contact: Jim Johnson, USFWS, Migratory Bird Management, 1011 East Tudor Road, Anchorage, AK 99503; E-mail: jim_a_johnson@fws.gov

Study Objectives

- Monitor the marked population to estimate adult survival.
- Determine how temperature, precipitation, and prey availability impact chick growth and survival.
- Collect information on nest initiation and survival.

Results

- Observers arrived May 23 and departed July 24 for the entire nest initiation and brood rearing period for the 12th year (no 2020 or 2021) of studies at the site.
- We found 11 nests: 2 found using a thermal spotting scope, 5 found by tracking adults attached with VHF radios to their nests, and 3 with behavioral observations. This is the second most nest nests discovered in a single season (max = 12).
- We captured 36 total adults with 13 being new birds: 7 captures used whoosh nets, chick calls, and adult calls, and 6 captures using a mist net and chick calls during brood rearing.
- We attached VHF radios to 28 adults to find nests and monitor broods.
- We resighted 22 adults from previous years (most ever; range 11-19).
- We monitored 15 total broods comprising 47 chicks.

Alaska Shorebird Conservation Plan II Objectives Reached:

RESEARCH:

- Assess the effects of climate change on shorebird demography.
- Conduct breeding ecology studies on species occupying alpine, boreal, or other rare or difficult-to-access habitats.

ENVIRONMENTAL EDUCATION AND PUBLIC OUTREACH:

- Raise the profile of shorebirds through public presentations, media outreach, support of shorebird festivals, and collaboration with education programs.
- Encourage the synthesis and reporting of results of Alaskan shorebird studies to scientific and general audiences.

INTERNATIONAL COLLABORATIONS:

- Foster and participate in cooperative research and monitoring efforts throughout species' ranges (e.g., Arctic Shorebird Demographics Network, PRISM, Migratory Shorebird Project, and Arctic Birds Breeding Conditions Survey).

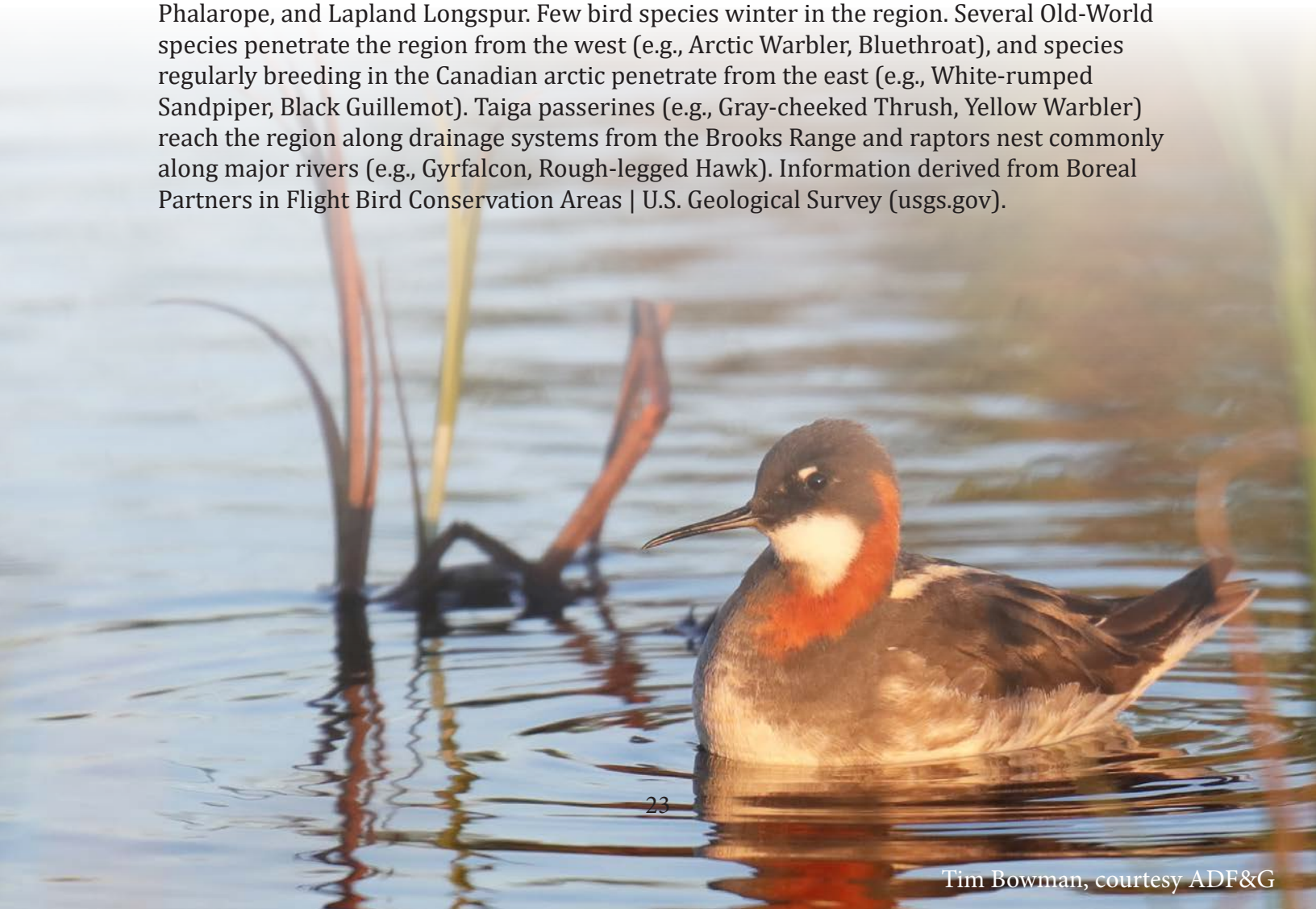
Red Knot

Photo: Callie Gesmundo

ANNUAL SUMMARIES

BIRD CONSERVATION REGION 3

Northern Alaska-Arctic Coastal Plain/Foothills: This region includes low-lying, coastal tundra and drier uplands of the Arctic Foothills of the Brooks Range. Sub-regions include A) Arctic Coastal Plain, and B) Arctic Foothills and north slope of the Brooks Range. It extends from the Alaska-Canada border at Demarcation Point westward, and southward, to the mouth of the Noatak River. Because of thick, continuous permafrost, surface water dominates the landscape (20-50% of the land surface on the coastal plain). Freezing and thawing form a patterned mosaic of polygonal ridges and ponds. Several rivers (e.g., Colville River) bisect the plain and flow into the Arctic Ocean. Barrow/Utqiaġvik, lying near the Arctic Ocean, experiences 67 days of darkness in the winter and 84 days of continuous sunlight in the summer. The ocean surface, except for leads, is frozen 9 to 10 months a year, and the ice pack is never far from shore. Because of the wetness, waterfowl and shorebirds dominate the breeding avian community and passerines are scarce. The most abundant breeding birds on the coastal plain include the: Northern Pintail, King Eider, Oldsquaw, American Golden-Plover, Semipalmated Sandpiper, Pectoral Sandpiper, Red-necked Phalarope, and Lapland Longspur. Few bird species winter in the region. Several Old-World species penetrate the region from the west (e.g., Arctic Warbler, Bluethroat), and species regularly breeding in the Canadian arctic penetrate from the east (e.g., White-rumped Sandpiper, Black Guillemot). Taiga passerines (e.g., Gray-cheeked Thrush, Yellow Warbler) reach the region along drainage systems from the Brooks Range and raptors nest commonly along major rivers (e.g., Gyrfalcon, Rough-legged Hawk). Information derived from Boreal Partners in Flight Bird Conservation Areas | U.S. Geological Survey (usgs.gov).



Tim Bowman, courtesy ADF&G

#8 (BCR 3): Prudhoe Bay Long-term Nest Monitoring

Study Species: American Golden-Plover, Black-bellied Plover, Buff-breasted Sandpiper, Pectoral Sandpiper, Semipalmated Sandpiper, Stilt Sandpiper, Red Phalarope, Red-necked Phalarope, Dunlin, Long-billed Dowitcher, Ruddy Turnstone

Study Location: Prudhoe Bay, 70.30754, -148.6104

Principal Investigators: Martin Robards and Sarah Hoepfner (Arctic Beringia Program, Wildlife Conservation Society)

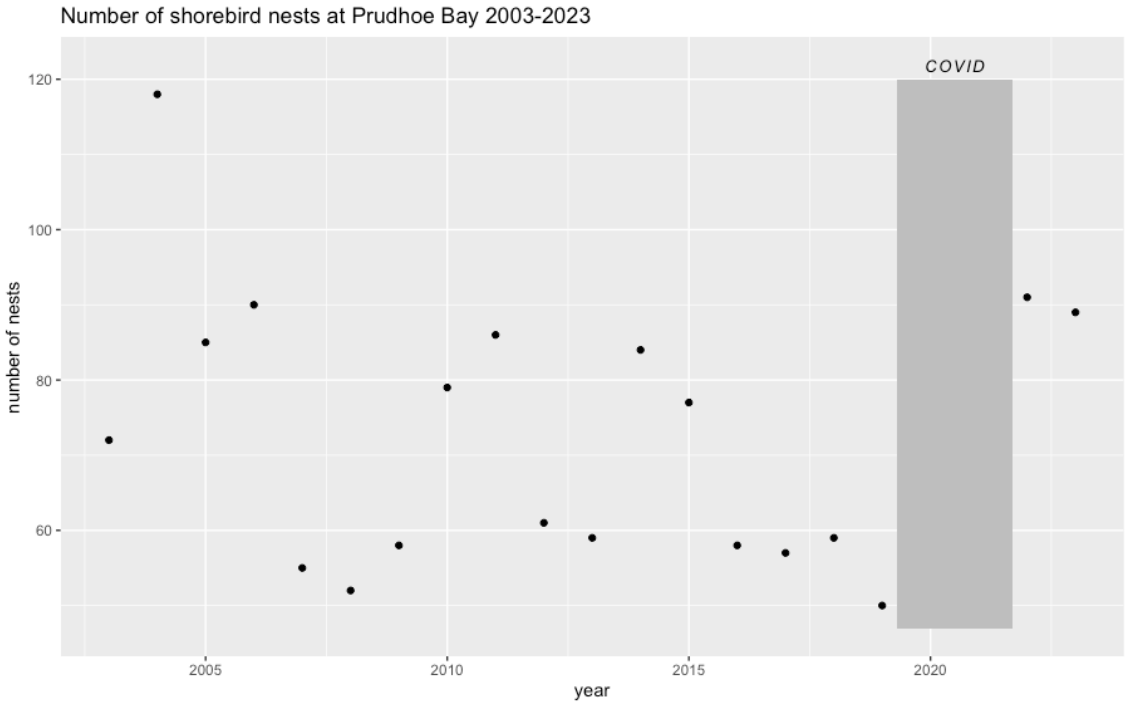
Primary Contact: Martin Robards; Wildlife Conservation Society; 302 Cushman Street Fairbanks, AK 99701; mrobards@wcs.org

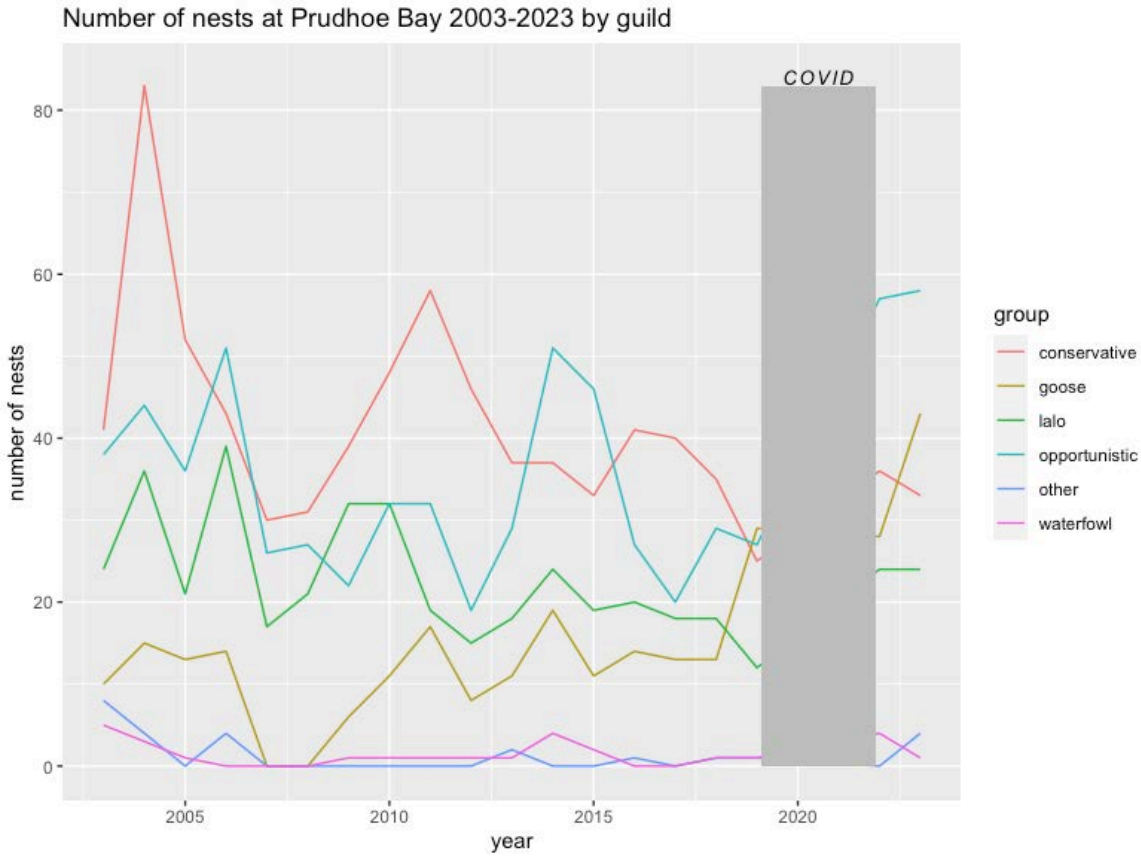
Study Objectives

- Long-term nest monitoring of shorebirds, waterfowl, and passerines within the Prudhoe Bay oilfield since 2003 (minus 2020 and 2021).
- Determine nest density, nest survival, nest predator abundance, and other parameters affecting nest survival.
- Gain a better understanding of potential impacts from industry, climate change, and other factors on breeding birds.
- Supported stilt sandpiper tagging, see other report.
- In 2023 we replicated the 2012-2014 study of bird use at rehabilitated oilfield gravel pads.

Results

- In 2023 we found the highest number of nests (152) since the start of the study in 2003 (86 shorebird nests of seven species, 40 waterfowl, 24 passerine, and 2 others).
- Highest recorded number of red and red-necked phalaropes nesting on the site (17 nests each).
- Nest initiation dates were about average for the study.
- Apparent nest success for shorebirds was 35%, slightly above average.
- This summer was warmer at our site (earliest 70-degree day ever on June 12th), and snow on most plots was melted before arrival on June 4th.


Number of shorebird nests at Prudhoe Bay 2003-2023
COVID
number of nests
120
100
80
60
2005
2010
2015
2020
year


Number of nests at Prudhoe Bay 2003-2023 by guild
COVID
number of nests
80
60
40
20
0
2005
2010
2015
2020
year
group
conservative
goose
lalo
opportunistic
other
waterfowl

Alaska Shorebird Conservation Plan II Objectives Reached:

RESEARCH:

- Identify and determine the magnitude of factors limiting shorebird populations during breeding and nonbreeding periods of the annual cycle.
- Determine migratory timing, routes, and site use of shorebirds.
- Assess the effects of climate change on shorebird demography.
- Identify effects associated with energy production, mining, disturbance, and other anthropogenic activities on shorebirds.
- Develop habitat-based models to predict the abundance and distribution of shorebirds and assess the adaptability of shorebirds to habitat changes.

POPULATION INVENTORY AND MONITORING:

- Conduct long-term population monitoring efforts (e.g., PRISM).

HABITAT MANAGEMENT AND PROTECTION:

- Minimize loss and degradation of critical shorebird habitats by participating in natural resource planning and management.

ENVIRONMENTAL EDUCATION AND PUBLIC OUTREACH:

- Raise the profile of shorebirds through public presentations, media outreach, support of shorebird festivals, and collaboration with education programs.
- Develop shorebird-related outreach and media materials.
- Encourage the synthesis and reporting of results of Alaskan shorebird studies to scientific and general audiences.
- Incorporate principles of good governance in research and outreach efforts.

INTERNATIONAL COLLABORATIONS:

- Foster and participate in cooperative research and monitoring efforts throughout species' ranges (e.g., Arctic Shorebird Demographics Network, PRISM, Migratory Shorebird Project, and Arctic Birds Breeding Conditions Survey).
- Participate in partnerships to conserve migratory shorebirds and their habitats in the circumpolar Arctic (e.g., the Arctic Council's Conservation of Arctic Flora and Fauna working group and initiatives therein), North America (e.g., landscape conservation cooperatives, joint ventures, flyway councils), Western Hemisphere (e.g., Western Hemisphere Shorebird Reserve Network, Western Hemisphere Shorebird Group), Asia (e.g., East Asian-Australasian Flyway Partnership), and other partnerships as they arise.

- Coordinate and participate in international, national, and other regional shorebird conservation planning efforts (e.g., Pacific Americas Shorebird Conservation Strategy, Atlantic Flyway Shorebird Initiative).

In the field

Photo: Sarah Hoepfner

In the field

Photo: Sarah Hoepfner

#9 (BCR 3): Long-term shorebird monitoring in the Willow Project area, NPR-A, Alaska

Study Species: All shorebird species nesting on our study plots. Pectoral Sandpiper, Long-billed Dowitcher, Red Phalarope, Red-necked Phalarope are the most common species in the study area.

Study Location: Willow Project area, National Petroleum Reserve-Alaska (approximate coordinates: 70.1337, -152.0679)

Principal Investigators: Lauren B. Attanas, Rebecca L. McGuire, Andrew R. Bankert (ABR, Inc.- Environmental Research & Services)

Primary Contact: Lauren B. Attanas, ABR, Inc.—Environmental Research & Services, PO Box 80410 Fairbanks, AK 99708, lattanas@abrinc.com

Study Objectives

- Document the distribution, abundance, habitat associations, and nesting success of breeding shorebirds in the Willow project area.
- Determine whether there are changes in these metrics from the baseline pre-construction period to the construction and post-construction (production) periods.
- Measure the effects, if any, of development and environmental factors on breeding shorebird densities and breeding success during construction and production.

Results

- During 1 June–16 July 2023, we found 236 nests of 18 species, including 142 nests of 8 shorebird species, on and off plot.
- Overall nest density for shorebird species across all plots was 51.3 nests/km^2, higher than in 2021 (27.1 nests/km^2) and 2022 (40.4 nests/km^2).
- Again, Pectoral Sandpiper had the highest nest density (30.4 nests/km^2). Nest density for this species was higher in 2023 than in 2022 or 2021.
- In 2023, we monitored nest temperature at 30 shorebird nests of 4 shorebird species (Pectoral Sandpipers, Long-billed Dowitchers, Red-necked Phalaropes, and Black-bellied Plovers) using Gemini TinyTag data loggers attached to thermistor probes. All data loggers successfully collected data which is being used to calculate incubation parameters (recess frequency and duration, incubation start and end dates) and will be included in nest survival analysis (in progress).
- Snow melt occured earlier and mean snow cover was lower 2023 than in 2022.

- Jaegers (Parasitic and Long-tailed) and Glaucous Gulls were the most commonly-observed predator species during predator counts in 2023.
- Microtine/arvicoline abundance, as measured by the presence of sign and live animals, was low at all plots in 2023.

Alaska Shorebird Conservation Plan II Objectives Reached:

RESEARCH:

- Identify effects associated with energy production, mining, disturbance, and other anthropogenic activities on shorebirds.

POPULATION INVENTORY AND MONITORING:

- Conduct long-term population monitoring efforts (e.g., PRISM).

HABITAT MANAGEMENT AND PROTECTION:

- Apply abundance and distribution information to identify key shorebird habitats and sites.

ENVIRONMENTAL EDUCATOIN AND PUBLIC OUTREACH:

- Encourage the synthesis and reporting of results of Alaskan shorebird studies to scientific and general audiences.

Tundra nap

Photo by A. Von Duyke

PESA chick with Dryas

Photo by A. Von Duyke

#10 (BCR 3): Understanding the Ecological and Environmental Factors influencing Dunlin Movement Ecology on the Breeding Grounds

Study Species: Dunlin (arcticola subspecies)

Study Location: Utqiaġvik, Alaska (71.29 N, 156.64 W)

Principal Investigators: Aaron Yappert, Dr. Anna Tucker (USGS Cooperative Fish & Wildlife Unit, Iowa State University), Dr. Stephen Dinsmore (Iowa State University), Dr. Richard Lanctot (Migratory Bird Program, USFWS)

Primary Contact: Aaron Yappert, Iowa State University, 2310 Pammel Dr. Science II Rm 339, Ames, IA 50010, ayappert@iastate.edu

Study Objectives

- Evaluate Dunlin movements on the breeding grounds using high-frequency GPS tags
- Determine how ecological and environmental conditions influence Dunlin movements across multiple spatiotemporal scales
- Assess breeding territory settlement behavior in recently arrived Dunlin
- Refine breeding territory size estimates for Dunlin

Results

- Areas of early melt due to human snow clearing activities provide important feeding sites for recently arrived birds.
- Daily freeze-thaw cycles in late-May may influence bird movements, likely by limiting feeding opportunities.
- Territory establishment appears to occur quickly, with birds visiting future nesting sites multiple times while the tundra is still snow covered.
- During nesting, birds on incubation breaks remain relatively close to the nest, rarely straying more than 150m from the nest.

Alaska Shorebird Conservation Plan II Objectives Reached:

RESEARCH:

- Identify and determine the magnitude of factors limiting shorebird populations during breeding and nonbreeding periods of the annual cycle.
- Identify effects associated with energy production, mining, disturbance, and other anthropogenic activities on shorebirds.

POPULATION INVENTORY AND MONITORING

- Evaluate the efficacy of existing programs (e.g., the Alaska Landbird Monitoring Survey [ALMS], Breeding Bird Survey [BBS] program) to monitor shorebird populations.
- Assess the utility of new technologies (e.g., Automated Recording Units, aerial drones, eBird) to determine shorebird presence and abundance.

ENVIRONMENTAL EDUCATION AND PUBLIC OUTREACH:

- Raise the profile of shorebirds through public presentations, media outreach, support of shorebird festivals, and collaboration with education programs.

INTERNATIONAL COLLABORATIONS:

- Foster and participate in cooperative research and monitoring efforts throughout species' ranges (e.g., Arctic Shorebird Demographics Network, PRISM, Migratory Shorebird Project, and Arctic Birds Breeding Conditions Survey).

Dunlin tagging in the field.

Photo: Aaron Yappert

#11 (BCR 3): Reproductive ecology of shorebirds at Utqiaġvik, Alaska in 2023

Study Species: Dunlin, American Golden-plover, Semipalmated Sandpiper, Long-billed Dowitcher, Red Phalarope, Red-necked Phalarope, Baird's Sandpiper, Pectoral Sandpiper, Western Sandpiper, Buff-breasted Sandpiper, White-rumped Sandpiper, and Ruddy Turnstone

Study Location: Utqiaġvik, Alaska (71.29, -156.64)

Principal Investigators: Richard Lanctot (U.S. Fish and Wildlife Service), Sarah Saalfeld (U.S. Fish and Wildlife Service)

Primary Contact: Richard Lanctot, U.S. Fish and Wildlife Service, 1011 East Tudor Rd, MS 201, Anchorage, AK, 99503; richard_lanctot@fws.gov

Study Objectives

- Collect baseline data on temporal and spatial variability of shorebird diversity and abundance.
- Collect information on nest initiation and effort, replacement clutch laying, clutch and egg size, nest and chick survival, and other demographic traits of Arctic-breeding shorebirds.
- Establish a marked population of as many shorebird species as possible that will allow us to estimate adult survival, mate and site fidelity, and natal philopatry.
- Relate weather, food availability, and predator and prey abundances to shorebird productivity.
- Collaborate with others to support Arctic-wide data collection and graduate student work.

Results

- In 2023, we conducted the 21st year of a long-term shorebird study at Utqiaġvik, Alaska.
- We monitored 418 nests and captured and banded 177 adult shorebirds and 107 chicks to estimate nest and adult survival rates.
- We continue to collect annual data on timing of snow melt, lemming, and predator abundances.
- We continue to collect data for other Arctic-wide collaborations including the "Interactions Working Group" and a Bird Vocalization project which used automated recording units to assess shorebird abundance.
- We hosted the 1st Arctic Shorebird Festival in Utqiaġvik, Alaska

Alaska Shorebird Conservation Plan II Objectives Reached:

RESEARCH:

- Identify and determine the magnitude of factors limiting shorebird populations during breeding and nonbreeding periods of the annual cycle.
- Determine migratory timing, routes, and site use of shorebirds.
- Assess the effects of climate change on shorebird demography.

POPULATION INVENTORY AND MONITORING:

- Conduct long-term population monitoring efforts (e.g., PRISM).
- Assess the utility of new technologies (e.g., Automated Recording Units, aerial drones, eBird) to determine shorebird presence and abundance.

ENVIRONMENTAL EDUCATION AND PUBLIC OUTREACH:

- Raise the profile of shorebirds through public presentations, media outreach, support of shorebird festivals, and collaboration with education programs.
- Host workshops and outreach events to engage the diverse communities of Alaska in shorebird conservation.
- Encourage the synthesis and reporting of results of Alaskan shorebird studies to scientific and general audiences.

INTERNATIONAL COLLABORATIONS:

- Foster and participate in cooperative research and monitoring efforts throughout species' ranges (e.g., Arctic Shorebird Demographics Network, PRISM, Migratory Shorebird Project, and Arctic Birds Breeding Conditions Survey).

Shorebird Festival photo of crew.

Photo: Sarah Saalfeld

Shorebird crew in the fourth of July parade.

Photo Sarah Saalfeld.

#12 (BCR 3): Determining shorebird population status and trends in the Teshekpuk Lake Special Area using PRISM protocols and automated recording units

Study Species: BBPL, AMGP, BARG, RUTU, SESA, BASA, PESA, DUNL, STSA, BBSA, LBDO, RNPH, REPH

Study Location: Teshekpuk Lake Special Area, N 70.354902, W 153.196811

Principal Investigators: Richard Lanctot, Alaska Regional Shorebird Coordinator (US Fish and Wildlife Service), Stephen Brown, Vice President for Science (Manomet, Inc.), Shiloh Schulte, Senior Shorebird Scientist (Manomet, Inc.), Jim Lyons, Research Ecologist (U.S. Geological Survey), Sarah Saalfeld, Quantitative Wildlife Biologist (US Fish and Wildlife Service), Nicola Lecomte, Canada Research Chair in Polar and Boreal Ecology (Université de Moncton), Morgan Ziegenhorn, Post-doctoral Research Associate (Université de Moncton), Paul Smith, Research Scientist (Environment and Climate Change Canada)

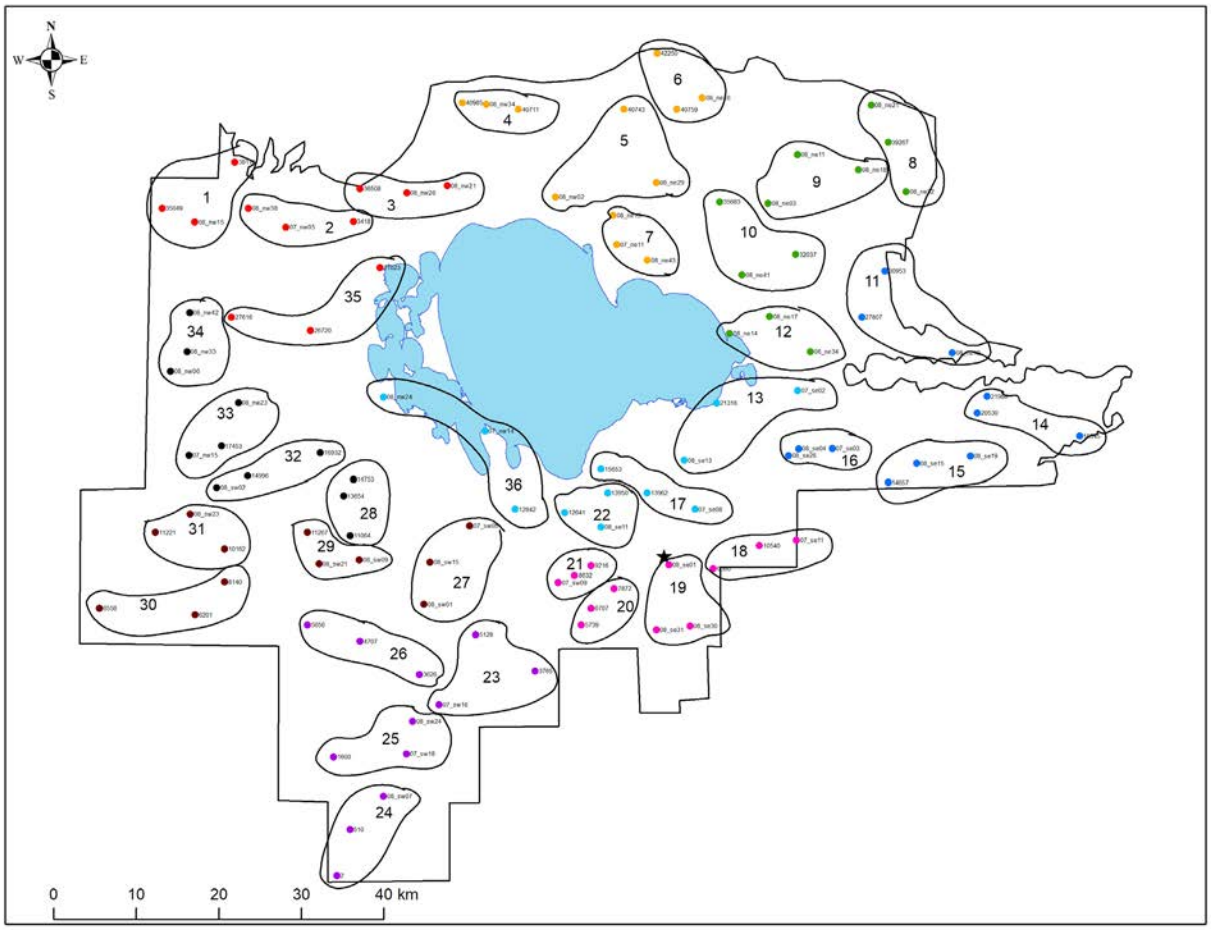
Primary Contact: Richard Lanctot, U.S. Fish and Wildlife Service, 1011 East Tudor Rd, MS 201, Anchorage, AK, 99503; richard_lanctot@fws.gov

Study Objectives

- Document occupancy of avian species within defined study plots
- Estimate abundance, density, and species richness of shorebirds within the Teshekpuk Lake Special Area
- Estimate population sizes and monitor trends of breeding shorebirds within the Teshekpuk Lake Special Area
- Assess the use of automated recording devices to assess shorebird species presence and density

Results

- PRISM surveys were conducted at 112 plots, half of which were last surveyed in 2002 or 2004
- Automated Recording Devices were deployed at the center of 80 of the PRISM plots prior to PRISM surveys in late May and then recovered in late August
- Arrays of automated recording devices were deployed at USFWS long-term study plots at Utqiagvik to assess ways to use the devices to assess density
- PRISM and automated recording device work will be repeated in 2024



PRISM Plot clusters

Alaska Shorebird Conservation Plan II Objectives Reached

RESEARCH:

- Identify effects associated with energy production, mining, disturbance, and other anthropogenic activities on shorebirds.

POPULATION INVENTORY AND MONITORING:

- Conduct long-term population monitoring efforts (e.g., PRISM).
- Assess the utility of new technologies (e.g., Automated Recording Units, aerial drones, eBird) to determine shorebird presence and abundance.

HABITAT MANAGEMENT AND PROTECTION:

- Apply abundance and distribution information to identify key shorebird habitats and sites.
- Support land acquisitions, easements, restoration efforts, and conservation designations (e.g., the Western Hemisphere Shorebird Reserve Network, East Asian–Australasian Shorebird Reserve Network, Ramsar Convention on Wetlands, and Important Bird Areas Programs) for key shorebird sites.
- Minimize loss and degradation of critical shorebird habitats by participating in natural resource planning and management.

INTERNATIONAL COLLABORATIONS:

- Foster and participate in cooperative research and monitoring efforts throughout species' ranges (e.g., Arctic Shorebird Demographics Network, PRISM, Migratory Shorebird Project, and Arctic Birds Breeding Conditions Survey).

Stephen and Shiloh at Teshekpuk Lake, Marty Strip Camp.

Photo Richard Lanctot.

Automated recording device Coyote Air at Teshekpuk

Photos: Richard Lanctot

#13 (BCR 3): Breeding Ecology of Tundra-nesting Birds at Sites on Arctic National Wildlife Refuge

Study Species: whimbrel, black-bellied plover, American golden plover, semipalmated plover, semipalmated sandpiper, pectoral sandpiper, dunlin, red-necked phalarope, red phalarope

Study Location: Atigun River Valley, Arctic National Wildlife Refuge, 68.4689°, -149.3359°; Canning River Delta, Arctic National Wildlife Refuge, 70.1179°, -145.8496°; Jago Bitty, Arctic National Wildlife Refuge, 69.7227°, -143.6061°

Principal Investigators: Sadie E.G. Ulman and Christopher Latty, Arctic National Wildlife Refuge, U.S. Fish and Wildlife Service

Primary Contact: Sadie E.G. Ulman (Arctic National Wildlfie Refuge, U.S. Fish and Wildlife Service), sadie_ulman@fws.gov

Study Objectives

- Locate and monitor tundra nesting bird nests to determine key vital rates, daily nest survival rates, and nest density.
- Determine breeding-season related shorebird limiting factors.
- Use remote monitoring tools (temperature loggers and nest cameras) to determine shorebird nest survival. These devices provide more higher resolution and more accurate data than traditional nest checks, all while requiring only a single within nesting-period visit, which greatly reduces our disturbance and local footprint.

Preliminary Results

- Because we no longer revisit any nests until after fate, this year we moved away from intensive monitoring at a single site, and instead spent 1 to 2 weeks at 3 sites. Moving to this new model was only possible by using line-transect distance sampling and embracing remote monitoring tools, including temperature loggers and cameras.
- Field crew spent 6 days nest searching at Atigun River Valley, 8 days at Jago Bitty, and 13 days at Canning River Delta.
- We located 110 nests at three sites; Atigun River Valley (n=10), Jago Bitty (n=37), and Canning River Delta (n=63) of which, 54 were shorebirds from 9 species. There were no shorebird nests found at Atigun, 22 nests at Jago Bitty, and 31 at Canning.
- This was the third year of deploying a new style of cryptic camera placed directly at the nest bowl. Previously, cameras were placed ~10 m from the nest, but this new design, using a modified Brinno camera with an external lens, was placed ~20 cm from the bowl and angled to peer into nests. This allowed us to easily visualize the behavior of the incubating adult, hatch of individual eggs, and loss of eggs to both large and small predators (we even documented a collared lemming

depredating an unattended passerine nest!). In most cases, the incubation information we recorded would have been missed by a camera set at a further distance.

- This was the second year of using line-transect distance sampling to discover nests. By using transect sampling, we are able to estimate nest density and minimize disturbance to any one area.
- This was the first year that all nests were only visited once at discovery, and again post-fate to collect devices.
- Data analysis is on-going.
- By using line-transect distance sampling and remote monitoring devices, we expect to continue to increase our sample size of nests encountered and monitored, increase our accuracy and precision for derived parameters like fate and fate timing, reduce our impact to the local study area, and increase our area of coverage.

Alaska Shorebird Conservation Plan II Objectives Reached:

RESEARCH:

- Identify and determine the magnitude of factors limiting shorebird populations during breeding and nonbreeding periods of the annual cycle.
- Assess the effects of climate change on shorebird demography.
- Conduct breeding ecology studies on species occupying alpine, boreal, or other rare or difficult-to-access habitats.
- Develop habitat-based models to predict the abundance and distribution of shorebirds and assess the adaptability of shorebirds to habitat changes.

POPULATION INVENTORY AND MONITORING:

- Inventory alpine, boreal, and other poorly studied shorebird species.

HABITAT MANAGEMENT AND PROTECTION:

- Apply abundance and distribution information to identify key shorebird habitats and sites.
- Support land acquisitions, easements, restoration efforts, and conservation designations (e.g., the Western Hemisphere Shorebird Reserve Network, East Asian–Australasian Shorebird Reserve Network, Ramsar Convention on Wetlands, and Important Bird Areas Programs) for key shorebird sites.
- Minimize loss and degradation of critical shorebird habitats by participating in natural resource planning and management.

- Model the potential effects of climate change on shorebird habitats and identify future potential regions of habitat refugia.

ENVIRONMENTAL EDUCATION AND PUBLIC OUTREACH:

- Raise the profile of shorebirds through public presentations, media outreach, support of shorebird festivals, and collaboration with education programs.
- Encourage the synthesis and reporting of results of Alaskan shorebird studies to scientific and general audiences.

INTERNATIONAL COLLABORATIONS:

- Foster and participate in cooperative research and monitoring efforts throughout species' ranges (e.g., Arctic Shorebird Demographics Network, PRISM, Migratory Shorebird Project, and Arctic Birds Breeding Conditions Survey).
- Participate in partnerships to conserve migratory shorebirds and their habitats in the circumpolar Arctic (e.g., the Arctic Council's Conservation of Arctic Flora and Fauna working group and initiatives therein), North America (e.g., landscape conservation cooperatives, joint ventures, flyway councils), Western Hemisphere

American Golden Plover nest in the Arctic Refuge

Photo: Sadie Ulman

(e.g., Western Hemisphere Shorebird Reserve Network, Western Hemisphere Shorebird Group), Asia (e.g., East Asian-Australasian Flyway Partnership), and other partnerships as they arise.

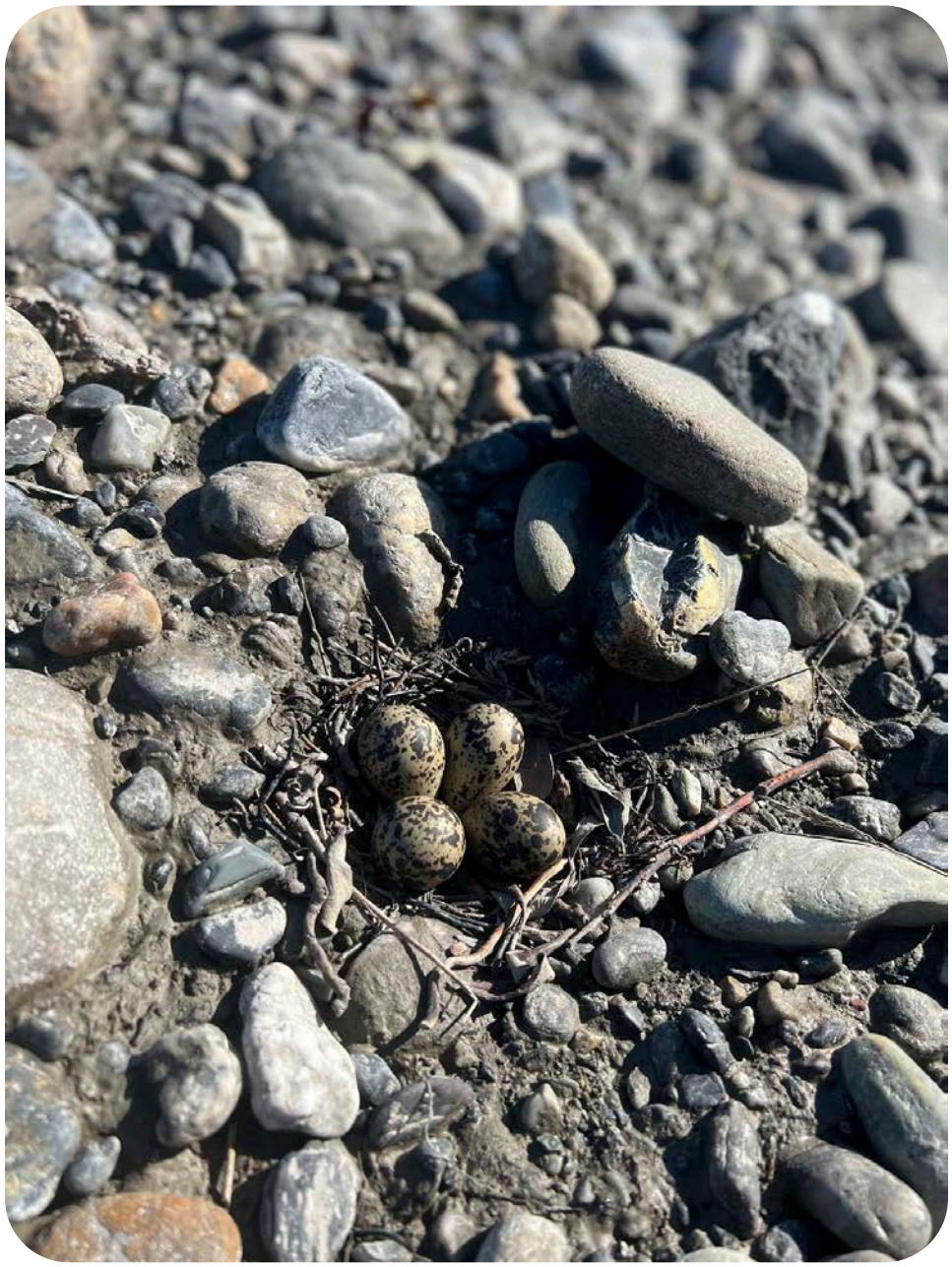


Photo: SEPL nest in the Arctic Refuge.

Photo Sadie Ulman

#14 (BCR 3): Dunlin adult survival, mate fidelity, and breeding dispersal

Study Species: Dunlin spp C. a. arcticola

Study Location: 71.2906° N, 156.7886° W

Principal Investigators: Lindsay Hermanns (Virginia Tech), Daniel Catlin (Virginia Tech), James Fraser (Virginia Tech), Sarah Karpanty (Virginia Tech), Christy Wails (Virginia Tech), Richard Lanctot (USFWS), Sarah Saalfeld (USFWS), Bobbi Pearson (Former USGS).

Primary Contact: Lindsay Hermanns, Virginia Tech, 142 High Street, Fayetteville, WV, lindfh89@vt.edu

Study Objectives

- To understand what influences C.a.arcticola annual adult survival on the breeding grounds, and, on the non-breeding grounds, and additionally, to understand what drives mate fidelity in the subspecies, and how interannual nest site / breeding fidelity is influenced by specific breeding grounds variables.

Results

- We used a Barker model to estimate true survival (unbiased relative to fidelity) rates of adult C. a. arcticola using 19 years (2003 – 2021) of mark-recapture data and environmental data, collected from a breeding area, Utqiaġvik, Alaska, U.S.A. These data were supplemented with resighting observations and habitat data from non-breeding sites in eastern Asia (Japan, China, Taiwan).
- We examined the effects of breeding ground variables with potential to impact adult survival (snow cover, days with extreme precipitation fall, days below freezing, fox control, avian predator abundance, invertebrate biomass, lemming counts, and breeding shorebird nest density) along with non-breeding shorebird habitat loss (area of intertidal extent at non-breeding locations) on survival estimates.
- The true adult survival rate (S = 0.62, 95% CI = 0.50–0.73) was slightly higher than previous estimates from Utqiaġvik, yet still remain low.
- Adult survival was positively associated with non-breeding intertidal extent and breeding ground precipitation (β = 0.11, 85% C.I. = 0.01 – 0.21, β = 0.39, 85% C.I. = 0.19 – 0.39, respectively).
- We examined mate fidelity and breeding dispersal, and found faithful pairs exhibited a high hatching rate (92%) compared to divorced individuals.
- Divorce was more frequent when there was variability in mate options, notably, if a potential mate's age changed from the previous year. This tendency was even

- stronger among males. (β_(change in mate age f)= 0.81, 95% CI = -0.65 – 2.28), than females (β_(change in mate age m)= 1.27, 95% CI = 0.28– 2.25).
- Our results indicate divorce in this breeding population most closely follows the better-option hypothesis.
- Interannual female dunlin breeding dispersal was higher than ($\bar{x}$ = 166.66 ± 136.10, range 1.55 – 854.26 m) than males ($\bar{x}$ = 118.25 ± 75.62, range 1.55 – 316.36 m; Welch's Two Sample t-test: t = 2.60, degrees of freedom [df] = 126.18, p-value = 0.01), with interannual breeding dispersal best predicted by divorce for females (β_ divorce= 0.76, 95% CIs = 0.25 – 1.26) and males dispersed farther after years with low hatching success (β_(% of eggs hatched)= -0.66, 95% CIs = -1.39 – 0.08).

Alaska Shorebird Conservation Plan II Objectives Reached:

RESEARCH:

- Identify and determine the magnitude of factors limiting shorebird populations during breeding and nonbreeding periods of the annual cycle.
- Determine migratory timing, routes, and site use of shorebirds.
- Conduct breeding ecology studies on species occupying alpine, boreal, or other rare or difficult-to-access habitats.

POPULATION INVENTORY AND MONITORING:

- Inventory alpine, boreal, and other poorly studied shorebird species.
- Conduct long-term population monitoring efforts (e.g., PRISM).

HABITAT MANAGEMENT AND PROTECTION

- Apply abundance and distribution information to identify key shorebird habitats and sites.
- Model the potential effects of climate change on shorebird habitats and identify future potential regions of habitat refugia.

INTERNATIONAL COLLABORATIONS:

- Participate in partnerships to conserve migratory shorebirds and their habitats in the circumpolar Arctic (e.g., the Arctic Council's Conservation of Arctic Flora and Fauna working group and initiatives therein), North America (e.g., landscape conservation cooperatives, joint ventures, flyway councils), Western Hemisphere (e.g., Western Hemisphere Shorebird Reserve Network, Western Hemisphere Shorebird Group), Asia (e.g., East Asian-Australasian Flyway Partnership), and other partnerships as they arise.

#15 (BCR 3): Migration pathways for American Golden-plover and Stilt Sandpiper

Study Species: AMGP, STSA

Study Location: Marty Strip: N70.354902, W153.196811; Prudhoe Bay: N70.233431, W148.403708

Principal Investigators: Richard Lanctot, Sarah Saalfeld (US Fish and Wildlife Service), H. River Gates, David Krause, Jeff Wells, Victoria Elmore, Carrie Gray (Audubon Alaska), Martin Robards, Philipp Maleko, Sarah Hoepfner (Wildlife Conservation Society), Shiloh Schulte, Stephen Brown (Manomet, Inc.), Paul Smith (Environment and Climate Change Canada)

Primary Contact: Richard Lanctot, US. Fish and Wildlife Service, 1011 East Tudor Road, MS 201, Anchorage, AK 99503; richard_lanctot@fws.gov

Study Objectives

- Identify post-breeding habitats on the Arctic Coastal Plain for American Golden-plover and Stilt Sandpiper breeding near Marty Strip, Teshekpuk Lake Special Area and Prudhoe Bay, AK
- Document migration routes, stopover sites, and wintering locations of American Golden-plover and Stilt Sandpiper breeding near Marty Strip, Teshekpuk Lake Special Area and Prudhoe Bay, AK
- Assess threats to survival along their migratory routes for American Golden-plover with respect to hurricanes/tropical storms in the Atlantic Flyway, harvest in the Caribbean and South America
- Share habitat use and stopover site information with local, regional, and national entities to educate and inform conservation decisions

Results

- Equipped 8 American Golden-plover and 11 Stilt Sandpipers with Lotek Sunbird PTT tags, and tracked most individuals south to the Continental U.S. and Latin America.
- Identified migration routes and stopover migration sites of both species
- Established a blog called Tullik's Odyssey (https://www.tulliksodyssey.org/) describing the migration of American Golden-plovers tracked from the Teshekpuk Lake Special Area
- Added these American Golden-plover track lines to those accumulated from 2018 to 2022, allowing an assessment of inter-year variation in movements and threats encountered
- Shared tracking data with Shorebird Science and Conservation Collective to support on-the-ground conservation

Alaska Shorebird Conservation Plan II Objectives Reached:

RESEARCH:

- Identify and determine the magnitude of factors limiting shorebird populations during breeding and nonbreeding periods of the annual cycle.
- Determine migratory timing, routes, and site use of shorebirds.
- Identify and delineate potentially distinct populations of shorebirds breeding in Alaska.

HABITAT MANAGEMENT AND PROTECTION:

- Support land acquisitions, easements, restoration efforts, and conservation designations (e.g., the Western Hemisphere Shorebird Reserve Network, East Asian–Australasian Shorebird Reserve Network, Ramsar Convention on Wetlands, and Important Bird Areas Programs) for key shorebird sites.
- Minimize loss and degradation of critical shorebird habitats by participating in natural resource planning and management.

ENVIRONMENTAL EDUCATION AND PUBLIC OUTREACH:

- Raise the profile of shorebirds through public presentations, media outreach, support of shorebird festivals, and collaboration with education programs.
- Develop shorebird-related outreach and media materials.

INTERNATIONAL COLLABORATIONS:

- Participate in partnerships to conserve migratory shorebirds and their habitats in the circumpolar Arctic (e.g., the Arctic Council's Conservation of Arctic Flora and Fauna working group and initiatives therein), North America (e.g., landscape conservation cooperatives, joint ventures, flyway councils), Western Hemisphere (e.g., Western Hemisphere Shorebird Reserve Network, Western Hemisphere Shorebird Group), Asia (e.g., East Asian-Australasian Flyway Partnership), and other partnerships as they arise.

STSA tagged near nest

Photo Kirsti Carr

AMGP and River Gates

Photo Rick Lanctot

#16 (BCR 3): Acoustic and visual monitoring of the Willow Development Area in the National Petroleum Reserve – Alaska

Study Species: BBPL, AMGP, BARG, RUTU, SESA, BASA, PESA, DUNL, STSA, BBSA, LBDO, RNPH, REPH, other waterbirds; as well as anthropogenic sounds

Study Location: Willow Development Area, N70.144165, W152.027458

Principal Investigators: Morgan Zeigenhorn, Nicolas Lecomte (Université de Moncton), Sarah Saalfeld, Richard Lanctot (U.S. Fish and Wildlife Service), Shiloh Schulte, Stephen Brown (Manomet, Inc.)

Primary Contact: Richard Lanctot, U.S. Fish and Wildlife Service, Migratory Bird Management, 1011 East Tudor road, MS 201, Anchorage, AK 99503, richard_lanctot@fws.gov

Study Objectives

- Record and archive baseline levels of anthropogenic and avian vocalizations (i.e., bird activity and presence of particular species) during the summer at varying distances from planned infrastructure prior to and as development at the Willow Development Area
- Deploy cameras at some of the audio recording locations to identify the presence and frequency of natural and anthropogenic activity at various distances from planned infrastructure prior to and during development at the Willow Development Area

Results

- Deployed and retrieved 42 automated recording units and 15 cameras at 1) varying distances from future oil pads, runway, and roads that are proposed as part of the Willow Development Project, 2) lakes where loon activity was recorded in prior years, and 3) four control areas away from any development.
- Recordings are just beginning to be processed to produce spectrograms

Alaska Shorebird Conservation Plan II Objectives Reached:

RESEARCH:

- Identify effects associated with energy production, mining, disturbance, and other anthropogenic activities on shorebirds.

POPULATION INVENTORY AND MONITORING:

- Assess the utility of new technologies (e.g., Automated Recording Units, aerial drones, eBird) to determine shorebird presence and abundance.

ENVIRONMENTAL EDUCATION AND PUBLIC OUTREACH

- Develop shorebird-related outreach and media materials.

INTERNATIONAL COLLABORATIONS:

- Foster and participate in cooperative research and monitoring efforts throughout species' ranges (e.g., Arctic Shorebird Demographics Network, PRISM, Migratory Shorebird Project, and Arctic Birds Breeding Conditions Survey).

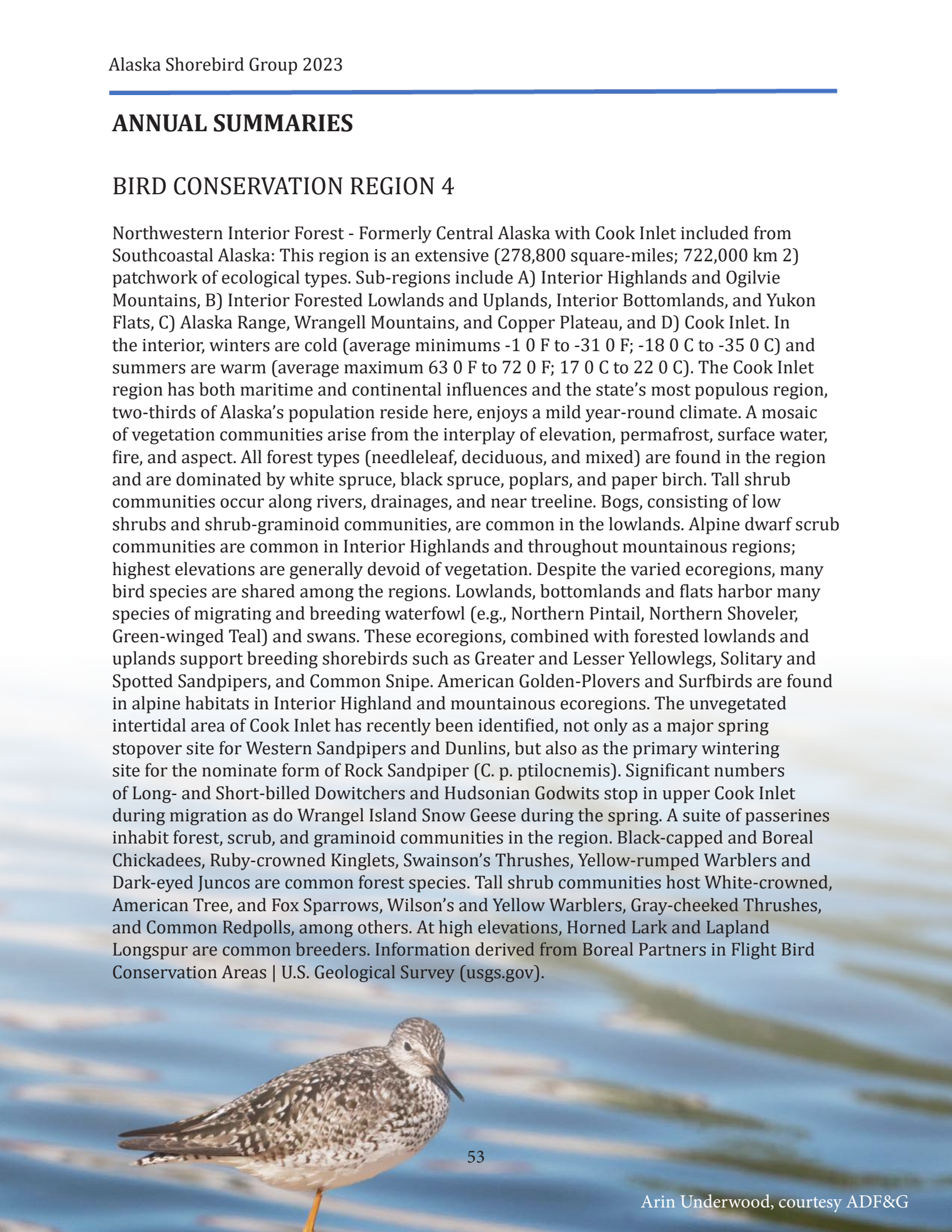
Helicopter pilot at Teshekpuk.

Photo: Shiloh Schulte

ANNUAL SUMMARIES

BIRD CONSERVATION REGION 4

Northwestern Interior Forest - Formerly Central Alaska with Cook Inlet included from Southcoastal Alaska: This region is an extensive (278,800 square-miles; 722,000 km 2) patchwork of ecological types. Sub-regions include A) Interior Highlands and Ogilvie Mountains, B) Interior Forested Lowlands and Uplands, Interior Bottomlands, and Yukon Flats, C) Alaska Range, Wrangell Mountains, and Copper Plateau, and D) Cook Inlet. In the interior, winters are cold (average minimums -1 0 F to -31 0 F; -18 0 C to -35 0 C) and summers are warm (average maximum 63 0 F to 72 0 F; 17 0 C to 22 0 C). The Cook Inlet region has both maritime and continental influences and the state's most populous region, two-thirds of Alaska's population reside here, enjoys a mild year-round climate. A mosaic of vegetation communities arise from the interplay of elevation, permafrost, surface water, fire, and aspect. All forest types (needleleaf, deciduous, and mixed) are found in the region and are dominated by white spruce, black spruce, poplars, and paper birch. Tall shrub communities occur along rivers, drainages, and near treeline. Bogs, consisting of low shrubs and shrub-graminoid communities, are common in the lowlands. Alpine dwarf scrub communities are common in Interior Highlands and throughout mountainous regions; highest elevations are generally devoid of vegetation. Despite the varied ecoregions, many bird species are shared among the regions. Lowlands, bottomlands and flats harbor many species of migrating and breeding waterfowl (e.g., Northern Pintail, Northern Shoveler, Green-winged Teal) and swans. These ecoregions, combined with forested lowlands and uplands support breeding shorebirds such as Greater and Lesser Yellowlegs, Solitary and Spotted Sandpipers, and Common Snipe. American Golden-Plovers and Surfbirds are found in alpine habitats in Interior Highland and mountainous ecoregions. The unvegetated intertidal area of Cook Inlet has recently been identified, not only as a major spring stopover site for Western Sandpipers and Dunlins, but also as the primary wintering site for the nominate form of Rock Sandpiper (C. p. ptilocnemis). Significant numbers of Long- and Short-billed Dowitchers and Hudsonian Godwits stop in upper Cook Inlet during migration as do Wrangel Island Snow Geese during the spring. A suite of passerines inhabit forest, scrub, and graminoid communities in the region. Black-capped and Boreal Chickadees, Ruby-crowned Kinglets, Swainson's Thrushes, Yellow-rumped Warblers and Dark-eyed Juncos are common forest species. Tall shrub communities host White-crowned, American Tree, and Fox Sparrows, Wilson's and Yellow Warblers, Gray-cheeked Thrushes, and Common Redpolls, among others. At high elevations, Horned Lark and Lapland Longspur are common breeders. Information derived from Boreal Partners in Flight Bird Conservation Areas | U.S. Geological Survey (usgs.gov).



Arin Underwood, courtesy ADF&G

#17 (BCR 4): Kachemak Bay Shorebird Monitoring Project: 2023 Report

Study Species: All spring shorebird migrants that stopover at Kachemak Bay

Study Location: Kachemak Bay, Anchor River intertidal area, Kasilof River intertidal area

Principal Investigators: George Matz (Kachemak Bay Birders), plus 63 volunteers in 2023 who participated in one or more monitoring sessions

Primary Contact: George Matz, Kachemak Bay Birders, PO Box 15182, Fritz Creek, AK 99603 geomatz41@gmail.com

Study Objectives

- The long-term objective for this citizen science project is to attain a better understanding of the status of shorebird populations in Kachemak Bay as well as the intertidal areas of the Anchor and Kasilof Rivers, particularly during spring migration. Volunteer participation provides local birders with more opportunity to observe and enjoy shorebirds.
- Secondary objectives are:
    - To contribute information that might be useful to others assessing shorebird populations across the entire Pacific Flyway.
    - To use the monitoring data to help protect shorebird populations and habitat on the western side of the Kenai Peninsula.

Results

- This year at five Kachemak Bay monitoring sites we observed 21 species of shorebirds and counted 14,223 individual shorebirds. Our 15-year annual average is 24 species and 13,726 individual shorebirds.
- We saw one new species of shorebird, a Killdeer, bringing our total list of species over 15 years to 33.
- At the mouth of the Anchor River, this year we saw 18 species of shorebirds and counted 1,816 individual shorebirds. Our 11-year average is 19 species and a count of 1,481 individual shorebirds. The total number of shorebird species seen since 2013 is 28.
- At the mouth of the Kasilof River, this year we saw 21 species of shorebirds and counted 8,059 individual shorebirds. Our 11-year average is 18 species and a count of 9,242 individual shorebirds. The total number of shorebird species seen since 2013 is 28.

		April				May					
# of sp	**SPECIES**	13	18	23	28	3	8	13	18	23	**Total**
1	Semipalmated Plover	-	-	-	-	21	59	54	32	29	195
2	Killdeer	-	1	-	-	-	-	-	-	-	1
	American Golden-Plover	-	-	-	-	-	-	-	-	-	-
3	Pacific Golden Plover	-	2	12	44	9	5	-	-	-	72
4	Black-bellied Plover	3	55	53	42	28	10	7	1	-	199
	Black-bellied/Golden Plover	-	12	3	-	-	64	-	-	-	79
	Black Oystercatcher	-	-	-	-	-	-	-	-	-	-
5	Greater Yellowlegs	-	102	72	20	11	18	5	1	5	234
6	Lesser Yellowlegs	-	-	-	-	-	1	3	1	2	7
	Yellowlegs sp.	-	17	-	-	1	-	-	-	-	18
	Spotted Sandpiper	-	-	-	-	-	-	-	-	-	-
7	Whimbrel	-	-	-	-	8	4	5	5	2	24
	Bristle-thighed Curlew	-	-	-	-	-	-	-	-	-	-
8	Bar-tailed Godwit	-	-	-	-	-	2	1	1	-	4
	Hudsonian Godwit	-	-	-	-	-	-	-	-	-	-
9	Marbled Godwit	-	-	-	-	1	2	2	-	-	5
10	Wandering Tattler	-	-	-	-	-	-	5	14	3	22
11	Surfbird	-	-	-	-	-	-	-	-	30	30
12	Ruddy Turnstone	-	-	-	-	4	-	-	-	3	7
13	Black Turnstone	-	-	-	-	-	1	-	1	-	2
14	Western Sandpiper	-	-	-	3	712	8,625	2,071	85	13	11,509
15	Least Sandpiper	-	-	-	-	2	250	132	13	7	404
16	Semipalmated Sandpiper	-	-	-	-	-	-	7	-	-	7
	LESA/WESA/SESA (peeps)	-	70	-	-	13	106	339	-	2	530
	Sanderling	-	-	-	-	-	-	-	-	-	-
	Pectoral Sandpiper	-	-	-	-	-	-	-	-	-	-
17	Dunlin	-	96	-	11	49	138	176	6	-	476
18	Rock Sandpiper	212	2	2	1	-	-	-	-	-	217
	Baird's Sandpiper	-	-	-	-	-	-	-	-	-	-
	Red Knot	-	-	-	-	-	-	-	-	-	-
19	Short-billed Dowitcher	-	-	4	2	18	44	27	6	5	106
20	Long-billed Dowitcher	-	-	-	-	-	-	8	-	1	9
	Dowitcher sp.	-	-	3	-	-	3	-	-	-	6
	Wilson's Snipe	-	-	-	-	-	-	-	-	-	-
	Red Phalarope	-	-	-	-	-	-	-	-	-	-
21	Red-necked Phalarope	-	-	-	-	-	-	-	-	60	60
	Rare; Solitary Sandpiper										
	Total	215	357	149	123	877	9,332	2,842	166	162	14,223

Table 1. 2023 Kachemak Bay observations

		April				May					
# of sp.	SPECIES	13	18	23	28	3	8	13	18	23	Total
1	Semipalmated Plover					6	12	13	1	17	49
	Killdeer										-
2	American Golden-Plover						2				2
3	Pacific Golden Plover					1	3				4
4	Black-bellied Plover		2	3	1	14	39				59
	Black Oystercatcher										-
5	Greater Yellowlegs	1	14	35	34	43	38	8	5	6	184
6	Lesser Yellowlegs						1				1
	Yellowlegs sp.										-
7	Spotted Sandpiper							4	1	1	6
8	Whimbrel					1	33	12	9	7	62
	Bristle-thighed Curlew										-
9	Bar-tailed Godwit						2				2
	Hudsonian Godwit										-
10	Marbled Godwit					1	1	2			4
	godwit sp.										-
	Wandering Tattler										-
11	Surfbird						1				1
	Ruddy Turnstone										-
12	Black Turnstone						3				3
13	Western Sandpiper					5	730	50	33	17	835
14	Least Sandpiper						202	5	3	3	213
15	Semipalmated Sandpiper							5			5
	LESA/WESA/SESA (peeps)					8	25	17		24	74
	Sanderling										-
16	Pectoral Sandpiper						26	1	2	32	61
17	Dunlin						192	15	1	3	211
	Rock Sandpiper										-
	Baird's Sandpiper										-
	Red Knot										-
18	Short-billed Dowitcher					8	24			3	35
	Long-billed Dowitcher										-
	Dowitcher sp.			5							5
	Wilson's Snipe										-
	Red Phalarope										-
	Red-necked Phalarope										-
	Total	1	16	43	35	87	1,334	132	55	113	1,816

Table 2. 2023 Anchor River observations

		April				May					
# of sp.	SPECIES	13	18	23	28	3	8	13	18	23	Total
1	Black Oystercatcher					2					2
2	Black-bellied Plover		5	7	28	33	3		1		77
3	Killdeer							1			1
4	Semipalmated Plover					1	2	2			5
5	Whimbrel					2	6	1			9
6	Bar-tailed Godwit						1				1
7	Hudsonian Godwit					7	3	1			11
8	Marbled Godwit					1	1				2
9	Ruddy Turnstone					1					1
10	Red Knot					1					1
11	Sanderling			1		1					2
12	Dunlin			1	1	70	600	30			702
13	Least Sandpiper					3		7	3		13
14	Pectoral Sandpiper								33		33
15	Semipalmated Sandpiper						2	1			3
16	Western Sandpiper					1,600	4,700	400	12		6,712
17	Short-billed Dowitcher				1	120	78	23	1	1	224
18	Long-billed Dowitcher						2				2
19	Wilson's Snipe						1	2	2	1	6
20	Greater Yellowlegs		4	28	98	90	7	1	4	1	233
21	Lesser Yellowlegs				1	5	4	2	5	2	19
	Total	-	9	37	129	1937	5410	471	61	5	8,059

Table 3. 2023 Kasilof River observations

# of Sp.	Species	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Average	Total
1	Western Sandpiper	3,229	4,996	4,100	16,375	7,964	4,000	2,267	1,403	7,225	14,508	2,941	14,011	4,638	9,889	11,509	7,270	109,055
	LESA/WESA/SESA (peeps)	104	803	3,336	844	5,305	987	306	6,269	360	404	922	1,826	1,149	1,504	530	1,643	24,649
2	Red-necked Phalarope	1,630	1,500	5,152	1,501	703	3,006	1,503	39	102	1,025	2,513	102	1,014	16	60	1,324	19,866
3	Surfbird	292	110	574	2,919	748	2,644	2,111	1,335	1,186	715	850	350	2,740	491	30	1,140	17,095
4	Dunlin	1,097	561	1,283	1,205	2,548	1,530	826	508	590	928	579	1,156	641	743	476	978	14,671
5	Least Sandpiper	136	245	219	103	128	195	168	245	102	164	66	634	407	350	404	238	3,566
6	Semipalmated Plover	194	203	197	142	92	251	273	270	246	322	204	205	174	189	195	210	3,157
7	Black-bellied Plover	179	315	282	354	221	114	210	107	80	135	106	82	132	61	199	172	2,577
8	Rock Sandpiper	90	405	482	6	4	6	6	4	47	12	3	597	688	4	217	171	2,571
9	Black Turnstone	81	373	121	71	21	56	352	55	122	92	22	6	52	16	2	96	1,442
	Dowitcher sp.	99	82	57	76	344	49	65	17	14	139	176	55	128	130	6	96	1,437
10	Greater Yellowlegs	24	36	59	68	90	24	39	44	58	59	88	64	108	74	234	71	1,069
11	Whimbrel	10	22	27	28	65	26	28	43	51	25	27	204	153	17	24	50	750
12	Semipalmated Sandpiper	1	5	3	34	-	13	33	3	10	10	-	613	10	5	7	50	747
13	Short-billed Dowitcher	125	-	33	76	18	15	-	20	57	24	2	17	37	78	106	41	608
14	Wandering Tattler	13	56	30	18	62	39	39	58	58	55	28	5	43	12	22	36	538
15	Pacific Golden Plover	5	42	5	95	96	17	4	23	13	16	13	42	3	91	72	36	537
16	Pectoral Sandpiper	-	7	-	1	146	98	11	-	15	11	40	26	14	15	-	26	384
17	Long-billed Dowitcher	-	-	15	1	22	36	-	1	37	7	3	126	49	7	9	21	313
18	Black Oystercatcher	11	11	13	8	2	8	18	15	-	7	22	7	17	18	-	10	157
19	Marbled Godwit	3	12	1	7	-	8	5	5	11	29	4	6	4	14	5	8	114
20	Lesser Yellowlegs	-	26	3	15	9	4	11	1	5	13	-	2	1	-	7	6	97
	Black-bellied/Golden Plover	-	-	-	-	-	-	-	-	-	-	-	-	-	-	79	5	79
	Yellowlegs sp.	2	18	-	2	2	-	5	-	15	1	2	4	-	8	18	5	77
21	Red Knot	-	-	2	-	-	1	1	-	-	-	-	67	4	-	-	5	75
22	Ruddy Turnstone	1	10	1	2	9	2	6	9	7	3	5	2	5	5	7	5	74
23	Hudsonian Godwit	18	-	2	-	3	3	-	-	1	3	1	6	8	8	-	4	53
24	Wilson's Snipe	1	5	1	1	-	-	-	-	-	-	3	10	6	12	-	3	39
25	Sanderling	-	1	8	8	-	2	-	-	-	1	1	3	-	-	-	2	24
26	Bar-tailed Godwit	3	-	-	4	6	-	-	1	1	1	-	-	-	2	4	1	22
27	American Golden-Plover	3	1	1	1	10	-	-	-	-	-	2	-	1	-	-	1	19
28	Baird's Sandpiper	1	-	-	6	-	-	-	1	-	-	-	-	-	-	-	1	8
29	Spotted Sandpiper	3	-	-	1	-	-	-	1	-	-	-	1	-	-	-	0.4	6
30	Bristle-thighed Curlew	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	0.3	5
31	Red Phalarope	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	0.3	5
32	Solitary Sandpiper	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	0.1	2
33	Killdeer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.1	1
	Total Individuals	7,355	9,845	16,007	23,972	18,623	13,139	8,287	10,477	10,413	18,709	8,623	20,229	12,226	13,761	14,223	13,726	205,889
	Total Species	24	23	25	27	23	25	21	23	22	24	23	26	25	24	21	24	

Table 4. 2009-2023 Kachemak Bay observations

#	SPECIES	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Average
1	Red-necked Phalarope	-	5,000	400	-	-	2	1	-	-		-	491
2	Western Sandpiper	606	135	204	13	219	799	80	1,322	484	436	835	467
	LESA/WESA/SESA (peeps)	29	32	14	41	1,364	-	3	36	69	319	74	180
3	Greater Yellowlegs	44	39	42	50	54	64	51	62	124	108	184	75
4	Dunlin	67	27	24	9	47	69	41	22	54	12	211	53
5	Least Sandpiper	10	28	24	17	12	19	3	6	7	4	213	31
6	Black-bellied Plover	40	48	40	16	19	16	10	19	18	20	59	28
7	Whimbrel	75	29	2	8	9	20	27	8	25	29	62	27
8	Semipalmated Plover	14	13	17	10	28	50	7	9	13	16	49	21
	Dowitcher sp.	19	8	15	4	3	4	8	22	28	45	5	15
9	Short-billed Dowitcher	15	27	5	4	14	4	11	2	20	19	35	14
10	Pacific Golden Plover	10	1	8	7	16	32	21	30	6	10	4	13
11	Black Turnstone	3	20	-	18	5	24	-	3	42	17	3	12
12	Rock Sandpiper	16	22	1	-	-	2	-	89	-	4	-	12
13	Pectoral Sandpiper	3	9	-	1	6	20	3	3	8		61	10
14	Semipalmated Sandpiper	8	6	3	5	8	8	1	-	15	5	5	6
15	Lesser Yellowlegs	20	20	2	1	7	5	-	1	-	5	1	6
	Yellowlegs sp.	45	-	-	1	-	-	-	-	2		-	4
16	Spotted Sandpiper	-	-	6	5	1	2	2	9	5	8	6	4
17	Long-billed Dowitcher	18	7	3	-	2	3	2	-	3		-	3
18	Wandering Tattler	1	1	5	-	-	5	1	-	-	3	-	1
	Plover sp.	15	-	-	-	-	-	-	-	-		-	1
19	Marbled Godwit	1	-	-	-	1	1	1	-	2	3	4	1
20	Ruddy Turnstone	1	-	-	-	4	3	-	-	1	3	-	1
21	Hudsonian Godwit	1	-	-	2	-	3	-	1	1	3	-	1
22	Sanderling						3	-	3	-	2	-	1
23	Wilson's Snipe	3	1	-	-	-	1	-	1	1	1	-	1
24	American Golden-Plover	-	-	2	-	-	1	-	-	-		2	0.5
25	Red Knot	-	3	-	-	-	2	-	-	-		-	0.5
26	Surfbird	-	-	1	-	-	-	-	-	2		1	0.4
27	Bar-tailed Godwit	-	-	-	-	-	-	-	-	-	-	2	0.2
28	Black Oystercatcher	1	-	-	-	-	-	-	-	-		-	0.1
	godwit sp.										1	-	0.1
	Total Individuals	1,065	5,476	818	212	1,819	1,162	273	1,648	930	1,073	1,816	

Table 5. 2013-2023 Anchor River observations

#	SPECIES	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Average
1	Western Sandpiper	16,950	588	4,634	2,652	2,557	14,755	6,721	16,588	6,827	5,760	6712	7,704
2	Dunlin	3,338	60	459	523	133	1,462	1,872	1,329	375	968	702	1,020
3	Short-billed Dowitcher	620	174	195	378	158	429	122	310	277	200	224	281
4	Greater Yellowlegs	34	16	17	18	47	9	12	29	99	43	233	51
5	Black-bellied Plover	59	19	40	70	64	80	38	26	11	11	77	45
6	Least Sandpiper	209	5	-	2	4	41	4	3	45	23	13	32
7	Whimbrel	43	58	8	6	5	18	18	7	32	7	9	19
8	Semipalmated Sandpiper	8	-	1	14	2	4	21	71	50		3	16
9	Hudsonian Godwit	25	8	12	21	14	10	6	30	10	15	11	15
10	Lesser Yellowlegs	8	16	6	13	16	2	6	34	6	12	19	13
11	Pectoral Sandpiper	7	2	2	1	-	20	26	1	20	6	33	11
12	Semipalmated Plover	6	3	10	5	5	32	7	22	7	4	5	10
13	Long-billed Dowitcher	42	-	-	-	-	4	-	2	12		2	6
14	Wilson's Snipe	3	3	4	5	4	4	7	6	11	7	6	5
15	Pacific Golden Plover	1	2	7	8	1	1	8	3	4	11		4
	Dowitcher sp.	3	-	-	-	-	-	-	-	21			2
16	Marbled Godwit	-	2	-	1	-	6	4	2	2	1	2	2
17	Rock Sandpiper	-	-	-	-	2	9	-	4	-			1
18	Red Knot	-	-	2	5	-	-	1	4	-		1	1
19	Surfbird	-	-	-	-	-	-	-	7	3			0.9
20	Sanderling	-	-	1	2	-	-	1	2	-		2	0.7
21	American Golden-Plover	5	-	-	-	-	-	-	-	-	2		0.6
22	Bar-tailed Godwit	1	-	-	-	-	1	-	1	-	3	1	0.6
23	Ruddy Turnstone				2	1	-	-	2	-		1	0.5
	Godwit sp.									4			0.4
	LESA/WESA/SESA							1	-	3			0.4
24	Killdeer	-	-	-	-	1	-	-	-	1		1	0.3
25	Red-necked Phalarope	-	2	-	-	-	1	-	-	-	-	-	0.3
26	Black Oystercatcher	-	-	-	-	-	-	-	-	-	-	2	0.2
27	Baird's Sandpiper	1	-	-	1	-	-	-	-	-			0.2
28	Black Turnstone	-	-	-	-	-	1	-	-	-			0.1
	Total Individuals	4,413	370	764	1,075	457	2,134	8,875	1,895	993	1,313	8,059	2,759
	Total Species	19	15	15	19	16	20	17	22	18	16	21	18

Table 6. 2013-2023 Kasilof River observations

Alaska Shorebird Conservation Plan II Objectives Reached:

RESEARCH:

- Determine migratory timing, routes, and site use of shorebirds.

POPULATION INVENTORY AND MONITORING:

- Conduct long-term population monitoring efforts (e.g., PRISM).

HABITAT MANAGEMENT AND PROTECTION:

- Apply abundance and distribution information to identify key shorebird habitats and sites.
- Support land acquisitions, easements, restoration efforts, and conservation designations (e.g., the Western Hemisphere Shorebird Reserve Network, East Asian–Australasian Shorebird Reserve Network, Ramsar Convention on Wetlands, and Important Bird Areas Programs) for key shorebird sites.
- Minimize loss and degradation of critical shorebird habitats by participating in natural resource planning and management.

ENVIRONMENTAL EDUCATION AND PUBLIC OUTREACH:

- Raise the profile of shorebirds through public presentations, media outreach, support of shorebird festivals, and collaboration with education programs.
- Develop shorebird-related outreach and media materials.
- Encourage the synthesis and reporting of results of Alaskan shorebird studies to scientific and general audiences.
- Identify and support ways to involve citizen scientists in shorebird monitoring programs.
- Incorporate principles of good governance in research and outreach efforts.

INTERNATIONAL COLLABORATIONS:

- Foster and participate in cooperative research and monitoring efforts throughout species' ranges (e.g., Arctic Shorebird Demographics Network, PRISM, Migratory Shorebird Project, and Arctic Birds Breeding Conditions Survey).

- Participate in partnerships to conserve migratory shorebirds and their habitats in the circumpolar Arctic (e.g., the Arctic Council's Conservation of Arctic Flora and Fauna working group and initiatives therein), North America (e.g., landscape conservation cooperatives, joint ventures, flyway councils), Western Hemisphere (e.g., Western Hemisphere Shorebird Reserve Network, Western Hemisphere Shorebird Group), Asia (e.g., East Asian-Australasian Flyway Partnership), and other partnerships as they arise.

#18 (BCR 4): Migratory patterns and vital rates of boreal breeding shorebirds at Eielson Air Force Base

Study Species: Lesser Yellowlegs, Solitary Sandpiper, Spotted Sandpiper

Study Location: Eielson Air Force Base, Alaska (64.65 N, -147.06 W)

Principal Investigators: Callie Gesmundo, Zak Pohlen, Hannah Vincelette, and Jim Johnson (U.S. Fish and Wildlife Service, Migratory Bird Program), Katie Christie (Alaska Department of Fish and Game, Threatened, Endangered and Diversity Program)

Primary Contact: Jim Johnson, USFWS, Migratory Bird Management, 1011 East Tudor Road, Anchorage, AK 99503. Phone: 907-786-3423; E-mail: jim_a_johnson@fws.gov

Study Objectives

- Estimate annual adult survival and recruitment of Lesser Yellowlegs, Solitary Sandpipers, and Spotted Sandpipers breeding at Eielson Air Force Base.
- Document migration routes, stopover sites, and wintering locations of Solitary Sandpipers and Spotted Sandpipers.

Results

- Captured 14 Lesser Yellowlegs, 32 Solitary Sandpiper, and 10 Spotted Sandpiper adults.
- Deployed 10 store-on-board Argos PinPoint-50 GPS tags, 10 Argos Sunbird PTT transmitters on Solitary Sandpipers, and 5 store-on-board Argos PinPoint-10 GPS tags on Spotted Sandpipers.
- Resighted 7 Lesser Yellowlegs marked in 2022, 1 Lesser Yellowlegs marked in 2021, 3 Solitary Sandpipers marked in 2022, 3 Spotted Sandpipers marked in 2021, and 1 Spotted Sandpiper marked in 2022.

Alaska Shorebird Conservation Plan II Objectives Reached:

RESEARCH:

- Determine migratory timing, routes, and site use of shorebirds.
- Conduct breeding ecology studies on species occupying alpine, boreal, or other rare or difficult-to-access habitats.

POPULATION INVENTORY AND MONITORING:

- Inventory alpine, boreal, and other poorly studied shorebird species.

HABITAT MANAGEMENT AND PROTECTION:

- Minimize loss and degradation of critical shorebird habitats by participating in natural resource planning and management.

ENVIRONMENTAL EDUCATION AND PUBLIC OUTREACH:

- Develop shorebird-related outreach and media materials.
- Encourage the synthesis and reporting of results of Alaskan shorebird studies to scientific and general audiences.

INTERNATIONAL COLLABORATIONS:

- Foster and participate in cooperative research and monitoring efforts throughout species' ranges (e.g., Arctic Shorebird Demographics Network, PRISM, Migratory Shorebird Project, and Arctic Birds Breeding Conditions Survey).
- Coordinate and participate in international, national, and other regional shorebird conservation planning efforts (e.g., Pacific Americas Shorebird Conservation Strategy, Atlantic Flyway Shorebird Initiative).

Eielson

Photo: Callie Gesmundo

#19 (BCR 4): Migratory movements of Alaska-breeding Upland Sandpipers

Study Species: Upland Sandpiper

Study Location: Delta Junction, Alaska (63.91 N, -145.18 W)

Principal Investigators: Callie Gesmundo, Zak Pohlen, Hannah Vincelette, Richard Lanctot, and Jim Johnson (U.S. Fish and Wildlife Service, Migratory Bird Program)

Primary Contact: Jim Johnson, USFWS, Migratory Bird Management, 1011 East Tudor Road, Anchorage, AK 99503; E-mail: jim_a_johnson@fws.gov

Study Objectives

- Document migration routes, stopover sites, and wintering locations of Upland Sandpipers breeding in Delta Junction, Alaska.

Preliminary Results

- 1 adult recaptured and transmitter removed.
- • 2 adults resighted.
- • 4 transmitters from 2022 deployments are still active as of November 2023.
- • During southbound and northbound migration, birds used a narrow migratory corridor through the Midcontinent Flyway (Arctic/Boreal, Great Plains, and West Gulf Coast), crossing at the Isthmus of Tehuantepec, and over the Pacific Ocean to and from South America.
- • Non-breeding areas occur in northeast Argentina and Uruguay.

Alaska Shorebird Conservation Plan II Objectives Reached:

RESEARCH:

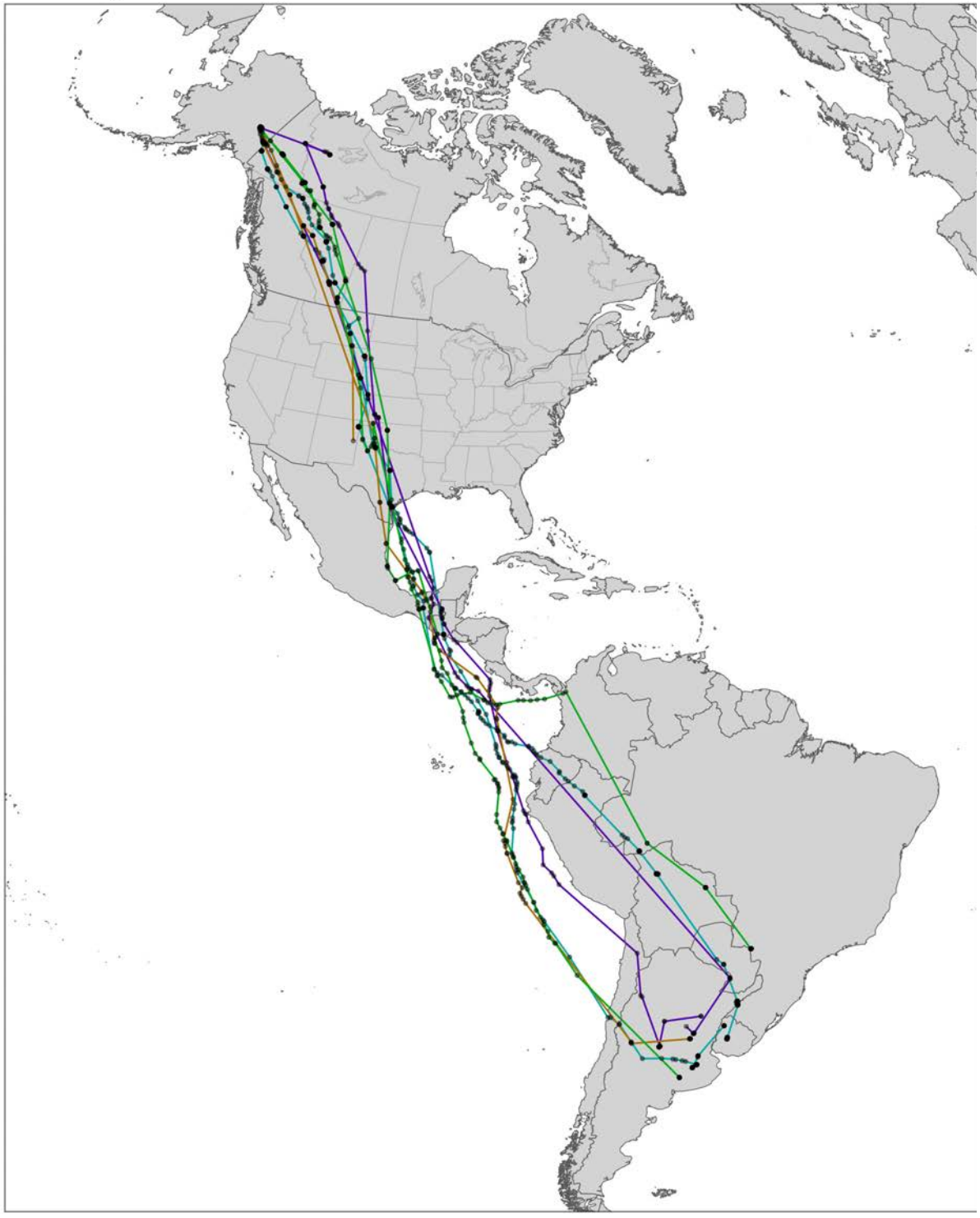
- Determine migratory timing, routes, and site use of shorebirds.

ENVIRONMENTAL EDUCATION AND PUBLIC OUTREACH:

- Encourage the synthesis and reporting of results of Alaskan shorebird studies to scientific and general audiences.

Alaska Upland Sandpiper Movements in 2023

Full annual cycle tracklines of 4 individuals from Delta Junction, AK Jan-Nov 2023



INTERNATIONAL COLLABORATIONS:

- Foster and participate in cooperative research and monitoring efforts throughout species' ranges (e.g., Arctic Shorebird Demographics Network, PRISM, Migratory Shorebird Project, and Arctic Birds Breeding Conditions Survey).
- Coordinate and participate in international, national, and other regional shorebird conservation planning efforts (e.g., Pacific Americas Shorebird Conservation Strategy, Atlantic Flyway Shorebird Initiative).

Upland Sandpiper

Photo: Callie Gesmundo

#20 (BCR 4): Lesser Yellowlegs research and conservation

Study Species: Lesser Yellowlegs

Study Location: Anchorage, Alaska (61.17652, -150.04508), Fairbanks, Alaska (64.64354, -147.0342), Churchill, Manitoba (58.7018, -94.13197)

Principal Investigators: Katie Christie (ADF&G), Kelly Srigley Werner (University of Idaho), Jim Johnson (USFWS), Brad Andres (USFWS), Erica Nol (Trent University), David Mizrahi (New Jersey Audubon)

Primary Contact: Katie Christie, ADF&G, 333 Raspberry Road, katie.christie@alaska.gov

Study Objectives

- Conduct a mark-resight and nest monitoring study of Lesser Yellowlegs at sites in Anchorage, Fairbanks, and Churchill to obtain estimates of annual apparent survival of adults and reproductive success. These vital rates will be incorporated into an integrated population model.
- We will continue to conduct 4 surveys per breeding season at 40 wetlands in Southcentral Alaska for Lesser Yellowlegs and other wetland birds. These wetlands have been surveyed by citizen scientists over the past 9 years through the Birds 'n Bogs program.
- We are supporting Delta Wind Birds to contract with farmers in the Mississippi Alluvial Valley to create ~180 acres of shorebird habitat in fall 2023 and 360 acres in fall 2024 during the months of September through November. A graduate student will quantify bird abundance and habitat quality on agricultural and natural wetlands.
- We are conducting outreach and education campaigns to achieve a more sustainable shorebird harvest in northern South America and the Caribbean. Hunter training and licensing is a critical first step in reducing the illegal hunting of coastal shorebirds in Suriname. Our specific objective is to develop an online, mobile device-friendly training program with a verifiable completion certification, which would be modeled after other online hunter training/licensing programs.

Alaska Shorebird Conservation Plan II Objectives Reached:

RESEARCH:

- Identify and determine the magnitude of factors limiting shorebird populations during breeding and nonbreeding periods of the annual cycle.

POPULATION INVENTORY AND MONITORING:

- Inventory alpine, boreal, and other poorly studied shorebird species.

HABITAT MANAGEMENT AND PROTECTION:

- Support land acquisitions, easements, restoration efforts, and conservation designations (e.g., the Western Hemisphere Shorebird Reserve Network, East Asian–Australasian Shorebird Reserve Network, Ramsar Convention on Wetlands, and Important Bird Areas Programs) for key shorebird sites.
- Minimize loss and degradation of critical shorebird habitats by participating in natural resource planning and management.

ENVIRONMENTAL EDUCATION AND PUBLIC OUTREACH:

- Raise the profile of shorebirds through public presentations, media outreach, support of shorebird festivals, and collaboration with education programs.
- Identify and support ways to involve citizen scientists in shorebird monitoring programs.

INTERNATIONAL COLLABORATIONS:

- Participate in partnerships to conserve migratory shorebirds and their habitats in the circumpolar Arctic (e.g., the Arctic Council's Conservation of Arctic Flora and Fauna working group and initiatives therein), North America (e.g., landscape conservation cooperatives, joint ventures, flyway councils), Western Hemisphere (e.g., Western Hemisphere Shorebird Reserve Network, Western Hemisphere Shorebird Group), Asia (e.g., East Asian-Australasian Flyway Partnership), and other partnerships as they arise.
- Coordinate and participate in international, national, and other regional shorebird conservation planning efforts (e.g., Pacific Americas Shorebird Conservation Strategy, Atlantic Flyway Shorebird Initiative).

Top: A Lesser Yellowlegs in Anchorage, Bottom: Arin Underwood holding a Willet and Dowitcher caught in noose traps at the same time

Photo: Arin Underwood, Shelby McCahon

ANNUAL SUMMARIES

BIRD CONSERVATION REGION 5

Northwest Pacific Rainforest- Formerly Southcentral and Southeastern Alaska: The coastal rainforest stretches from extreme southern Alaska to the western Gulf of Alaska and is characterized by heavy precipitation and mild temperatures typical of a maritime climate. Sub-regions include A) Coastal Hemlock-Spruce Forests, and B) Pacific Coastal Mountains. The regions stark, rugged features are a result of intense glaciation during the Pleistocene and nearly all adjacent land area remains glaciated. Much of the terrain is steep sloped from sea level up to 3,300 feet (1,000 m), but large floodplains, alluvial fans, outwash plains, and river deltas also occur here. The region is dominated by needleleaf forests of Western Hemlock and Sitka Spruce; other needleleaf species also occur in coastal forests. Broadleaf forests are found along large mainland river drainages. Several other communities are present in this region and include tall, low, and dwarf scrub; tall and low scrub bogs and swamps; and wet graminoid and forb herbaceous communities. The Copper and Stikine River deltas and the Yakutat forelands are major stopover sites for migrating shorebirds, especially Western Sandpipers and Dunlins. Black Oystercatchers, Rock Sandpipers, Black Turnstones, and Surfbirds are common wintering species. Nearshore marine areas support many breeding and wintering sea ducks (e.g., Surf Scoter, Harlequin Duck) and seabirds (e.g., Black-legged Kittiwakes, murres, murrelets). Coastal forests support a host of resident and breeding passerines (e.g., Chestnut-backed Chickadee, Winter Wren, Brown Creeper, Ruby and Golden-crowned Kinglets, Red-breasted Sapsucker), raptors (Bald Eagle, Northern Goshawk, Northern Saw-whet Owl), and seabirds (Marbled Murrelet). Information derived from Boreal Partners in Flight Bird Conservation Areas | U.S. Geological Survey (usgs.gov)

Tim Bowman, courtesy ADF&G

#21 (BCR 5): Red Knot abundance, diet, and habitat use in Controller Bay

Study Species: Red Knot

Study Location: 60.14 N, 144.27 W, Controller Bay, Alaska

Principal Investigators: Jenell Larsen Tempel (ADF&G), Erin Cooper (USFS)

Primary Contact: Jenell Larsen Tempel, Endangered Species Biologist, ADF&G, 1255 W. 8th St. Juneau, AK 99801, jenell.larsentempel@alaska.gov

Study Objectives

- Determine the abundance of Red Knots using Controller Bay as a spring stopover site.
- Assess prey availability in Controller Bay.
- Determine Red Knot diet in Controller Bay.

Preliminary Results

- We timed the migration in 2023 much better than in 2022; fieldwork occurred one week later than the previous year (May 4-26, 2023). Experienced wildlife photographers documented leg flagged knots this season. This resulted in collecting data on 3 times as many individually tagged birds compared to 2022 and removed observer error. In 2022 only 13 identifiable birds were recorded, in 2023 45 identifiable birds were documented with photographs. The analysis for estimating the spring stopover abundance is underway.
- Prey availability was determined by sorting through benthic invertebrates collected at 4 locations during transects in May 2022. Across the bay, of the benthic invertebrate samples that could be identified, 89% were Limecola balthica, 6% were polychaete sp., 4% were Mya arenaria, and the remaining 1% were Clinocardium ciliatum, Corophium salmonis, and Emerita analoga. Prey densities of L. balthica ranged from 161-1472 m-2. This was lower than expected based on other literature, but within the range of densities for this bivalve at locations further north near the Copper River Delta.
- Fecal pellets (n=50) and potential prey items were collected in 2023 for eDNA analyses to determine diet. Primers are being developed to determine diet from fecal samples, but results are not yet available.
- A MOTUS tower was installed on Okalee Spit within Controller Bay for the first time. The tower detected 5 MOTUS tagged red knots from Mexico, 4 of which occurred during the study period in May, and one occurring in early June. Length of stay in Controller Bay ranged from 1-6 days. The mean length of stay across the entire Copper River Delta Complex was 3 days (this included information from 2 other MOTUS towers in the area).

- Of the 45 tagged birds, 36 were originally tagged in Washington state, 5 were originally tagged in Mexico, two were tagged in Texas, one in Nome, and one is unknown at this time. It is worth noting that although Mexico generally uses wine-red flags, they are using yellow for Red Knots currently and one bird that was tagged in central Mexico by industry had a true red leg flag. The two birds originally tagged in Texas had light green flags whereas those tagged in Washington and Nome had dark green. It is unknown if the Texas birds belong to the roselaari or rufa subspecies. Most flags were not entered in the BBL database.

Alaska Shorebird Conservation Plan II Objectives Reached:

RESEARCH:

- Determine migratory timing, routes, and site use of shorebirds.

HABITAT MANAGEMENT AND PROTECTION:

- Apply abundance and distribution information to identify key shorebird habitats and sites.

ENVIRONMENTAL EDUCATION AND PUBLIC OUTREACH:

- Raise the profile of shorebirds through public presentations, media outreach, support of shorebird festivals, and collaboration with education programs.
- Encourage the synthesis and reporting of results of Alaskan shorebird studies to scientific and general audiences.

INTERNATIONAL COLLABORATIONS:

- Foster and participate in cooperative research and monitoring efforts throughout species' ranges (e.g., Arctic Shorebird Demographics Network, PRISM, Migratory Shorebird Project, and Arctic Birds Breeding Conditions Survey).
- Participate in partnerships to conserve migratory shorebirds and their habitats in the circumpolar Arctic (e.g., the Arctic Council's Conservation of Arctic Flora and Fauna working group and initiatives therein), North America (e.g., landscape conservation cooperatives, joint ventures, flyway councils), Western Hemisphere (e.g., Western Hemisphere Shorebird Reserve Network, Western Hemisphere Shorebird Group), Asia (e.g., East Asian-Australasian Flyway Partnership), and other partnerships as they arise.

In the field, Red Knots in flight

Photos Blake Richard

ANNUAL SUMMARIES

BIRD CONSERVATION REGIONS OUTSIDE OF ALASKA

Northwest Pacific Rainforest- Formerly Southcentral and Southeastern Alaska: The coastal rainforest stretches from extreme southern Alaska to the western Gulf of Alaska and is characterized by heavy precipitation and mild temperatures typical of a maritime climate. Sub-regions include A) Coastal Hemlock-Spruce Forests, and B) Pacific Coastal Mountains. The regions stark, rugged features are a result of intense glaciation during the Pleistocene and nearly all adjacent land area remains glaciated. Much of the terrain is steep sloped from sea level up to 3,300 feet (1,000 m), but large floodplains, alluvial fans, outwash plains, and river deltas also occur here. The region is dominated by needleleaf forests of Western Hemlock and Sitka Spruce; other needleleaf species also occur in coastal forests. Broadleaf forests are found along large mainland river drainages. Several other communities are present in this region and include tall, low, and dwarf scrub; tall and low scrub bogs and swamps; and wet graminoid and forb herbaceous communities. The Copper and Stikine River deltas and the Yakutat forelands are major stopover sites for migrating shorebirds, especially Western Sandpipers and Dunlins. Black Oystercatchers, Rock Sandpipers, Black Turnstones, and Surfbirds are common wintering species. Nearshore marine areas support many breeding and wintering sea ducks (e.g., Surf Scoter, Harlequin Duck) and seabirds (e.g., Black-legged Kittiwakes, murres, murrelets). Coastal forests support a host of resident and breeding passerines (e.g., Chestnut-backed Chickadee, Winter Wren, Brown Creeper, Ruby and Golden-crowned Kinglets, Red-breasted Sapsucker), raptors (Bald Eagle, Northern Goshawk, Northern Saw-whet Owl), and seabirds (Marbled Murrelet). Information derived from Boreal Partners in Flight Bird Conservation Areas | U.S. Geological Survey (usgs.gov)

Shelby McCahon

#22 (North Dakota): Evaluating the effects of agricultural practices on shorebird abundance, body condition, and invertebrate biomass in the Prairie Pothole Region

Study Species: Lesser Yellowlegs (primary), Greater Yellowlegs, Willet, American Avocet, Wilson's Phalarope, Semipalmated Sandpiper, Least Sandpiper, Long-billed Dowitcher, Short-billed Dowitcher, Pectoral Sandpiper

Study Location: Upper Souris National Wildlife Refuge, ND (48.4377778, -102.5830556), Audubon National Wildlife Refuge, ND (47.50615, -100.444949), Jamestown, ND (47.1242139, -98.86997), Tewaukon National Wildlife Refuge, ND (45.99874, -97.31284),

Principal Investigators: Dr. Courtney Conway (U.S. Geological Survey, Idaho Cooperative Fish and Wildlife Research Unit, University of Idaho, Moscow ID), Dr. Katherine Christie (Alaska Department of Fish and Game, Anchorage AK), Dr. Christy Morrissey (University of Saskatchewan, Saskatoon, Saskatchewan)

Primary Contact: Shelby McCahon, Department of Fish and Wildlife Sciences, University of Idaho, Moscow ID; 550 Deer Meadow Court #4, Moscow ID, 83843; smccahon2@alaska.edu

Study Objectives

- Quantify exposure and accumulation of neonicotinoid insecticides in migratory shorebirds.
- Measure effects of neonicotinoid insecticides on shorebird body condition and migratory refueling
- Compare habitat use and quality in agricultural and grassland-dominated wetlands that are used and available to shorebirds.
- Determine predictors of shorebird abundance
- Assess impacts of agricultural practices and neonicotinoid insecticides on invertebrate biomass

Preliminary Results

Regarding water samples

- Frequent detections of neonicotinoid insecticides in water samples during spring (52%, n=25) and fall (33%, n=3) migration suggest chronic and repeated exposure to aquatic invertebrates and birds.
- We detected nine neonicotinoid compounds in water samples with 40% (n=19) and 22% (n=2) of samples containing multiple neonicotinoids during spring and fall migration, respectively.
- Neonicotinoid insecticide concentrations in water samples were below effect levels to aquatic organisms (Toxic Units < 1; max. = 0.18).

- We detected higher concentrations for both water and plasma samples during spring migration after snowmelt but before crop seeding, suggesting a long-term exposure risk.

Regarding Shorebird Plasma Samples

- This study is the first to document neonicotinoid accumulation in shorebirds.
- We detected neonicotinoid insecticides in shorebird plasma samples during spring (69%, n=20) and fall (15%, n=4) migration.
- We detected three neonicotinoid compounds in shorebird plasma samples with 28% (n=8) and 0% of samples containing multiple neonicotinoids during spring and fall migration, respectively.
- Relative to the literature, some birds had high maximum neonicotinoid concentrations (120.8 µg/L; imidacloprid).

Alaska Shorebird Conservation Plan II Objectives Reached:

RESEARCH:

- Identify and determine the magnitude of factors limiting shorebird populations during breeding and nonbreeding periods of the annual cycle
- Determine migratory timing, routes, and site use of shorebirds.
- Identify effects associated with energy production, mining, disturbance, and other anthropogenic activities on shorebirds.

HABITAT MANAGEMENT AND PROTECTION:

- Apply abundance and distribution information to identify key shorebird habitats and sites.

ENVIRONMENTAL EDUCATION AND PUBLIC OUTREACH:

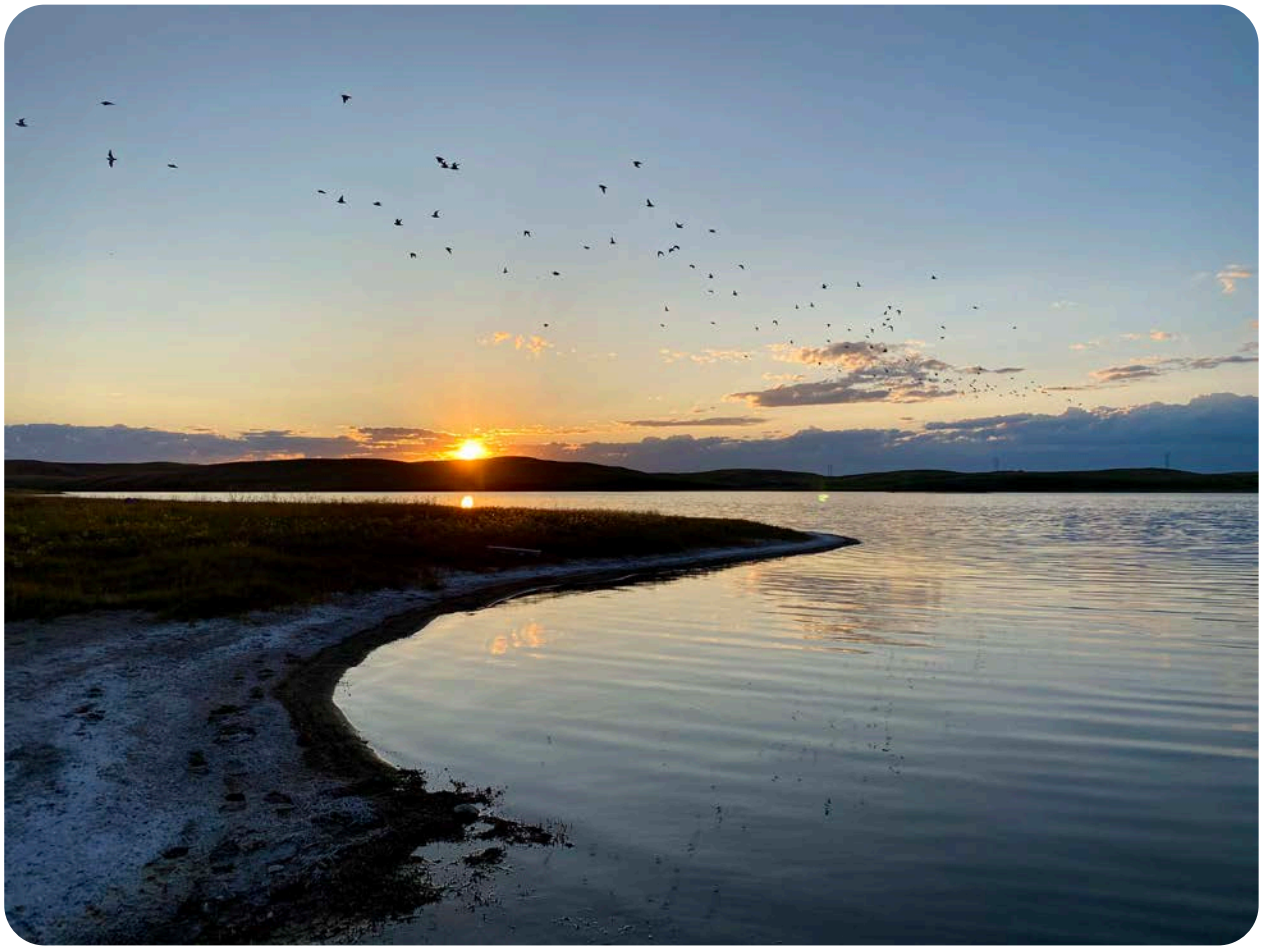
- Raise the profile of shorebirds through public presentations, media outreach, support of shorebird festivals, and collaboration with education programs.
- Develop shorebird-related outreach and media materials.
- Encourage the synthesis and reporting of results of Alaskan shorebird studies to scientific and general audiences.

INTERNATIONAL COLLABORATIONS:

- Foster and participate in cooperative research and monitoring efforts throughout species' ranges (e.g., Arctic Shorebird Demographics Network, PRISM, Migratory Shorebird Project, and Arctic Birds Breeding Conditions Survey).

- Participate in partnerships to conserve migratory shorebirds and their habitats in the circumpolar Arctic (e.g., the Arctic Council's Conservation of Arctic Flora and Fauna working group and initiatives therein), North America (e.g., landscape conservation cooperatives, joint ventures, flyway councils), Western Hemisphere (e.g., Western Hemisphere Shorebird Reserve Network, Western Hemisphere Shorebird Group), Asia (e.g., East Asian-Australasian Flyway Partnership), and other partnerships as they arise.

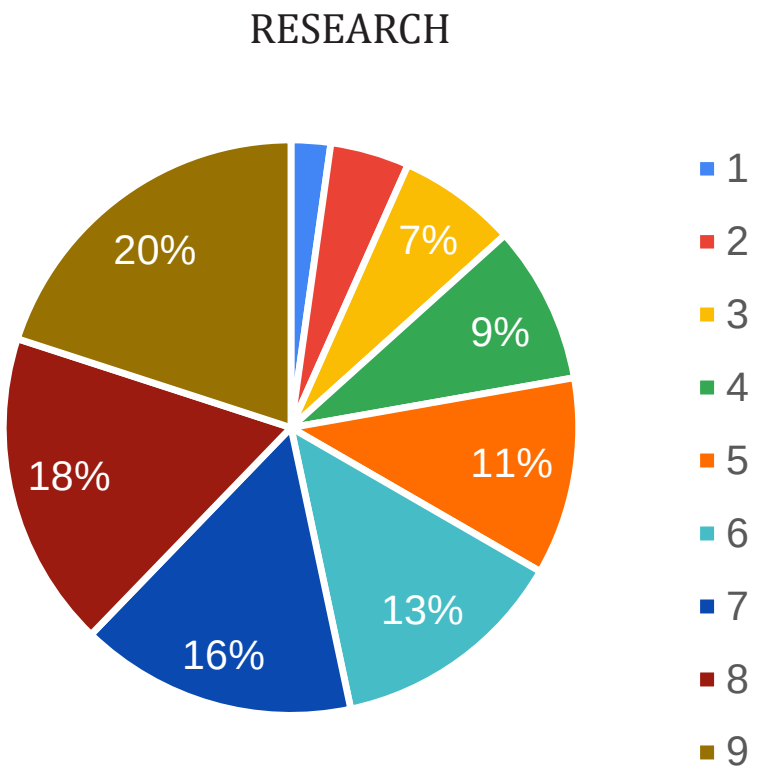
Banding Lesser Yellowlegs. Photo Shelby McCahon



Phalarope sunset. Photo Shelby McCahon

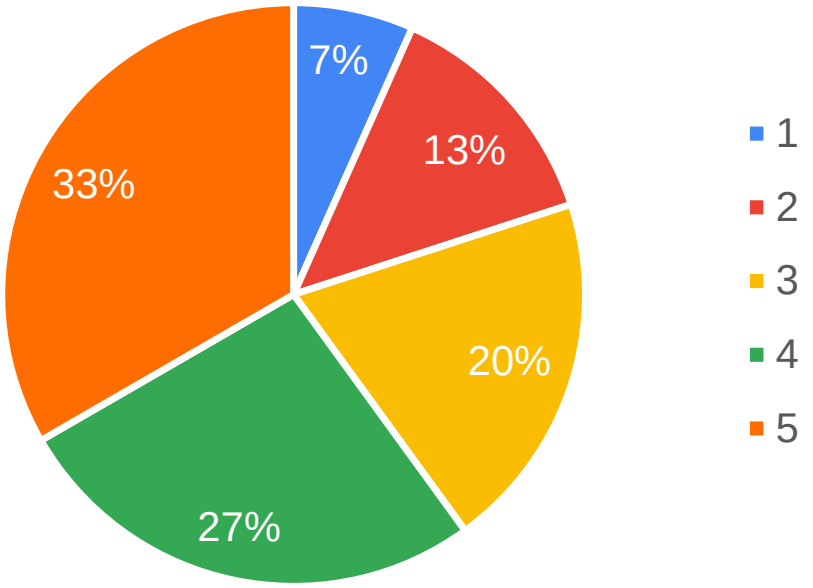
ANNUAL SUMMARIES

Alaska Shorebird Conservation Plan II Objectives Summary



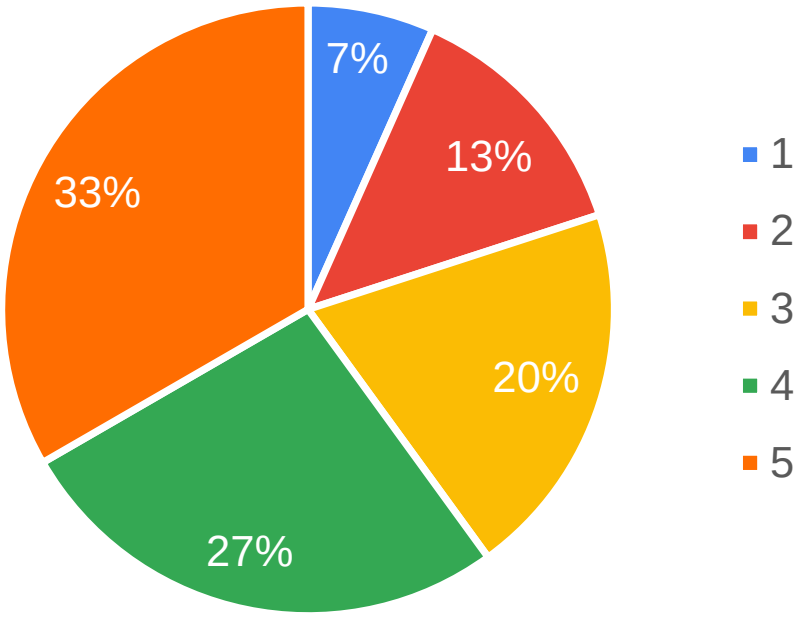
1. Identify and determine the magnitude of factors limiting shorebird populations during breeding and nonbreeding periods of the annual cycle.
2. Determine migratory timing, routes, and site use of shorebirds.
3. Assess the effects of climate change on shorebird demography.
4. onduct breeding ecology studies on species occupying alpine, boreal, or other rare or difficult-to-access habitats.
5. Obtain better estimates of illegal and legal harvest levels for Alaska-breeding shorebirds within Alaska and when outside Alaska.
6. Identify effects associated with energy production, mining, disturbance, and other anthropogenic activities on shorebirds.
7. Identify and delineate potentially distinct populations of shorebirds breeding in Alaska.
8. Develop habitat-based models to predict the abundance and distribution of shorebirds and assess the adaptability of shorebirds to habitat changes.
9. Not applicable

POPULATION INVENTORY AND MONITORING



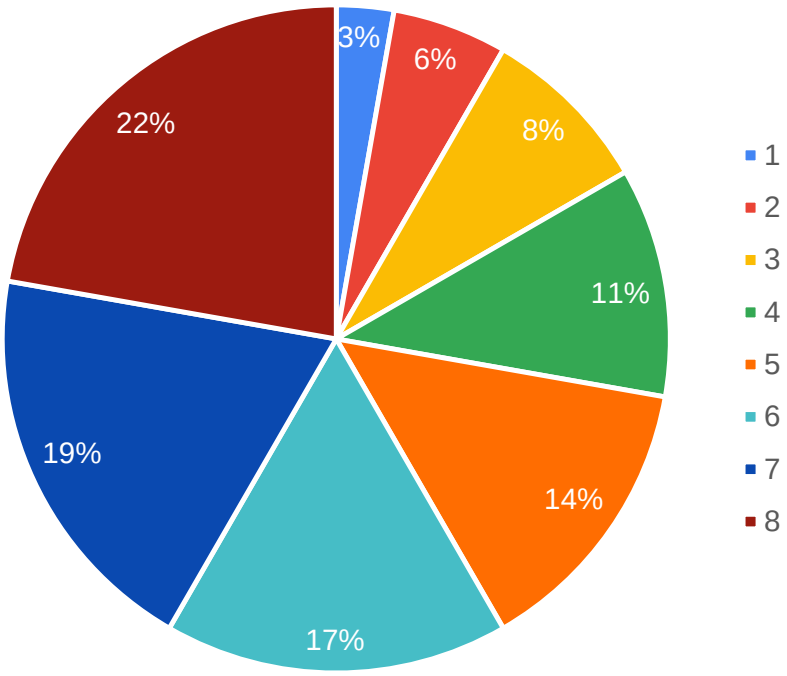
1. Inventory alpine, boreal, and other poorly studied shorebird species.
2. Conduct long-term population monitoring efforts (e.g., PRISM).
3. Evaluate the efficacy of existing programs (e.g., the Alaska Landbird Monitoring Survey [ALMS], Breeding Bird Survey [BBS] program) to monitor shorebird populations.
4. Assess the utility of new technologies (e.g., Automated Recording Units, aerial drones, eBird) to determine shorebird presence and abundance.
5. Not applicable

HABITAT MANAGEMENT AND PROTECTION

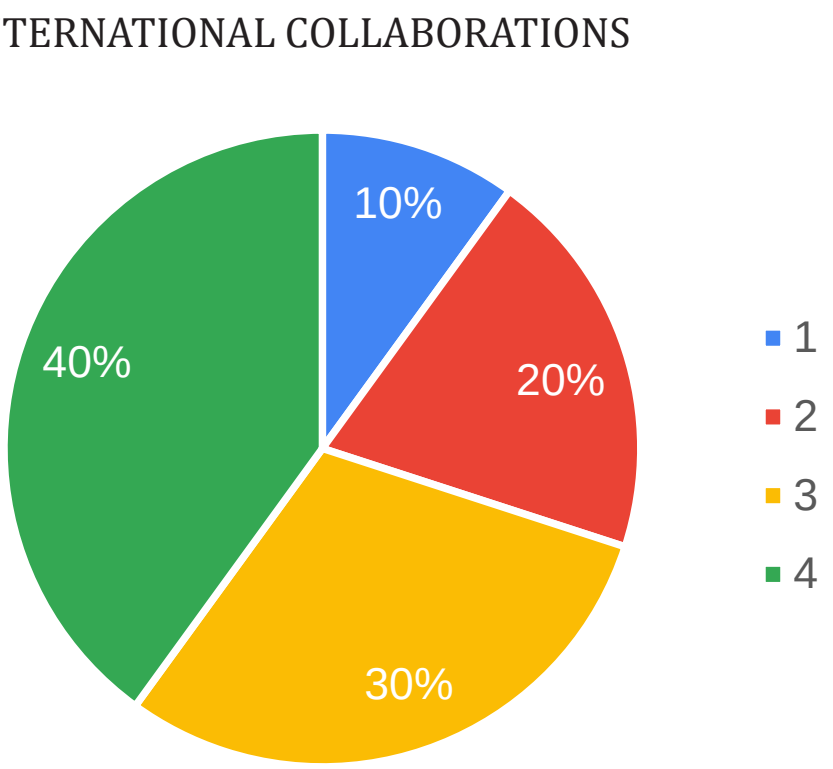


1. Apply abundance and distribution information to identify key shorebird habitats and sites.
2. Support land acquisitions, easements, restoration efforts, and conservation designations (e.g., the Western Hemisphere Shorebird Reserve Network, East Asian– Australasian Shorebird Reserve Network, Ramsar Convention on Wetlands, and Important Bird Areas Programs) for key shorebird sites.
3. Minimize loss and degradation of critical shorebird habitats by participating in natural resource planning and management.
4. Model the potential effects of climate change on shorebird habitats and identify future potential regions of habitat refugia.
5. Not applicable

ENVIRONMENTAL PROTECTION AND PUBLIC OUTREACH



1. Raise the profile of shorebirds through public presentations, media outreach, support of shorebird festivals, and collaboration with education programs.
2. Develop shorebird-related outreach and media materials.
3. Host workshops and outreach events to engage the diverse communities of Alaska in shorebird conservation.
4. Encourage the synthesis and reporting of results of Alaskan shorebird studies to scientific and general audiences.
5. Promote shorebird education to youth via the Shorebird Sister Schools Program.
6. Identify and support ways to involve citizen scientists in shorebird monitoring programs.
7. Incorporate principles of good governance in research and outreach efforts.
8. Not applicable



1. Foster and participate in cooperative research and monitoring efforts throughout species' ranges (e.g., Arctic Shorebird Demographics Network, PRISM, Migratory Shorebird Project, and Arctic Birds Breeding Conditions Survey).
2. Participate in partnerships to conserve migratory shorebirds and their habitats in the circumpolar Arctic (e.g., the Arctic Council's Conservation of Arctic Flora and Fauna working group and initiatives therein), North America (e.g., landscape conservation cooperatives, joint ventures, flyway councils), Western Hemisphere (e.g., Western Hemisphere Shorebird Reserve Network, Western Hemisphere Shorebird Group), Asia (e.g., East Asian-Australasian Flyway Partnership), and other partnerships as they arise.
3. Coordinate and participate in international, national, and other regional shorebird conservation planning efforts (e.g., Pacific Americas Shorebird Conservation Strategy, Atlantic Flyway Shorebird Initiative).
4. Not applicable

PUBLICATIONS & ABSTRACTS

Aldabe, J., F. Pírez, S. Hackembruck, A. Medina, D. Castelli, F.A. Faria, J.B. de Almeida, R.B. Lanctot, and B. Andres. 2023. Merín Lagoon – a new important non-breeding site for the Buff-breasted Sandpiper *Calidris subruficollis. Wader Study* 130:18-24. https://www.researchgate.net/publication/370360214_Merin_Lagoon_Uruguay_-a_new_important_non-breeding_site_for_the_Buff-breasted_Sandpiper_Calidris_subruficollis

The Buff-breasted Sandpiper Calidris subruficollis is a long-distance migratory shorebird of global conservation concern. During the non-breeding season, the species concentrates on grasslands in southern South America. High densities have been reported at six sites, but more sites with high concentrations are suspected to exist. Here, we estimated Buff-breasted Sandpiper abundance within a grassland sector near the Merín Lagoon, Uruguay. To estimate abundance within this grassland sector, we randomly selected transect lines in areas where concentrations of Buff-breasted Sandpipers had been seen previously. We estimated abundance in two austral summers (Jan and Dec 2021). In the first season, using the mean density of 10.1 birds/ha recorded in an area of 1,650 ha, we estimated an abundance of 16,665 individuals (95% CI = 8,019–25,410). In the second season we estimated a density of 8.7 birds/ha in an area of 3,829 ha, resulting in an abundance estimate of 33,427 (95% CI = 10,644–56,286). These numbers represent between 29.8 and 59.7% (using mean value) of the global population in ca. 4,000 ha. However, such large numbers may be inflated as large groups of birds were present in the study area during both years of our study and we focused our sampling in areas known to contain Buff-breasted Sandpiper. Therefore, these estimates cannot be used to extrapolate to areas outside of our original sampling frame. Regardless, the regular occurrence and large numbers (even based on just the direct counts) of Buff-breasted Sandpiper suggest that Merín Lagoon is an important wintering site for them. Coastal grasslands appear to be widespread around the lagoon (ca. 250,000 ha), although more studies are needed to determine the extent of suitable habitat (short grass) and its use by Buff-breasted Sandpipers. The large number of birds that repeatedly use this area indicates it is essential to continue managing this area for livestock production, so as to maintain the short grass preferred by Buff-breasted Sandpipers.

Attanas, L. B., K. S. Orion, A. R. Bankert, A. K. Prichard, and R. W. McNown. 2022. Shorebird monitoring in the Willow Project area, National Petroleum Reserve-Alaska, 2021. Unpublished report for ConocoPhillips Alaska, Inc., Anchorage, AK by ABR, Inc.—Environmental Research & Services, Fairbanks, AK. 39 pp. Available at: https://catalog.northslopescience.org/dataset/3017

Attanas, L.B., A. R. Bankert, R.L. McGuire, and R.W. McNown. 2023. Shorebird monitoring in the Willow Project area, National Petroleum Reserve-Alaska, 2022. Unpublished report for ConocoPhillips Alaska, Inc., Anchorage, AK by ABR, Inc.—Environmental Research & Services, Fairbanks, AK. 54 pp.

https://catalog.northslopescience.org/dataset/741de395-883b-45e9-8d32-6a4c693aad0c/resource/518998c8-180d-40c7-bbdb-3ecca3480a40/download/2022-willow-shorebirds.pdf.

Christie, K.S., R.E. Wilson, J. A. Johnson, C. Friis, C. M. Harwood, L. A. McDuffie, E. Nol, S. A. Sonsthagen. Movement and Genomic Methods Reveal Mechanisms Promoting Connectivity in a Declining Shorebird: The Lesser Yellowlegs. Diversity 2023, 15, 595. https://www.researchgate.net/publication/370267246_Movement_and_Genomic_Methods_Reveal_Mechanisms_Promoting_Connectivity_in_a_Declining_Shorebird_The_Lesser_Yellowlegs

Integrating tracking technology and molecular approaches provides a comprehensive picture of contemporary and evolutionary mechanisms promoting connectivity. We used mitochondrial DNA and double digest restriction-site associated DNA (ddRAD) sequencing combined with satellite telemetry to investigate the connectivity of geographically disparate breeding populations of a declining boreal shorebird, the lesser yellowlegs (Tringa flavipes). We were able to track 33 individuals on their round-trip migrations to Central and South America and back to the boreal wetlands of North America. Nearly all (93%) adults captured on the breeding grounds returned to within 5 km of the original capture site, with a median dispersal distance of 629 m. While our telemetry data revealed limited breeding dispersal in adults, genetic data uncovered significant interconnectedness across the species' range. Very little genetic structure was estimated at ddRAD autosomal (ΦST= 0.001),Z-linked (ΦST= 0.001), and mt DNA loci (ΦST= 0.020), and maximum likelihood-based clustering methods placed all individuals in a single cluster regardless of capture location, indicating the species is panmictic. Our data indicate that large-scale juvenile dispersal is the main mechanism maintaining connectivity in this species, resulting in the absence of genomic structure.

Christin, S., C. Chicoine, T. O'Neill Sanger, M. F. Guigueno, J. Hansen, R. B. Lanctot, D. MacNearney, J. Rausch, S. T. Saalfeld, N. M. Schmidt, P. A. Smith, P. F. Woodard, É. Hervet, and N. Lecomte. 2023. ArcticBirdSounds: an open-access, multiyear, and detailed annotated dataset of bird songs and calls. Ecology 104:e4047. https://www.researchgate.net/publication/369907550_ArcticBirdSounds_An_open-access_multiyear_and_detailed_annotated_data_set_of_bird_songs_and_calls

Tracking biodiversity shifts is central to understanding past, present, and future global changes. Recent advances in bioacoustics and the low cost of high-quality automatic recorders are revolutionizing studies in biogeography and community and behavioral ecology with a robust assessment of phenology, species occurrence, and individual activity. This large volume of acoustic recordings has recently generated a plethora of datasets that can now be handled automatically, mostly via big data methods such as deep learning. These approaches need high-quality annotations to classify and detect recorded sounds efficiently. However, very few strongly annotated datasets-that is, with detailed information on start and end time of each vocalization-are openly accessible to the public. Moreover,

these datasets mostly cover temperate species and are usually limited to a single year of recordings. Here, we present ArcticBirdSounds, the first open-access, multisite, and multiyear strongly annotated dataset of arctic bird vocalizations. ArcticBirdSounds offers 20 h of annotated recordings over 2 years (2018, 2019), taken from 15 distinct plots within six locations across the Arctic, from Alaska to Greenland. Recordings cover the arctic vertebrates' breeding period and are evenly spaced during the day; they capture most species breeding there with 12,933 temporal annotations in 49 classes of sounds. While these data can be used for many pressing ecological questions, it is also a unique resource for methodological development to help meet the challenges of fast ecosystem transformations such as those happening in the Arctic. All data, including audio files, annotation files, and companion spreadsheets, are available in an Open Science Framework repository published under a CC BY 4.0 License.

Flemming, S.A., R.B. Lanctot, C. Price, M.L. Mallory, S. Kühn, M.C. Drever, T. Barry, and J.F. Provencher. 2022. Shorebirds ingest plastics too: What we know, what we don't know, and what we should do next. Environmental Reviews 30:537–551. https://www.researchgate.net/publication/360506650_Shorebirds_ingest_plastics_too_What_we_know_what_we_don't_know_and_what_we_should_do_next

Concerns about the impact of plastics pollution on the environment have been growing since the 1970s. Marine debris has reportedly entangled and/or been ingested by 914 marine species ranging from microinvertebrates to large marine mammals. Shorebirds could have a high potential to be exposed to and ingest plastics pollution, as many species migrate long distances and periodically concentrate around shorelines, coastal areas, and estuaries that can have elevated levels of plastics pollution. Currently, little is understood about plastics exposure, frequency of occurrence, and potential impacts relating to shorebirds. In this study, we catalogued and reviewed available studies across the globe that examined plastics pollution in shorebirds. We then quantified relevant traits of species and their environments to explore how shorebirds may be exposed to plastics pollution. Of 1106 samples from 26 shorebird species described within 16 studies that examined plastics ingestion, 53% of individuals contained some form of plastics pollution. Overall, Haematopodidae (oystercatchers) had the highest frequency of occurrence (FO) of plastics, followed by Recurvirostridae (avocets), Scolopacidae (sandpipers, phalaropes, godwits, curlews), and Charadriidae (plovers). Plastics FO was much greater among species that migrated across marine areas (either oceanic or coastal) than those species that used continental flyways. Species that foraged at sea, on mudflats, or on beaches, had higher average FO of plastics ingestion than species than foraged in upland, or freshwater environments. Finally, species that used a sweeping foraging mode showed higher levels of ingested plastics and contained a far greater number of plastic pieces than all other techniques. These conclusions are based on a limited number of species and samples, with the distribution of samples skewed taxonomically and geographically. Using the combined knowledge of known shorebirds-plastics interactions and shorebird ecology, we present a hierarchical approach to identifying shorebirds that may be more vulnerable and susceptible to plastics ingestion. We provide recommendations on sampling protocols and

future areas of research.

McDuffie, L.A., K.S. Christie, A.R. Taylor, E. Nol, et al. 2022. Flyway-scale GPS tracking reveals migratory routes and key stopover and non-breeding locations of Lesser Yellowlegs. Ecology and Evolution 10.1002/ece3.9495.
https://www.researchgate.net/publication/365294327_Flyway-scale_GPS_tracking_reveals_migratory_routes_and_key_stopover_and_non-breeding_locations_of_lesser_yellowlegs

Many populations of long-distance migrant shorebirds are declining rapidly. Since the 1970s, the lesser yellowlegs (Tringa flavipes) has experienced a pronounced reduction in abundance of ~63%. The potential causes of the species' decline are complex and interrelated. Understanding the timing of migration, seasonal routes, and important stopover and non-breeding locations used by this species will aid in directing conservation planning to address potential threats. During 2018–2022, we tracked 118 adult lesser yellowlegs using GPS satellite tags deployed on birds from five breeding and two migratory stopover locations spanning the boreal forest of North America from Alaska to Eastern Canada. Our objectives were to identify migratory routes, quantify migratory connectivity, and describe key stopover and non-breeding locations. We also evaluated predictors of southbound migratory departure date and migration distance. Individuals tagged in Alaska and Central Canada followed similar southbound migratory routes, stopping to refuel in the Prairie Pothole Region of North America, whereas birds tagged in Eastern Canada completed multi-day transoceanic flights covering distances of >4000 km across the Atlantic between North and South America. Upon reaching their non-breeding locations, lesser yellowlegs populations overlapped, resulting in weak migratory connectivity. Sex and population origin were significantly associated with the timing of migratory departure from breeding locations, and body mass at the time of GPS-tag deployment was the best predictor of southbound migratory distance. Our findings suggest that lesser yellowlegs travel long distances and traverse numerous political boundaries each year, and breeding location likely has the greatest influence on migratory routes and therefore the threats birds experience during migration. Further, the species' dependence on wetlands in agricultural landscapes during migration and the non-breeding period may make them vulnerable to threats related to agricultural practices, such as pesticide exposure. Since the 1970s, the lesser yellowlegs (Tringa flavipes) has experienced a pronounced reduction in abundance of ~63%. The potential causes of the species' decline are complex and interrelated and understanding the timing of migration and seasonal routes used by this species will aid in directing conservation planning to address potential threats. Our objectives were to identify migratory routes, quantify migratory connectivity and describe key stopover and non-breeding locations.

McGuire, R. L., Robards, M., & Liebezeit, J. R. (2023). Patterns in avian reproduction in the Prudhoe Bay Oilfield, Alaska, 2003–2019. Journal of Avian Biology, e03075. https://onlinelibrary.wiley.com/doi/full/10.1111/jav.03075

The Arctic Coastal Plain is one of the most important avian breeding grounds in the world; however, many species are in decline. Arctic-breeding birds contend with short breeding seasons, harsh climatic conditions, and now, rapidly changing, variable, and unpredictable environmental conditions caused by climate change. Additionally, those breeding in industrial areas may be impacted by human activities. It is difficult to separate the impacts of industrial development and climate change; however, long-term datasets can help show patterns over time. We evaluated factors influencing reproductive parameters of breeding birds at Prudhoe Bay, Alaska, 2003–2019, by monitoring 1265 shorebird nests, 378 passerine nests, and 231 waterfowl nests. We found that nest survival decreased significantly nearer high-use infrastructure for all guilds. Temporally, passerine nest survival declined across the 17 years of the study, while there was no significant evidence of change in their nest density. Shorebird nest survival did not vary significantly across years, nor did nest density. Waterfowl nest density increased over the course of the study, but we could not estimate nest survival in all years. Egg predator populations varied across time; numbers of gulls and ravens increased in the oilfields 2003–2019, while Arctic fox decreased, and jaeger numbers did not vary significantly. Long-term datasets are rare in the Arctic, but they are crucial for understanding impacts to breeding birds from both climate change and increasing anthropogenic activities. We show that nest survival was lower for birds nesting closer to high-use infrastructure in Arctic Alaska, which was not detected in earlier, shorter-term studies. Additionally, we show that Lapland longspur nest survival decreased across time, in concert with continent-wide declines in many passerine species. The urgency to understand these relationships cannot be expressed strongly enough, given change is continuing to happen and the potential impacts are large.

Perkins, M. I.J. Stenhouse, R.B. Lanctot, S. Brown, J. Bêty, M. Boldenow, J Cunningham, W. English, H.R. Gates, G. Gilchrist, M.-A. Giroux, K. Grond, B. Hill, E. Kwon, J.-F. Lamarre, D.B. Lank, N. Lecomte, D. Pavlik, J. Rausch, K. Regan, M. Robards, S.T. Saalfeld, F. Smith, P.A. Smith, B. Wilkinson, P. Woodard, and N. Basu. 2023. Factors influencing mercury exposure in Arctic-breeding shorebirds. Ecotoxicology 32:1062-1083. https://www.researchgate.net/publication/371404466_Factors_Influencing_Mercury_Exposure_in_Arctic-Breeding_Shorebirds

Mercury (Hg) pollution remains a concern to Arctic ecosystems. The objective of this study was to identify factors influencing Hg concentrations in Arctic-breeding shorebirds and highlight regions and species at greatest risk of Hg exposure. We analyzed 2,478 blood and feather samples from 12 shorebird species breeding at nine sites across the North American Arctic during 2012 and 2013. Blood Hg concentrations, which reflect Hg exposure in the local area in individual shorebirds: 1) ranged from 0.01–3.52 µg/g, with an overall mean of 0.30 ± 0.27 µg/g; 2) were influenced by species and study site, but not sampling year, with birds sampled near Utqiaġvik, AK, having the highest concentrations; and 3) were influenced

by foraging habitat at some sites. Feather Hg concentrations, which reflected Hg exposure from the wintering grounds, were generally higher than blood, ranging from 0.07–12.14 µg/g in individuals, with a mean of 1.14 ± 1.18 µg/g. Feather Hg concentrations were influenced by species and year. Most Arctic-breeding shorebirds had blood and feather Hg concentrations at levels where no adverse effects of exposure were likely, though some individuals sampled near Utqiaġvik had Hg levels that are certainly of concern. Overall, these data increase our understanding of how Hg is distributed in the various habitats of the Arctic, and what factors predispose Arctic-breeding shorebirds to Hg, and lay the foundation for future monitoring efforts.

Saalfeld, S.T., M. Valcu, S. Brown, W. English, M-A. Giroux, A-L. Harrison, J. Krietsch, K. Kuletz, J-F. Lamarre, C. Latty, N. Lecomte, R. McGuire, M. Robards, A. Scarpignato, S. Schulte, P.A. Smith, B. Kempenaers, and R.B. Lanctot. (in press). From land to sea: the fall migration of the Red Phalarope through the Western Hemisphere. *Marine Ecology Progress Series*.

Wright, L.L., E. Nol, R. Lanctot, and L. McKinnon. 2022. Rushing in the spring and relaxing in the fall: Seasonal and sex-specific migration profiles of Dunlin. *Journal of Field Ornithology.* 93(2):10. [online] URL: https://doi.org/10.5751/JFO-00102-930210

Developing effective species conservation strategies relies on our ability to understand the spatiotemporal distribution of birds across their annual cycle. Assessing the connectivity between breeding and non-breeding areas remains challenging in migratory species that may exhibit intraspecific variation in migration strategies. Here we use light-level geolocation to test for sex-specific differences in the migration strategies (i.e. migration routes, stopovers, and wintering sites) of a population of Dunlin (Calidris alpina hudsonia) that breeds in Churchill, Manitoba, Canada. Churchill Dunlin exhibited relatively weak connectivity, as birds spread out evenly across the Atlantic Coast south of New Jersey, U.S.A, and the Gulf Coast from Mexico to Florida, U.S.A., the entire known non-breeding range of the species. We did identify important concentrated stopovers in James Bay, ON, Canada and along the coast of Delaware, U.S.A. Overall migration and stopover durations were significantly shorter during spring (northward) compared to fall (southward) migration. During spring migration, males followed a more direct migration route than females. In fall, male Dunlin departed breeding grounds earlier and spent more time on migration than females, likely driven by a trend of longer stopover durations. These sex-specific differences suggest that in spring, males deploy an energy minimization

strategy to reach breeding grounds quickly and select the highest quality mating territories, whereas in fall, males take a much more relaxed migration. This research sheds light on the least understood period of the avian life cycle and informs our ability to target conservation initiatives to locations most important for this species.

PRESENTATIONS

"Monitoring Kachemak Bay's Shorebird Migration", presentation at 2023 Kachemak Bay Shorebird Festival.

IN PROGRESS

[in submission] Bathrick, R., Johnson, J., Ruthrauff, D, Snyder, R., & N. Senner. Migratory strategy across a geographic barrier: is the answer blowing in the wind? Movement Ecology. October 2023

Harrison et al. In prep. The collective application of tracking data to shorebird conservation. (If you would like to see a draft copy, please email HarrisonAL@si.edu)

WEB DOCUMENTS

Scott, S. (2023, July 6). *Alaska Kōlea Quest 23: A hatchling bonanza.* Kolea Count. https://www.koleacount.org/kolea-quest-23-a-hatchling-bonanza/

chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://hiaudubon.org/wp-content/uploads/2023/10/Elepaio83.6.pdf

DATA RELEASES

USGS Alaska Science Center, National Park Service Southwest Alaska Inventory and Monitoring Network, University of Alaska Fairbanks College of Fisheries and Ocean Sciences. 2017, Black Oystercatcher nest and diet data from Kachemak Bay, Katmai National Park and Preserve, Kenai Fjords National Park, and Prince William Sound (ver. 2.0, November 2023): U.S. Geological Survey data release, https://doi.org/10.5066/F7WH2N5Q