2023 Alaska Bird Conference

Oral & Poster Presentation Abstracts

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Tuesday (Morning): Breeding Biology & Avian Health

Session Moderator: Emily Weiser

Estimating age-specific recruitment probability of long-lived birds using Bayesian capture-reencounter models

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Recruitment probability, defined as the age-specific probability that an individual reproduces for the first time, is an important life history trait for many long-lived bird species that exhibit delayed reproduction. Estimating recruitment probability of wild bird populations is challenging, particularly when a fraction of juveniles disperse and are rarely observed again on study areas before they reproduce. The inability to observe natal dispersal to other breeding areas may bias estimates of recruitment probability if not accounted for analytically. To address these challenges, we parameterized a Bayesian multistate capture-reencounter model that integrates banding and resight data from breeding areas with hunter recoveries and resights from nonbreeding areas to estimate natal dispersal, age-specific recruitment, and survival probabilities. We tested the efficacy of the model using simulations and applied the model to examine temporal variation in age-specific recruitment probability of Black Brant (*Branta bernicla nigricans*) banded at the Tutakoke River colony on the Yukon-Kuskokwim Delta, Alaska. This approach will enable investigators to estimate important demographic parameters and identify life-history tradeoffs for a variety of long-lived bird species and study designs.

Factors influencing incubation behavior and nesting success of Yellow-billed Loons in Arctic Alaska

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Reductions in nest attendance can increase predation risk and, therefore, reduce nesting success of ground-nesting birds. We recorded the incubation behavior, nest predators, and nesting success of Yellow-billed Loons (*Gavia adamsii*) breeding in two adjacent study areas on the Arctic Coastal Plain of Alaska during 2008–2015 and 2019. Successful pairs had higher incubation constancies than failed pairs and took fewer and shorter recesses than failed pairs. Daily incubation constancy declined with the intrusion of conspecifics into territories and as the daily maximum temperature increased, especially during periods with little wind. Predation was the primary cause of nest failure, with gulls and jaegers accounting for 41% of nest failures. Those predators took advantage of unattended nests, underscoring the consequence of disrupting incubation behavior. In both study areas, nest survival decreased as recess frequency increased.

In the Colville Delta study area, loons with territories composed of separate nesting and brood-rearing lakes had lower nest survival than loons that used one lake for both activities. In the National Petroleum Reserve-Alaska study area, loons nesting on shorelines and peninsulas had lower nest survival than those nesting on islands and nest survival decreased as the proportion of days with intruders increased. Our results demonstrate the importance of nest attendance in warding off nest predators of yellow-billed loons.

Cross-seasonal effects in a sea ice-associated sea duck: do winter conditions affect breeding Spectacled Eiders?

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Climate change in the Arctic affects the marine environment which can impact the distribution and abundance of Arctic and sub-Arctic species. The Spectacled Eider (*Somateria fischeri*), a sea duck listed as threatened under the Endangered Species Act, winters in the Bering Sea and nests along coastal areas of Alaska and Arctic Russia. The severity of winter conditions in the Bering Sea have been associated with adult survival and may also have sublethal effects in the following breeding season. In this study, we used long-term nest monitoring data from Kigigak Island and Utqiaġvik to examine the hypothesis that winter conditions in the Bering Sea influence the reproductive performance of eiders in the following breeding season. Nest initiation date and clutch size were not strongly associated with conditions experienced prior to the breeding season. Low ice cover during winter was associated with lower nest survival and moderate to high ice cover was associated with higher nest survival. We speculate that low sea ice winters reduce nest survival through negative effects on body condition. Negative effects of changing ice conditions on multiple demographic rates may lead to future population declines for Spectacled Eiders at rates higher than previously predicted.

Improvements in nest monitoring methodologies on Arctic National Wildlife Refuge

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Over the last several years we have tested a variety of tools to expand spatial coverage, simplify protocols, and increase the accuracy of nest monitoring for tundra nesting birds–including waterfowl, shorebirds, and passerines–on the Arctic Refuge. We have moved from typical game cameras set at ~10–15 m from the nest to a more cryptic setup using a modified camera with an external lens angled ~6” from the bowl. Only a ~1x1x1” board lens, flat ½” ribbon cable, and ¼

x 6” rod for ground attachment are visible. The camera allows us to peer into the nest bowl and easily visualize behavior of the incubating adult, hatch of individual eggs, and loss of eggs to large and small predators (e.g., we documented collared lemming as an egg predator). For shorebirds and passerines, the incubation information would have been missed by a camera set at a further distance. We successfully used nest bowl temperature loggers to provide information on nest fate. This allowed us to move away from plot-based surveys at a single long-term monitoring site, to line-transect distance-sampling at multiple sites throughout the Refuge coastal plain. Rather than scheduled visits throughout incubation to monitor for fate, nests are now only visited once at discovery and again post-fate to collect devices. This reduces investigator disturbance at nests while increasing the accuracy and precision of the data. Our results show that small cameras and temperature loggers do not affect behavior of the birds or attract predators.

Foraging distribution and diving behavior of Common Murres in a variable prey landscape

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Seabird distribution, reproductive success and abundance are regulated largely by the dispersion of their prey. In the Gulf of Alaska, relationships between Common Murres (*Uria aalge*) and their prey have been a focus of our studies for decades. We have consistently observed patterns in the community composition and dispersion of seabird prey within differing marine habitats around seabird colonies. To further examine seabird foraging behavior in relation to fine-scale variation in prey distribution and foraging habitat, we deployed GPS loggers outfitted with diving sensors on Common Murres at two colonies with contrasting prey distribution and density in lower Cook Inlet, Alaska during the summers of 2022 and 2023. Vertical and horizontal prey densities were assessed by acoustic-trawl surveys within 45 km of each colony. We used the location and profiles of dives to explore the relationship between distance from colony and foraging depth. We then compared the locations of these dives to spatial-temporal patterns in prey availability. These two elements, energy expended in reaching prey (commuting distance and dive depth), and predictability of prey resources across time and space, will refine our understanding of murre habitat use and foraging behavior response to variable prey landscapes.

Monitoring shorebird nest survival across a large landscape of the Arctic National Wildlife Refuge using minimal disturbance methods

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Reproductive success is a key demographic parameter that has often been used to assess impacts from climatic and anthropogenic changes. Indeed, among Arctic-breeding shorebirds, nest survival estimates have been generated at numerous field sites over the past 30 years. Unfortunately, virtually all these studies have monitored nests using intensive human disturbance techniques and have conducted assessments in small, non-randomly located study areas. To assess baseline levels of nest survival prior to potential oil and gas development on the Arctic National Wildlife Refuge, we monitored 129 shorebird nests (9 species) using minimal disturbance methods in 2019 and 2022. Nests were distributed across 43 survey areas randomly selected throughout the 1,219 km^2 northwest portion of the Arctic Refuge. Overall, nest survival probabilities ranged from 39 to 49% (SE = 7%), depending on a species' incubation period. In a subsample of nests, cameras identified Arctic foxes (*Vulpes lagopus*) as the nest predator in 85% of depredation events. In both years, greater depredation occurred earlier in incubation and in wet habitats concentrated in the northwest region of our study area. We speculate that greater bird abundance in these wet habitats increased predator presence and led to greater nest predation rates. We discuss how human disturbance may affect nest survival estimates and the factors that make comparing nest survival rates among studies difficult. Finally, we discuss the merits and logistical difficulties of estimating nest survival at random locations over large landscapes.

Nest survival of Black Brant and Semipalmated Sandpipers at a rapidly expanding Lesser Snow Goose colony in Arctic Alaska

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The population of Lesser Snow Geese (*Chen caerulescens caerulescens)* in northern Alaska is rapidly increasing, resulting in dense nesting aggregations that could affect other birds through increased grazing pressure, alteration of nesting habitat through grazing, trampling, and nutrient deposition, or by influencing predation risk. We modeled the effects of goose nesting density on nest survival of Black Brant (*Branta bernicla nigricans*) and Semipalmated Sandpipers (*Calidris pusilla*) at a recently established snow goose colony on the Colville River Delta. We also measured the effects of snow geese on terrestrial and freshwater ecosystem processes. During the study period (2011–2022), snow geese increased at an average rate of 30% per year. Despite this trend, Brant were not excluded from their original nesting areas over time and Brant nest success was positively correlated with Snow Goose nest density. However, high Snow Goose nest density was also associated with reduced Semipalmated Sandpiper nest survival and increased predation risk for simulated shorebird nests. Over a five-year period, the spatial extent of early

season grubbing expanded and grazing offtake in saltmarsh habitat increased. Ponds near Snow Goose nests had higher nutrient loads and chlorophyll-*a*, and significantly different ratios of C and N stable isotopes indicating increased productivity due to Snow Goose fecal deposition. While some effects of Snow Geese appear beneficial, if the current rate of increase continues, the apparent positive effects on Brant nest success could still be outweighed by the consequences of degraded nesting habitat and reduced forage availability.

Presence, abundance, and identity of micro- and nano-plastics of Arctic and Beringian foodwebs

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The plastic debris that enters the Beringia region is unsightly, but the most problematic is what we cannot see: the microplastics and the nanoplastics. Plastics degrade through exposure to sunlight and the ocean, and quickly become microscopic. Microplastics act as sponges and absorb numerous chemical contaminants, particularly endocrine-disrupting compounds like phthalates, PCBs, and other persistent organic pollutants (POPs). We present results of a 5-year study in the Aleutian Islands, northern Bering Sea, and Northwest Greenland designed to identify and characterize the micro and nanoplastics found in Arctic ecosystems by focusing on their presence in breeding seabirds. We used high resolution UV spectrophotometric analysis of target organs, tissue, and ingested food (e.g., liver, muscle, feathers, skin; stomach and intestinal contents; nasal, oral, and cloacal swabs) that enables precision identification of microscopic microplastic contamination. We modeled foodweb structure associated with the sampled organisms using stable isotopic analysis of selected tissue from specimens and developed high likelihood models of microplastic entry and distribution within local and regional foodwebs. We show that micro and nanoplastics enter the Arctic marine foodweb through several routes—at the base (trophic level 1) through herbivorous plankton ingesting nano-plastics and thence upwards by their predators. Micro and macroplastics mimic shapes and sizes of regular food and are ingested by upper trophic level species.

Tuesday (Afternoon): Migration & Communication

Session Moderator: Julie Hagelin

Long-term changes in the timing of autumn migration in Alaska's boreal songbirds

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Alaska's boreal birds face a rapidly changing environment, but we know little about shifts in migratory timing. We used quantile regression to quantify long-term changes in autumn capture date in 21 boreal passerines, using datasets spanning more than 22 years from two banding stations in Interior Alaska. We also quantified differences between sites and explored whether select climate indices during three periods of the annual cycle could predict long-term changes in median capture. Long-term changes in autumn migration were detected in 86% of taxa, 76% of which exhibited advances in capture date, particularly long-distance migrants at one field site. Warmer conditions during the breeding period were associated with advances in autumn capture date in the greatest number of species (9). Collectively, we hypothesize that Alaska's immense size and spatially-variable climate regions impact reproductive timing, often resulting in long-term advances (with warming) and occasionally delays (with cooling). Carry-over effects of reproductive timing may therefore influence the autumn passage of different breeding populations, causing site-specific patterns, such as a species showing long-term advances at one location, but delays at another.

Correlates of Black Oystercatcher strategies of partial migration

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Black Oystercatchers are partial migrants, with some individuals that breed in south-coastal Alaska staying through winter and others migrating to coastal British Columbia. The drivers responsible for variation in migration strategies remain poorly understood. We tracked annual

movements of 23 Black Oystercatchers using geolocators and GPS devices and evaluated a suite of hypotheses commonly found in the literature to explain why some individuals migrate while others remain as residents. Variation in migration strategies was best explained by an individual's diet, providing support for the trophic polymorphism hypothesis. We found no evidence to support predictions made by the thermal tolerance, fasting endurance, dominance, or arrival time hypotheses for partial migration in oystercatchers. Our movement data also provide important insights into timing of migration, habitat use, and migratory connectivity, which are conservation-relevant and rarely described for the species.

Altitude selection in migrating geese produces a high risk of collision with offshore wind turbines

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Renewable energy facilities are a key part of mitigating climate change, but can pose threats to wild birds, most often through collisions with infrastructure. Understanding collision risk and the factors affecting it can help minimize the risk to wild populations. We quantified altitude selection of Pacific Flyway geese on transoceanic migrations between Alaska and the Pacific Coast of the contiguous U.S., an area where offshore windfarm development is beginning. We tracked the location and altitude of 45 geese of three subspecies (Pacific greater white fronted goose, tule greater white fronted goose, and lesser snow goose) >1 km from the coast across 114 migration bouts during spring and fall. We evaluated how geographic and environmental covariates affected 1) whether birds were at rest on the water vs. in flight and 2) altitude selection. We used the model results to predict how often geese would be within a potential rotor-swept zone (20–200 m asl) under various conditions. Further application of this formal altitude-selection framework to other species would be useful to understand how windfarms in this area may affect the migratory bird community.

Tracking fall migration of Bank Swallows from across North America with automated radio telemetry

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We studied fall migration of Bank Swallows (*Riparia riparia*), a steeply declining aerial insectivore, to understand variable population trends and reduce losses across the breeding range. In 2022–2023, across 13 sites in Canada and Alaska, we radio tagged 890 birds (99 in Alaska). Preliminary results from at least 250 birds indicate different migration routes, and we also detected departure times for at least 480 individuals. Birds in Alaska, Yukon and Northern B.C. moved southeast across Alberta and Saskatchewan, while those in Eastern Canada followed Atlantic coast southward, before crossing the Gulf of Mexico into Central America. Birds in southern B.C. followed the Rocky Mountains southward through Montana and Idaho. Southernmost detections occurred in Costa Rica (n = 3). Mean fall departure date for Alaska was 20 July, but any latitudinal trend among sites is currently unclear. Multiple migratory patterns may expose different breeding populations of Bank Swallows to different threats. This work represents initial steps towards informing and prioritizing spatially explicit conservation actions to reverse decline.

Fast food: importance of a short but critical stopover location for *roselaari* Red Knots

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The Pacific Red Knot (*Calidris canutus roselaari*) is a declining shorebird that forages along coastal Alaska on their northbound migration. *Roselaari* Knots make shorter stopover durations than other subspecies, making foraging at these locations extremely important for refueling. In this study, we 1) mapped Red Knot foraging areas along the Copper River Watershed, 2) determined length of stay, 3) determined potential prey items, and 4) assessed diet at Controller Bay, Alaska. Five birds with motus tags were detected by three motus towers throughout the Copper River Watershed. Mean length of stay was 3 days. Prey items were collected in May 2022 at three locations in Controller Bay. *Limecola balthica* was the dominant species, followed by polychaete worms, and *Mya arenaria*. Prey densities of *L. balthica* ranged from 161-1472 m^{-2}. Fecal pellets (n = 50) were assessed by eDNA analyses for diet. Results confirmed that Red Knots in Controller Bay are eating primarily *L. balthica*. This is the first time Red Knot diet has been assessed at a coastal Alaska stopover site with indications that there are multiple locations within the Copper River Watershed important to foraging ecology of this declining population.

Non-breeding ecologies of Tufted and Horned Puffins from the Kodiak Archipelago, Alaska

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Tufted and Horned Puffins (*Fratercula cirrhata* and *F. corniculata*) are of conservation concern due to declining populations within their breeding range. However, uncertainty remains regarding the scale of and mechanisms for these declines. Conservation and management efforts are currently limited by lack of data for puffin complete annual cycles. To better understand puffin movements and habitat use during the non-breeding season, we deployed archival geolocation light-sensing (gls) tracking devices on both species in the Kodiak Archipelago, Alaska during the 2022 breeding season. During summer 2023, we retrieved 15 from Tufted and 3 from Horned Puffins. We present preliminary results from tracking data collected during the non-breeding season that represent year-one of a three-year study. Next steps include pairing ecological data on non-breeding distributions with isotopic diets and measurements of corticosterone deposition in winter-grown feathers. Results will allow us to assess non-breeding conditions experienced by individuals from known breeding and wintering locations. Species-specific information on *Fratercula* puffin non-breeding resource use and response to environmental variability is crucial for identifying and targeting management decisions and actions.

Waddling wonders: unraveling Emperor Goose gosling movements on the Yukon Delta National Wildlife Refuge, Alaska

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In waterfowl, the time period between hatch and independence from adults is often difficult to study, due to constraints in the ability to tag or observe precocial young while they travel and learn from their parents. This time period has been especially difficult to study in Emperor Geese (*Anser canagicus*), due to their unknown range of post-hatch dispersal, high gosling mortality, and endemism to arctic ecosystems in Alaska and Russia. With decreasing sea ice levels and more extreme climatic events such as flooding and storms, it is imperative to study factors that influence juvenile recruitment and behavior of Emperor Geese, particularly given that their current population status is near the management objective threshold for closing sport harvest. Previous studies on Emperor Goose movements have used spatially coarse light-level

geolocation data or surgically implanted transmitters; however, for this study we tested a trial harness attachment method (e.g., external backpacks) to collect fine spatial data for examining natal dispersal. Preliminary results from 2022 indicate the mean seasonal home range area was 3.04 km^2during the period between hatching a nest and initiating autumn migration off the Yukon Delta. Most of the home range was centered around large mudflat habitat to the north and east of the nesting area. These findings of mudflat use are contrary to previous studies centered around grazing lawn habitat. Continued analysis for 2023 includes behavioral observations to gain further knowledge of resource use.

Migratory strategies of Whimbrel nesting in the Arctic National Wildlife Refuge

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Whimbrels are representatives of the most imperiled group of shorebirds: curlews and godwits. The population of Whimbrels that migrate along the Western Atlantic is in sharp decline, and the status of the Pacific Coast population is uncertain. Previous tracking studies in interior and North-central Alaska showed tracked birds using the Pacific Flyway during migration. From 2021 to 2023 we tracked 26 GPS-tagged Whimbrel nesting in the Arctic National Wildlife Refuge in Northeast Alaska. To our surprise these tracked birds showed a remarkable and distinct split in migration strategies despite all nesting in close geographic proximity, and in multiple cases being members of a breeding pair. Thirteen birds went down the Pacific Flyway and 13 went down the Atlantic Flyway. This finding suggests that the Refuge is a transition zone where Eastern and Western populations overlap and that the declines observed in the Eastern population likely represent declines also occurring on the Refuge. Further, this information means that Whimbrels using the Refuge could be affected by threats occurring within both Flyways, including oils spills, proposed wind turbine farms, shooting in the Caribbean and northeastern South America, and human disturbance.

Migratory connectivity between Arctic and subarctic breeding populations of Black Brant in Alaska

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Determining how Arctic and subarctic breeding populations of Black Brant are connected through space and time is a necessary step to understand inconsistent population dynamics and inform effective management decisions. Our objective was to calculate the strength of migratory connectivity during the non-breeding period for Arctic- and subarctic-breeding populations. To do this, we compiled 61 geolocator-derived annual migration tracks from a subarctic site

(Tutakoke River) and an Arctic site (Colville River Delta). By assessing migratory connectivity between the two populations and estimating the probability of spatial and temporal overlap at specific wintering locations, we can better understand how the two breeding populations differ in their migratory behavior. Preliminary results from the first year of data collection show that individuals from Tutakoke River had a 0.93 probability of overwintering in Baja, Mexico and a 0.07 probability of remaining on the Alaska Peninsula. In contrast, individuals from the Colville River Delta have a 0.52 probability of overwintering on the Alaska Peninsula, a 0.27 probability of migrating to Baja, and a 0.14 probability of using eelgrass beds in northern California and southern Oregon. Understanding these migration patterns helps assess the differences in migratory behavior and inform effective management decisions across the non-breeding distribution.

Rethinking the research and communication of marking and tagging of birds

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At a recent meeting, three Yup'ik Elders stood and in their own language forcefully expressed their objections to banding and radio tagging of migratory birds. Afterwards, they asked how we can work on this topic as a group and make progress toward incorporating their concerns into our actions as biologists and researchers. As a research program director, manager of a bird banding program in Alaska, Chair of an Institutional Animal Care and Use Committee, and advocate of the co-management process, I routinely review and evaluate the multiple steps in the development and implementation of research projects involving migratory birds. Perspectives from local community members on our research programs, however, are often lacking from this process. In this talk, I will review some of the different steps that go into migratory bird research planning and implementation and suggest ways in which we can rethink research design and better communicate the marking and tagging of birds with local communities and Indigenous Peoples.

Tuesday, December 12th- Poster Session (At-a-Glance)

4:00-5:00pm @ The Hotel Captain Cook (Mid Deck)

*Denotes student presentation

TITLE	PRESENTER	TOPIC
#1 Least Auklet plumage coloration and personality	Alexis Will*	Conservation
#2 Detection and genomic characterization of highly pathogenic avian influenza viruses in wild birds inhabiting western Alaska, USA	Andrew Ramey	Health, Disease and Genetics
#3 Low levels of adaptive genetic variation explain genetic differentiation between western and eastern North Pacific Rhinoceros Auklet breeding colonies	Brendan Graham	Health, Disease and Genetics
#4 Mercury and lead exposure in Red-throated and Pacific Loons breeding in northern Alaska	Brian Uher-Koch	Human Dimensions
#5 Survival probabilities of adult female Emperor Geese during harvest closure and after harvest opening	Bryan Daniels	Status and Trends
#6 Kanuti refuge's Trumpeter Swan population: "brought back" or not, it's booming	Christopher Harwood	Status and Trends
#7 Small temperature loggers provide highly accurate nest fate determination for shorebirds	Christopher Latty	Breeding Biology
#8 Nest survival rate for Lesser Yellowlegs – a comparison between Anchorage, Alaska and Churchill, Manitoba	Courtland Brown*	Breeding Biology
#9 Parasite infections and microplastic consumption by seabirds from Pacific and Atlantic Oceans	Douglas Causey	Conservation
#10 Complex shifts in population dynamics of Beringian seabirds are linked to long- and short-term climate modes	Douglas Causey	Conservation
#11 An investigation into an avian mortality event in the far western Aleutian Islands	Elizabeth Byrd*	Status and Trends
#12 Developing a key for seabird endoparasites	Ellie Olsen*	Health, Disease and Genetics
#13 Evaluating mechanisms of decline in a boreal-breeding aerial insectivore using integrated population models	Jeff Wagner*	Status and Trends
#14 Atlas of sea duck key habitat sites in North America	Kate Martin	Habitat
#15 Integrating stable isotopes and geolocator data to reveal variable origins and migratory pathways for a declining aerial insectivore (Tree Swallow)	Rachel Gringas*	Migration
#16 Factors influencing productivity of Yellow-billed Loons on the Colville River Delta	Rebecca McGuire	Breeding Biology
#17 Marine bird population trends in Prince William Sound, Alaska, 1989-2022	Robb Kaler	Status and Trends
#18 Investigating Aleutian Tern breeding and migration season movements using satellite telemetry 2019-2023	Robin Corcoran	Migration
#19 Lapland Longspur nesting trends at Prudhoe Bay	Sarah Hoepfner	Status and Trends
#20 Big white birds: progress towards automation in counting Snow Geese	Tim Obritschkewitsch	Migration

 # 1 Least Auklet plumage coloration and personality

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Melanin plumage markers have been identified as "badges of quality" and in some species are associated with boldness, an aspect of personality. Identifying phenotypic markers associated with personality creates opportunities to examine behaviors and predict responses related to environmental change. Least auklets, a marine ecosystem indicator species, are known for their high variability in coloration; some individuals have very light undersides, and others are very dark, which has been previously associated with age. In 2023, we conducted a pilot study as part of the Seabird Youth Network's Seabird Camp to test whether coloration is also associated with personality. We conducted a novel object experiment on free-living breeding least auklets to determine whether coloration was associated with "bold" behaviors, such as landing on a socialization rock first after a disturbance and approaching a blue ring. Trials were video-recorded and later analyzed using open-source software. In this presentation we will share results from our pilot study conducted on St. Paul and St. Lawrence (*Sivuqaq*) Islands.

#2 Detection and genomic characterization of highly pathogenic avian influenza viruses in wild birds inhabiting western Alaska, USA

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Highly pathogenic (HP) avian influenza A viruses (IAVs) re-emerged in North America in late 2021 and have since been detected in wild and domestic birds throughout much of the United States and Canada, including Alaska. Alaska has previously been identified as an important location to the ecology of IAVs maintained in wild birds inhabiting North America, insofar as serving as a point of entry for viruses from East Asia and an area where intercontinental reassortant viruses emerge. To assess the occurrence and genomic characteristics of HP IAVs among wild birds inhabiting Alaska, we collected 811 combined oral-pharyngeal and cloacal swab samples from hunter-harvested waterfowl (Anseriformes spp.) and 199 environmental fecal samples from monospecific flocks of either Emperor Geese (*Chen canagica*) or Glaucous-

Winged gulls (*Larus glaucescens*) within and around Izembek National Wildlife Refuge during September–October 2022. RNA was extracted from samples and screened for the IAV matrix gene using quantitative PCR. Genomic sequencing was attempted on all putatively positive samples. Here we report the detection of HP IAVs among wild birds inhabiting western Alaska and the genomic characterization of viruses. The detection of HP IAVs at an area where domestic poultry is virtually absent provides additional evidence, albeit anecdotal, that recently evolved HP viruses may exhibit differential transmissibility or infectivity among wild birds, as compared to those previously identified in North America. That is, these HP IAVs appear to be effectively maintained and spread by wild waterfowl in the absence of domestic birds, contrary to the previously proposed premise that unresolved mechanisms may restrict the perpetuation of HP IAVs within a wild bird reservoir.

#3 Mercury and lead exposure in Red-throated and Pacific Loons breeding in northern Alaska

Brian Uher-Koch[1], Emmanuelle Furst[2], Chris Latty[3], and Tuula Hollmen[2,4]
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Environmental and anthropogenic contaminant levels in the Arctic are projected to increase with rising temperatures, permafrost thaw, and transport from lower latitudes. Contaminants biomagnify through food chains to top predators. Loons, as top predators, are valuable bioindicators of environmental health, and contaminant exposure has the potential to negatively impact loon breeding populations. We collected blood (n = 77) and rectrix feather samples (n = 80) from Red-throated (*Gavia stellata*) and Pacific (*G. pacifica*) loons breeding in northern Alaska during 2021-2023 to evaluate exposure to lead (blood only) and methylmercury. Feathers are indicative of past exposure during the non-breeding period, while blood concentrations reflect recent dietary uptake from breeding areas. Lead blood concentrations were generally low for both species (<0.02 µg/g), with only three individuals exceeding levels that could be indicative of excessive exposure and possible lead toxicosis (>0.2 µg/g). Mercury was higher in feathers than blood for both species, likely indicating increased uptake at wintering areas in eastern Asia. Red-throated Loons had significantly higher concentrations of mercury in both blood (mean ± SE, 0.40 ± 0.02 µg/g) and feathers (4.78 ± 0.33 µg/g) than Pacific Loons (blood: 0.16 ± 0.01 µg/g, feathers: 3.13 ± 0.18 µg/g) suggesting differences in prey preferences or foraging areas. However, further research is needed to understand contaminant thresholds that might negatively impact breeding populations for these species. This study is the first to look at mercury and lead exposure in breeding Red-throated and Pacific Loons and will provide a baseline for the future given potential for increases in contaminant exposure due to climate and anthropogenic changes.

#4 Survival probabilities of adult female Emperor Geese during harvest closure and after harvest opening

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Agency aerial surveys and Indigenous Alaskan observational reports documented a population decline of Emperor Geese (*Anser canagicus)* that led to harvest restrictions and closures implemented in 1985. These declines prompted studies to determine Emperor Goose adult female survival rates, because adult survival rate is a critical parameter influencing population dynamics. We conducted Capture-Mark-Resight (CMR) efforts from 1994-2016 at the Manokinak River on the Yukon Delta National Wildlife Refuge (YDNWR) during the period when harvest was closed. Preliminary results of apparent annual survival of adult female Emperor Geese ranged from 0.75 to 0.80, with a population increase of 2% over the time period. In 2016, surveys indicated the population reached a threshold allowing the reopening of Emperor Goose harvest. With the opening of harvest for the first time in over 30 years, managers had concerns about the level of harvest the population could sustain. To quantify survival rates of emperor geese following the opening of harvest, YDNWR began CMR efforts on Kigigak Island (2017–2019, 2021–2023). Preliminary results of apparent survival of adult female Emperor Geese was 0.75, ranging from 0.63 to 0.95. These preliminary results suggest that survival of Emperor Geese may be decreasing since the initiation of the open harvest.

#5 Kanuti refuge's Trumpeter Swan population: "brought back" or not, it's booming

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Since 1990, Kanuti National Wildlife Refuge and partners have censused summering "white swans" (putatively, adult Trumpeter Swans *Cygnus buccinator*) about every five years in wetland habitats within the refuge and its surrounds in north-central interior Alaska. Between 1990 and 2020, trend data for this population follow an exponential growth ($R^2 = 0.99$). Paired swans, which likely represent the best index of the breeding population's status among years, increased 657% since 1990 and 92% since 2010. The wetland-rich central part of the Refuge, so called "Kanuti Flats," continues to host the densest concentration of swans. In 1989 there were 16 (59%) pairs of Trumpeters and 11 (41%) pairs of Tundra Swans *C. columbianus* nesting in the study area; in 2020, there were 227 pairs, of which 62 were confirmed nesting. A 2019 sample of 33 nesting swan pairs suggested that ~95% of swan pairs were now Trumpeters. I will discuss the growth and possible future of this population, including the likely effects of longer "growing" seasons for Trumpeter Swans in interior Alaska.

#6 Small temperature loggers provide highly accurate nest fate determination for shorebirds

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Small temperature loggers are increasingly utilized to monitor the nest fate and incubation behavior of ground-nesting birds; however, the accuracy of the derived fates has not been well reported. To test the accuracy of these devices we positioned the temperature probe of a Tinytag TGP-4020 (Gemini Data Loggers, United Kingdom) between the eggs in shorebird nests within the Arctic National Wildlife Refuge in northern Alaska. We also placed a camera nearby to monitor predator activity at the nest and revisited some nests during incubation to check for evidence of hatching. Temperature logger data were reviewed twice to estimate fate. (This was done independent of camera footage or post-fate data collected in the field at the nest bowl.) We found fates derived from temperature loggers matched evidence of hatch or failure from cameras, as well as instances where a chick was encountered at the nest bowl during checks. Therefore, we conclude temperature loggers provide a robust method to determine nest fate for tundra nesting shorebirds. We will also discuss results from complementary work on the effects of temperature loggers on shorebird nest survival and how temperature-logger-derived fates compare to fates derived from nest bowl cues (e.g., shell fragments).

#7 Nest survival rate for Lesser Yellowlegs-–a comparison between Anchorage, Alaska and Churchill, Manitoba

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Lesser Yellowlegs (*Tringa flavipes*) numbers have declined steeply over the last 50 years due to multiple threats across their geographic range. We produced the first estimates of reproductive success for the species in Canada and contrasted them with results from Alaska. We found and monitored Lesser Yellowlegs nests (n = 28) in Churchill, Manitoba in 2022 and 2023 and Anchorage, Alaska (n = 68) in 2018–2022. We calculated daily nest survival rates, using a maximum likelihood approach that is an extension of the Mayfield method. Our preliminary results show that Lesser Yellowlegs breeding in Anchorage (mean DSR = 0.98, se = 0.005) had significantly higher nest survival rates than Churchill birds (mean DSR = 0.94, se = 0.016). This suggests that, in addition to greater risk of exposure to harvest during migration as found by McDuffie et. al. (2022), birds breeding in the Churchill region also have lower reproductive success. Our work sheds light on a critical aspect of population dynamics for this declining

species and these data will be instrumental in the generation of an Integrated Population Model to inform the larger goals for Lesser Yellowlegs conservation.

#8 Parasite infections and microplastic consumption by seabirds from Pacific and Atlantic Oceans

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Seabirds acquire helminthic parasitic infections primarily through foraging activities. Likewise, birds consume microplastic contaminants, either intentionally or accidentally while feeding, drinking, or preening. Here, we document the frequencies of both endohelminthic parasites and microplastics from the digestive tracts of 17 species of seabirds. We collected numerous samples from the Aleutian archipelago, while others were donated to our collection from the NOAA Ocean Observers Offices. While microplastic fibers were found in every species, there was a gradient in microplastic frequency across species, where some contained more plastic debris than others. Similarly, some species harbored diverse and abundant parasite communities, while others had few infections. Interestingly, we found that the species that tend to consume more plastics had fewer parasites. However, there was a positive relationship between parasite species richness and plastics consumption, suggesting that seabirds with a higher dietary breadth might be more likely to also consumer plastics. Within individual species, these trends were not consistent, and only a few species exhibited detectable patterns between parasites and plastics. Samples sizes were relatively low, and we expect that as we process more individuals of the species in our collection, we can confirm these initial relationships.

#9 Complex shifts in population dynamics of Beringian seabirds are linked to long- and short-term climate modes

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Marine ecosystems and their populations are affected by complex long-term and short-term climatic modes climatic modes ranging from interannual and decadal variabilities. Because interactions between abiotic and biotic components of ecosystems, and oceanographic system change are subtle and complex, integrated analysis of these factors is essential to understanding

the nature of interactions among them. We utilize a wavelet transform analysis simultaneously to multiple datasets centered on the Beringian marine environment and on the population dynamics and breeding success of selected breeding seabirds (e.g., Puffins *Fratercula* spp., Auklets *Aethia* spp., Cormorants *Urile* spp., and Murres *Uria* spp.). We show that over the last 5 decades, population and demographic parameters of these species fluctuate with a periodicity of 3-5 years, similar to that detected in standard oceanographic parameters. Although the major periodicity of these interannual fluctuations is not common to different species and environmental variables, their cyclic characteristics not only show significant change, but diverse patterns of change.

#10 An investigation into an avian mortality event in the far western Aleutian Islands

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In July–August 2023, a comprehensive survey of land and waterbirds was undertaken in the Near Islands in the far Western Aleutian Islands archipelago. On land and coastal kelp beds, five breeding species of dead and dying seabirds were observed (Common Murres, *Uria aalge*; Glaucous-winged Gulls, *Larus glaucescens*; Black-legged Kittiwakes, *Rissa tridactyla*; Pigeon Guillemots, *Cepphus colomba*; and Tufted Puffins *Fratercula cirrhata*). Other breeding species appeared unaffected (Pelagic and Red-faced cormorants, *Uria pelagicus* and *U. urile*; Aleutian Tern, *Onychoprion aleuticus*; Marbled and Kittlitz's Murrelet, *Brachyramphus marmoratus* and *B. brevirostris*; Whiskered Auklet, *Aethia pygmaea*; Horned Puffin, *F. corniculatus*; and Northern Fulmar *Fulmarus rodgersi*), as were many individuals of affected species. Preliminary investigation of affected and unaffected individuals indicate that the cause of mortality was either avian influenza virus (AIV), algal biotoxins, or possibly both. The observations that not all species nor individuals were affected suggest that this was a minor Harmful Algal Bloom (HABs) event, that it was the start of an algal bloom likely to increase, or that some individuals may have different tolerance levels of biotoxin exposure. We present the initial results of tests for algal toxins, HPAI, and other known avian pathogens known to affect Beringian and North Pacific seabirds.

#11 Developing a key for seabird endoparasites

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While feeding and interacting with their surroundings, seabirds are exposed to dozens of parasites that are uniquely evolved to infect a narrow range of hosts. Despite the large taxonomic

diversity of seabird parasites, they have similar morphologies, making them difficult to differentiate with confidence. To identify helminths, we use taxonomic keys, requiring us to consult 7 volumes of text totaling over 3,000 pages. Final confirmation requires staining and mounting to visualize internal anatomies that are otherwise hard to see. As such, identifying parasites is difficult and time consuming. Using the Natural History Museum of London's Host-Parasite Database and the Smithsonian Institution's Invertebrate Zoology Collections Database of Parasitic Animals, we devised a single key from known infections of the alimentary canal for 7 species of seabirds collected as bycatch (Alaska and New England coasts) by NOAA Ocean Observers. With this new, abridged key that is targeted for only the species included in the NOAA collections, we can streamline the process of identification, increasing both processing speed, and accuracy of nomenclature. This will save time on the front end, as well as lead to less downstream reprocessing of misidentified specimens.

#12 Evaluating mechanisms of decline in a boreal-breeding aerial insectivore using integrated population models

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Conservation strategies for vulnerable species hinge on an understanding of population dynamics and demographic drivers of decline. The Olive-sided flycatcher (*Contopus cooperi*) is a steeply declining Neotropical-Nearctic migrant with low annual adult survival rates, high reproductive success in boreal Alaska, and a known migratory path. Yet, we do not understand how recruitment, age-specific survival, and migration contribute to statewide population decline. We are employing Bayesian integrated population models (IPMs) to quantify factors associated with flycatcher losses. To estimate vital rates and understand population dynamics, we are in the process of integrating mark-recapture and reproductive data (from ADF&G and USFWS), state-wide encounter data (e.g., ALMS, BBS, eBird), and environmental covariates to identify variables most closely associated with long-term population trends. Next, we will use simulations to quantify the sensitivity of population growth rate to changes in each vital rate and rank relative importance. Our analysis will identify the vital rate(s) with the greatest capacity to increase population growth, thereby directing where to focus conservation efforts.

#13 Atlas of sea duck key habitat sites in North America

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Several North American sea duck populations are below historical levels of abundance, and their habitats are susceptible to impacts of climate change and other anthropogenic factors. The Sea Duck Joint Venture (SDJV) is a conservation partnership formed under the North American Waterfowl Management Plan to advance knowledge about sea ducks and improve their conservation and management. Since 2001, SDJV partners have provided information on the distribution and abundance of sea ducks throughout the annual cycle. Using this information and other sources, the SDJV developed the Sea Duck Key Habitat Sites Atlas describing 85 sites that constitute important sea duck habitats, including 16 sites in Alaska. Site criteria, strict to highlight habitats most critical to sea ducks during at least one season, included: 1a) The area supports at least 5% of the continental population of a sea duck species, or 1b) The area supports a total of at least 20,000 sea ducks during any season, and 2) The density of sea ducks within the area is at least 10 birds/km^2. Narrative site descriptions include a synopsis of sea duck abundance, importance of the site to sea ducks, and sensitivities or potential conflicts that may impact sea ducks or their habitats. The Atlas is intended to heighten awareness of valuable sea duck habitats, aid in prioritizing habitats for protection, and provide information for environmental assessments. The Atlas and associated data products can be found at seaduckjv.org and will be regularly updated by the SDJV.

#14 Integrating stable isotopes and geolocator data to reveal variable origins and migratory pathways for a declining aerial insectivore (Tree Swallow)

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Pinpointing breeding and nonbreeding locations of migratory birds is critical for understanding migratory connectivity and population dynamics. Stable isotopes of hydrogen (δ^2H) can be used as intrinsic markers for the location where an organism's tissues are grown. Using Tree Swallows (*Tachycineta bicolor*) as a model avian organism, this study used stable isotope ecology to better understand interannual variation in both breeding and non-breeding origins, migratory pathways, and dispersal of Tree Swallows breeding in southcentral Alaska. This project infers origins from feather samples collected from a population of Tree Swallows at Otter Lake during the 2017-2019 breeding seasons and compares these data to migratory pathways determined from the

analysis of geolocator data from the same population. The primary feathers reflected an origin of growth that falls near the US/Canadian border, which coincides with a stopover location in southern Manitoba as shown by the geolocator data. The secondary feather isotope data agreed with the geolocator results, indicating non-breeding origins that span the entirety of the coastline along the Gulf of Mexico. This illuminates the dispersal of the Otter Lake breeding population onto specific non-breeding areas, the importance of an autumn stopover in Manitoba at Lake Winnipeg and informs our overall understanding of migration patterns in this population.

#15 Factors influencing productivity of Yellow-billed Loons on the Colville River Delta

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Yellow-billed Loons are a long-lived Arctic-breeding species with high inter-annual variation in productivity, making it difficult to determine mean productivity, or the typical range of productivity, for the species in shorter-term studies. Although the breeding population on the Arctic Coastal Plain is likely stable or increasing, there are concerns due to their small population size, specific habitat requirements and sensitivity to human disturbance. We evaluated annual productivity (chicks/territory surveyed) of Yellow-billed Loons on the Colville River Delta, in 1993–2023. We assessed the influence of landscape variables on productivity, including lake area, percent of the lake which is unfrozen in winter, connectivity of lakes, shoreline complexity, distance to coast, if the territory is on a lake shared with another Yellow-billed Loon pair, if the lake is used for both nesting and brood-rearing, weather, and distance to infrastructure. Yellow-billed Loons nesting in the Colville River Delta study area have been characterized by an adult population that, over the long-term, has fluctuated around an equilibrium state. As with adults, numbers of nests and young have varied considerably over the last 30 years and do not show long-term trends. However, an understanding of the causes of variation in annual productivity could help managers understand possible threats to Yellow-billed Loon populations.

#16 Marine bird populations trends in Prince William Sound, Alaska, 1989–2022

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In 1989, the T/V *Exxon Valdez* grounded on Bligh Reef in northeastern Prince William Sound (PWS), Alaska and spilled 40 million liters of crude oil. Over 30,000 marine bird carcasses were recovered following the spill and direct mortality to marine birds in PWS and the Gulf of Alaska was estimated at approximately 250,000 birds. With support from the *Exxon Valdez* Oil Spill Trustees Council, the U.S. Fish and Wildlife Service has conducted boat-based summer marine

birds surveys for over three decades in PWS. In addition to the oil spill, the marine ecosystems of PWS have been affected by climate variability. Declines of many piscivorous marine bird populations between the 1970s and 1990s paralleled changes in the climate system of the northeastern Pacific Ocean in the late 1970s. Ongoing climate perturbations, including an extreme marine heatwave event in 2014–2016, continue to affect ecosystems in PWS. In 2022, numbers of Bald Eagles (*Haliaeetus leucocephalus*), Buffleheads, goldeneyes, grebes, Glaucous-winged gulls, Harlequin Ducks, Black Oystercatchers, cormorants, loons, Common Murres, American Crows, and scoters were stable or increasing, while Black-legged Kittiwakes, Short-billed Gulls, Fork-tailed Storm-petrels, mergansers, murrelets, Pigeon Guillemots, puffins, and terns were declining. Given that oil from the spill is no longer bioavailable in PWS, these trends suggest broad-scale declines in prey or overall habitat quality.

#17 Investigating Aleutian Tern breeding and migration season movements using satellite telemetry, 2019–2023

Robin M. Corcoran[1], Jill Tengeres[2], Don Lyons[3,4], Kelly Nesvacil[5], Tory Rhoads[6], Susan Oehlers[7], Timothy Lawes[8], and Katelyn Stoner[3]
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Aleutian Tern (*Onychoprion aleuticus*) counts at known breeding colonies in Alaska have declined dramatically over the last several decades. Unfortunately, conservation planning is limited by the lack of information on breeding season site fidelity, formation of new colonies, and with-in season dispersal after colony failure and abandonment. We studied breeding season and migratory movements by fitting Aleutian Terns (n = 20) with 2g satellite telemetry tags at nesting colonies in the Kodiak Archipelago and Nome, AK from 2019–2023. Most tagged terns displayed extended fidelity to their capture location, with the maximum distance from their respective capture sites ranging from 60 to 190 km until the onset of migration from late July to mid-August. Several terns also spent time onshore near previously documented colonies and visited sites that potentially represent previously undocumented colonies. Onshore movements to active or previously documented colonies suggests these individuals may have attempted renesting after nest failure at their tagging site. All individuals with working tags at the time of migratory departure displayed steady long-distance migrations to Southeast Asia. Our initial results demonstrate that satellite telemetry tags are useful tools to study movements of Aleutian Terns and can help assess within-season colony attendance patterns and identify previously unknown colony sites.

#18 Lapland Longspur nesting trends at Prudhoe Bay

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Lapland Longspurs are one of the most common nesting passerines across the North Slope of Alaska. They are currently a species of low conservation concern; however, recent studies show that grassland and Arctic-nesting species are declining faster than other avian guilds. Even with their wide nesting range, there have been few studies assessing the nesting ecology or long-term trends of Lapland Longspurs. Here we report data from a long-term avian monitoring project at Prudhoe Bay that has collected data on Lapland Longspurs since 2003. Trends in nest density, nest survival, fledge rates, initiation dates, and clutch sizes, as well as evaluating the environmental factors affecting these trends. Over 19 years Lapland Longspur nest density has decreased, nest initiation dates have trended earlier, and clutch sizes have remained similar. Nest survival was low across the study period (range: 0.37-0.54) but has increased over time and fledge rates have remained relatively stable (mean= 0.82). We found the observed changes were driven primarily by spring snow melt dates. More work needs to be done to assess if these trends exist across the North Slope and investigation into how these will continue to shift with further climatic changes. Additionally, research and monitoring efforts should not overlook common species, especially where sufficient information about their population status and breeding ecology is lacking.

#19 Big white birds: progress towards automation in counting Snow Geese

Matt Macander[1], Tawna Morgan[1], Christopher Swingley[1], **Tim Obritschkewitsch**[1], Rebecca McGuire[1], and Brian Person[2]
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The North Slope Borough and ABR, Inc. have been studying the Ikpikpuk Delta Snow Goose (goose) colony since 1991. We have conducted a nest (breeding pair) photo census since 2010. The nest photo census has traditionally been processed with a complete manual review and tally on a photo mosaic in GIS. In 2021 and 2022, we recorded more precise goose locations for 10% of the study area to move towards automating the count. We applied the 2022 data to train a computer vision object detection algorithm (YOLOv5). In June 2023, we needed a rapid count of geese to support a density stratification of plots for a nest fate study, and no technicians were available to perform a manual estimate from thousands of photos. Therefore, we used the model trained on data from 2022 to identify goose locations for the entire study area on the 2023 mosaic. After filtering out false positives in ice-covered waterbodies using a water mask, the

results were determined to be accurate enough for the density stratification. The filtered model detected ~44,500 geese and confirmed a major shift of the colony into a new area northwest of its historical extent. Model refinement (i.e., incorporating examples of the false positives into the training as 'background') and a statistically robust error analysis are planned for this winter. We will share lessons learned, next steps, and recommendations for other researchers.

Wednesday, December 13th- Scientific Program Agenda (At-a-Glance)

@ The Hotel Captain Cook (Fore Deck)

*Denotes student presentation

TIME	TITLE	PRESENTER	SECTION
10:00-10:15 am	Observational and laboratory data provide insights into an outbreak of highly pathogenic avian influenza among wild birds inhabiting the Yukon-Kuskokwim Delta, Alaska during 2022	Bryan Daniels	Health, Disease and Genetics
10:15-10:30 am	Phenotypic and genomic variation in five subspecies of Song Sparrow in Alaska	Caitlyn Oliver Brown*	Health, Disease and Genetics
10:30-10:45 am	Genomic characterization of highly pathogenic avian influenza viruses from Alaska	Christina Ahlstrom	Health, Disease and Genetics
10:45-11:00 am	Barrow's Goldeneye population delineation: contrasting inferences from different data types	Dan Esler	Health, Disease and Genetics
11:00-11:15 am	Lead exposure continues to threaten Spectacled Eiders on the Yukon-Kuskokwim Delta	Daniel Rizzolo	Health, Disease and Genetics
11:15-11:30 am	Epizootic of beak deformities in wild birds: a review of avian keratin disorder worldwide	Danielle Gerik	Health, Disease and Genetics
11:30-11:45 am	Avian parasites in seasonal flux in a subarctic lake	Katie Sheehan	Health, Disease and Genetics
11:45-12:00 pm	Promoting avian research, monitoring, and conservation through open data	Laura McDuffie	Open Data
Lunch			
1:30-1:45 pm	Long-term changes in breeding probability and cause-specific mortality rates of Black Brant	Caroline Blommel*	Status and Trends
1:45-2:00 pm	Recent declines in population indices for Spectacled Eiders on both breeding areas in Alaska	David Safine	Status and Trends
2:00-2:15 pm	'Detecting' population trends is a red herring	Grey Pendleton	Status and Trends
2:15-2:30 pm	Low adult survival and high reproductive rates detected in a steeply declining aerial insectivore breeding in boreal Alaska	Julie Hagelin	Status and Trends
2:30-2:45 pm	Recent steep population decline of McKay's Buntings	Rachel Richardson	Status and Trends
2:45-3:00 pm	Nearshore marine bird surveys in the Kodiak Archipelago, 2011-2022	Robin Corcoran	Status and Trends
Break			
3:30-3:45 pm	Lesser Yellowlegs research and conservation: filling knowledge gaps while moving to action	Katie Christie	Conservation
3:45-4:00 pm	Pacific bird habitat joint venture: a strategic plan for conservation of coastal wetlands of the north Pacific flyway	Laura Farwell	Conservation
4:00-4:15 pm	Recent decline of Alaska's landbird avifauna	Nicole Michel	Conservation
4:15-4:30 pm	Emperor Geese of the Seward Peninsula: same same but different?	Tyler Lewis	Conservation
4:30-4:45 pm	Optimizing sea duck research: computer vision-based behavior and nest survival analysis	Lindsay Veazey	Modern Methods
4:45-5:00 pm	Lending an ear: incorporating acoustics into an existing shorebird monitoring framework	Morgan Ziegenhorn	Modern Methods

Wednesday (Morning): Health, Disease and Genetics & Open Data

Session Moderator: Lindsay Veazey

Observational and laboratory data provide insights into an outbreak of highly pathogenic avian influenza among wild birds inhabiting the Yukon-Kuskokwim Delta, Alaska during 2022

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Historically, highly pathogenic avian influenza (HPAI) infections were associated almost exclusively with domestic birds. Since 2002, HPAI has become more common in wild birds and in 2014 HPAI was recorded in wild birds inhabiting Canada and the United States for the first time. During 2022, HPAI caused unprecedented disease and mortality among wild birds in North America, including Arctic nesting geese and sympatric taxa on the Yukon Delta National Wildlife Refuge (YDNWR), Alaska. During June and July 2022, we observed sick birds and opportunistically collected dead birds on YDNWR, which some were later confirmed to have infections of HPAI via lab tests. Given these first confirmed cases of HPAI on the YDNWR, we collected paired serum and oropharyngeal/cloacal swabs from live and apparently healthy Emperor Geese (*Anser canagicus)*, Cackling Geese (*Branta hutchinsii minima),* and Black Brant (*Branta bernicla nigricans)* during brood banding drives to systematically test for active HPAI infections and prior exposure to avian influenza viruses. Our results help to elucidate the impacts of HPAI to wild birds in this region during the ongoing outbreak in North America. By understanding potential wild bird outcomes, managers can apply these results to planning and response efforts for future outbreak events.

Phenotypic and genomic variation in five subspecies of Song Sparrow in Alaska

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Island archipelagos are natural laboratories to examine local adaptation and how populations respond to selection pressures. One such archipelago is the Aleutian Islands of Alaska, which contains multiple avian species in which divergence from their mainland populations is evident through phenotypic differences. In this study, we use one such species, the Song Sparrow (*Melospiza melodia*), to study local adaptation. Song Sparrows occur across southern Alaska from Attu Island to southeast Alaska, and from west to east these populations demonstrate striking body size differences (larger-to-smaller) and a change from a sedentary to a migratory/partially-migratory life-history strategy. We examined the phenotypic attributes of these populations and used whole-genomic data to determine relationships and test candidate loci for evidence of selection. Phenotypic measurements of museum specimens (n = 227) quantified the dramatic size differences among these populations, with westernmost *maxima* being ~1.6 times larger than easternmost *rufina*. Ultraconserved elements (UCEs) and candidate genes that we predicted might be associated with adaptive traits were extracted from whole-genomic data. Among the candidate genes analyzed for body size, migration and dispersal, color, and salt tolerance, we found two candidate genes that showed signs of positive selection: BCO1 and KCTD21. Phylogenetic analysis of UCEs showed the westernmost subspecies (*M. m. maxima*) as sister to the other Alaska *M. melodia* subspecies, suggesting *maxima* colonized earliest and that Alaska was later recolonized by ancestors of the remaining subspecies.

Genomic characterization of highly pathogenic avian influenza viruses from Alaska

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The current outbreak of highly pathogenic avian influenza (HPAI) in North America began in late 2021, with HPAI viruses first detected in Alaska in April 2022. HPAI viruses of the H5 2.3.4.4b subtype have since spread across the state, infecting wild birds, domestic poultry, and mammals. To better understand transmission dynamics of HPAI viruses among hosts and locations over time, we compared the genomes of 178 confirmed HPAI viruses detected in Alaska during April 2022 – January 2023. Results suggest multiple introductions into Alaska between February and June 2022, as well as further spread to areas within and outside of the state. We found evidence for transmission of HPAI viruses between different wild bird species, wild birds and domestic poultry, and wild birds and mammals, including brown bear and red fox. Continued monitoring for, and genomic characterization of, HPAI viruses in Alaska will be important to understand the evolution and transmission of these economically, costly, and biologically relevant pathogens in Alaska and globally.

Barrow's Goldeneye population delineation: contrasting inferences from different data types

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Alaska constitutes a major portion of the global range of Barrow's Goldeneyes (*Bucephala islandica*). The degree to which Alaska Barrow's Goldeneye are demographically independent from those in other parts of the range, and thus constitute a meaningful management unit, has been examined using several methods. These methods include direct measures of dispersal and migratory connectivity, using tracking devices and band recoveries, and techniques that measure the potential results or indicators of those movement processes, such as genetics and morphometrics. Several lines of evidence indicate that populations are discrete at a continental scale (i.e., Pacific North America, Atlantic North America, and Iceland), as well as differentiated into subpopulations within the Pacific range, including Alaska as an independent subpopulation. These data include band recoveries, movements based on satellite telemetry, and mitochondrial DNA. Conversely, morphometric measures and nuclear DNA do not differ across the species range. We conclude that Barrow's goldeneyes can be delineated into several subpopulations that are largely demographically independent and are meaningful as management units, and we offer interpretations as to why not all data types are consistent.

Lead exposure continues to threaten Spectacled Eiders on the Yukon-Kuskokwim Delta

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We examined rates of lead exposure (> 0.2 ppm) in Spectacled Eiders (*Somateria fischeri*) on the Yukon-Kuskokwim Delta using blood samples collected during the breeding season 2018–2022 to compare with rates measured in the 1990s. In the 1990s, eiders were exposed to lead from spent shotgun pellets ingested while feeding in ponds with an estimated regional exposure rate of 11.8% and observed local exposure rates ranging 3–28%. We expected lower exposure rates given that over the previous decades, regulations prohibiting the use of lead ammunition have been in place, outreach and lead-for-steel ammunition exchange programs were implemented, and experimental studies indicated that previously deposited lead pellets should have settled in ponds and become unavailable to eiders. Contrary to our expectation, lead exposure rates measured in 226 blood samples remained similar to those observed in the 1990s indicating continued illegal use of lead ammunition during the past decade and/or that lead pellets remain available for very long periods of time. The temporal pattern of exposure was similar to the 1990s with exposure rate increasing with time spent on the breeding area. These results indicate the regulation of lead shotgun ammunition was likely ineffective and lead poisoning continues to impact Spectacled Eiders despite 30 years of protection under the Endangered Species Act.

Epizootic of beak deformities in wild birds: a review of avian keratin disorder worldwide

Danielle Gerik[1], Caroline Van Hemert[1], Colleen Handel[1], Becki Lawson[2], Jeff Walters[3], Kerry Brust[4], Anna Prinz[4], Andy Van Lanen[4], Jessie Schillaci[5], Susan Cottrell[6], Clifford Anderson[6], Cristian Gorosito[7], Víctor Cueto[7], and Maxine Zylberberg[8]
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An epizootic of debilitating beak deformities in wild birds has been documented in recent decades. Avian keratin disorder (AKD) is characterized by overgrowth of beak keratin and was first observed in clusters among Black-capped Chickadees (*Poecile atricapillus*) in Alaska. The prevalence of beak deformities is higher among Black-capped Chickadees and American Crows

(*Corvus brachyrhynchos*) in Alaska than in any other population ever recorded. Reports of birds with similar beak deformities have also been documented across North America, in South America, and in Europe. We compiled reports from community-science programs, bird monitoring studies, and scientific literature to summarize the current geographic scope and bird species affected by AKD-like beak deformities. From 1946 to 2021, >3,300 community-science observers reported 290 species with beak deformities, comprising >4,000 birds in Alaska, 1,900 elsewhere in North America, and >1,700 from outside of North America. We also examined the occurrence of beak deformities in populations of Red-tailed Hawks (*Buteo jamaicensis*) in the Pacific Northwest, Red-cockaded Woodpeckers (*Dryobates borealis*) in North Carolina, and Austral Thrushes (*Turdus falcklandii*) in Patagonia. Clinical signs of AKD in Black-capped Chickadees have been strongly associated with the occurrence of a novel picornavirus, which has now been detected in multiple species exhibiting morphologically similar beak deformities. Our detailed compilation, including geographic occurrence of individuals and species apparently affected, will help identify research and conservation actions required to evaluate and mitigate impacts of beak deformities on wild birds.

Avian Parasites in seasonal flux in a subarctic lake

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Birds naturally serve as hosts to several suites of parasites, which change seasonally as host geographic location (migration) and behaviors (dietary and mating) change. This is a consequence of changes in their densities and contact rates with one another and their environment. Additionally, the food items they encounter change in space and time as they respond to spatial and climactic constraints. Finally, birds are also agents of dispersal for other organisms that drop propagules from body surfaces or excretions. An excellent natural laboratory occurs in subarctic lakes (Cheney Lake, Anchorage, AK), where turnover of biomass changes drastically between seasons. Few birds are resident on Cheney Lake during winter; however, several hundred birds inhabit or are regular visitors to this waterbody once the lake ice retreats in summer. As such, the fish and invertebrate assemblages change from season to season, as thermal regimes shift throughout the year and avian predation rates are more frequent when birds are more abundant. Here, we review the seasons of Cheney Lake as documented over the last 3 years through the populations of its inhabitants, ranging from invertebrates, fishes, and avifauna. Additionally, we explore the utility of the tapeworm *Schistocephalus solidus* as a mechanism for energy and nutrient circulation within the organisms of Cheney Lake, ultimately modulating biomass turnover and ecosystem processes.

Promoting avian research, monitoring, and conservation through open data

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Each summer, ornithologists journey into the field to observe and document the bird species that breed across Alaska. The primary purpose for many studies is to discover what was previously unknown and systematically develop new approaches to answer the questions that remain. However, collecting data is only a small part of the scientific process; publicly sharing newfound knowledge not only informs the larger scientific community but also encourages transparency and enables the reproducibility of results. The ornithological community in Alaska holds a treasure trove of historic and modern data products. Recently, processes have been established to develop simple data sharing standards, provide access to previously inaccessible data, and maximize the use of formerly collected datasets. Here, we present examples of how the valuable ornithological data collected by the members of our community are being rediscovered and shared.

Wednesday (Afternoon #1): Status and Trends

Session Moderator: Tim Obritschkewitsch

Long-term changes in breeding probability and cause-specific mortality rates of Black Brant

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As a coastal long-distance migrant, Black Brant (*Branta bernicla nigricans*) are vulnerable to climate and land-use change while also facing changes in harvest pressure. To examine possible impacts on vitality and reproductive components of fitness, we combined band-recovery data with live recapture and resighting data from 1991 to 2023 for the Tutakoke River breeding colony of Brant on the Yukon-Kuskokwim Delta in western Alaska. We fit a Bayesian robust-design multistate model to these data to estimate temporal changes in cause-specific mortality and breeding probabilities over the last 30 years. Brant are long-lived, and thus may respond to increasingly variable environments by favoring their survival at the cost of periodic reductions in breeding effort, though harvest pressure can have a direct impact on brant survival. Understanding the demographic mechanisms affecting Brant fitness and population dynamics will provide valuable information for sustainably managing harvest in a changing environment. We are also interested in using the results from this time-variant model to inspire hypotheses for environmental variables that may be driving observed change in estimated non-harvest mortality and breeding probability.

Recent declines in population indices for Spectacled Eiders on both breeding areas in Alaska

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In Alaska, Spectacled Eiders (*Somateria fischeri*) breed on the Yukon-Kuskokwim Delta (YKD) and the Arctic Coastal Plain (ACP). In 1993, the species was listed as threatened due to a rapid population decline on the YKD. After listing there was an increase in the YKD population (YKD Coastal Zone Survey indicated total bird index [ITB]) until ~2010. After 2010, the population appeared to stabilize, recently (2021-2023), the index was down >50% from its high point. In contrast, the ACP breeding population (ACP breeding pair survey) has been stable to slightly declining since listing, but similar to the YKD, the ITB index dropped considerably in recent

years (2022 and 2023). Aerial survey design factors will also be discussed. Ground-based transect surveys for nests on the YKD in 2022 indicated about half the number of nests compared to recent plot-based surveys. Recent declines in pair and nest indices on the YKD and ACP are concerning and push this species further from achieving recovery criteria. Causes of the recent decreases are unknown but may include reduced breeding effort and population size.

'Detecting' population trends is a red herring

Grey Pendleton[1]
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Many papers in wildlife ecology that deal with population dynamics and monitoring report analyses for 'detecting' trends in population abundance. I suggest that 'detecting' trends is a red herring (i.e., something that diverts attention from the real matter at hand). I present two arguments against the concept of 'detecting' trends and discuss associated issues (e.g., power analyses). Under the concept of 'detecting' trends, a perfectly stable population has no trend, all other patterns of population change constitute a trend, which one attempts to detect. If statistical tests associated with the trend estimate reject the null hypothesis of trend=0, then a trend is 'detected', otherwise, no trend is 'detected'. The null hypothesis of trend=0 implies that the true population size is constant. My first argument is that wildlife populations of any size over reasonable time intervals are never constant. Consequently, the true trend is never 0. My second argument is that under most, if not all, definitions of trend (e.g., the geometric mean annual rate of population change), a trend of 0 is a perfectly acceptable value, no less so than any other value; hence, a trend always exists. As such, I recommend that studies estimate population trend and associated precision measures as the valuable part of modeling and monitoring. Whether confidence intervals include 0 or not, the estimates and CI will summarize the best understanding of the change in the population of interest.

Low adult survival and high reproductive rates detected in a steeply declining aerial insectivore breeding in boreal Alaska

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Demographic rates such as survival and reproduction are critical to identifying factors limiting population growth of vulnerable species. We estimated rates of adult survival and daily nest survival for a steeply declining aerial insectivore, the Olive-sided Flycatcher (*Contopus cooperi*).

From 2013–2018 we conducted a mark-recapture and nest monitoring study at three sites in boreal Alaska. Mean adult survival of 114 breeders was low (0.33 [95% CI: 0.24 - 0.43]) across sites and years, particularly in central Alaska (Fairbanks: 0.27 [0.18, 0.38]; Tetlin NWR: 0.29 [0.12, 0.51]) compared to southcentral (Anchorage: 0.51 [0.32, 0.69]). Historical Fairbanks data indicated adult survival declined since the 1990's. We located 80 nests and determined fates of 64. Mean daily nest survival was high compared to other studies (0.99 [95% CI: 0.98 - 0.99]), with 72% of broods surviving the 34-day incubation and nestling phase to fledging. Nest survival declined with number of cold days (<10°C) during the nestling phase. Management actions addressing low adult survival during migratory and non-breeding periods may confer maximum benefits for this species, though post-fledging survival remains unknown.

Recent steep population decline of McKay's Buntings

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The McKay's Bunting (*Plectrophenax hyperboreus*) is endemic to Alaska, breeds solely on the uninhabited St. Matthew and Hall islands in the Bering Sea, and is designated as a species of high conservation concern due to its small population size and restricted range. A previous population estimate (~2,800–6,000 individuals) based on expert opinion was greatly increased (~31,200 individuals) after systematic surveys of the species' entire breeding range in 2003. In 2018, we replicated the 2003 surveys to estimate breeding season densities, distributions, and population change over the intervening time period. Our results indicate that the McKay's Bunting population declined by 38% since 2003. Declines disproportionately occurred in both marginal habitats with reduced rocky nesting substrate and in high-density hotspots along the coast of St. Matthew Island. High-density hotspots shifted inland to higher elevations on both islands potentially due to exceptionally warm weather conditions and reduced spring snow cover in 2018. Our findings indicate that McKay's Bunting meets international standards for elevating its conservation status from Least Concern to Endangered based on the International Union for Conservation of Nature Red List of threatened species ranking criteria. Future population monitoring and studies to identify the causal mechanisms of the recent decline of this rare species are warranted.

Nearshore marine bird surveys in the Kodiak Archipelago, 2011–2022

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The goals of the Kodiak National Wildlife Refuge nearshore marine bird survey were to determine archipelago–wide population estimates, long–term trends, and an index to annual productivity for key marine bird species relevant to management objectives, and to contribute data to a regional monitoring program for birds throughout the Gulf of Alaska (GOA). The survey included systematic sampling from a random start point and transects surveyed represented 19–21% of the nearshore survey zone and 4–5% of the offshore survey zone. Black–legged Kittiwake, Glaucous–winged Gull, Tufted Puffin, Common Murre, Harlequin Duck, Pigeon Guillemot, and Marbled Murrelet were the most frequently encountered species and accounted for approximately 85% of nearshore marine birds observed across all years. We present the first archipelago–wide population estimates and trends for a suite of marine bird species of conservation concern. Marine bird productivity as measured by the ratio of hatch–year to adult birds was generally consistent with broader patterns seen in the GOA. The 2015–2016 surveys coincided with the most extreme marine heat wave on record in the North Pacific in which maximum sea surface temperatures anomalies at times exceeded 3–6°C. During 2015 surveys, Common Murre density increased significantly, and correspondingly fewer Pigeon Guillemot and Marbled Murrelet were observed. These declines may have resulted from increased competition in the nearshore for forage fish due to increases in the number of Common Murres.

Wednesday (Afternoon #2): Conservation & Modern Methods

Session Moderator: Dan Esler

Lesser Yellowlegs research and conservation: filling knowledge gaps while moving to action

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The Lesser Yellowlegs (*Tringa flavipes*) is a long-distance migrant shorebird that breeds in boreal wetlands across North America. This species has lost approximately 80% of its population since 1980, with pronounced declines (5-9% annually) in Alaska since 2003. Research and conservation efforts for this species have recently accelerated, and the Lesser Yellowlegs International Working Group is employing a full life-cycle approach to fill knowledge gaps about the species' demography, migratory connectivity, and threats. We are quantifying adult survival and reproductive success at three sites across the breeding range with the goal of elucidating factors limiting population growth. Meanwhile, migration tracking of Alaska-breeding birds has revealed important migratory stopovers in need of conservation attention including the Prairie Potholes Region, the Mississippi Alluvial Valley, and the Pampas of Argentina, all of which are heavily modified by agriculture. We are investigating the quality (pesticide levels, invertebrate biomass) of agricultural habitats for shorebirds and forming local partnerships to incentivize landowners to voluntarily create wetland habitat at key stopover sites. Finally, the species is one of the most frequently hunted shorebirds in the Caribbean and we continue to engage with local hunters and managers to develop and promote sustainable harvest practices.

Pacific birds habitat joint venture: a strategic plan for conservation of coastal wetlands of the north Pacific flyway

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Pacific Birds Habitat Joint Venture (Pacific Birds) is one of 25 Migratory Bird Joint Ventures in North America. Joint Ventures are cooperative, regional partnerships working to conserve habitats for the benefit of birds, other wildlife, and people. Coastal wetlands are one of three priority habitats for Pacific Birds. Together with partners from across the North Pacific Flyway, Pacific Birds developed a region-wide, 10-year plan for coastal wetland conservation from Northern California to Alaska. The plan convenes coastal conservation partners from across the region to build consensus around focused, shared strategies and generates momentum around a shared path forward. Shared conservation strategies and actions will help catalyze positive change for Pacific Coastal wetlands over the next ten years (2024–2035). The intended audience

for this plan includes agencies, Tribes and Alaska Native entities, organizations, communities, and individuals with a shared interest in coastal wetland conservation. By working together to conserve healthy wetlands and ecological processes in coastal ecosystems, we aim to ensure birds, other wildlife, and people thrive in abundance and diverse habitats that are safeguarded for future generations. This presentation will provide an overview of priority conservation strategies and actions identified.

Recent decline of Alaska's landbird avifauna

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Birds and their habitats are facing unprecedented threats and losses. We estimated changes in avian population size across and within Alaska from 1993–2021 for nearly 100 species of landbirds. We analyzed data from the North American Breeding Bird Survey using methods adapted from Rosenberg et al. (2019) to evaluate spatial, temporal, and trait-based patterns in population change. Overall, Alaska's landbird avifauna declined by 23% in population size since 1993. Obligate aerial insectivores and migratory species exhibited the largest proportional losses, with declines steepest in the Northwestern Interior Forest region and for species migrating to Mexico, Central, and South America. Obligate aerial insectivores (e.g., swallows) suffered much steeper declines across Alaska (-84%) than North America (-18%), suggesting vulnerability to environmental changes in Alaska or from their longer migration distance. Large declines were suggested for tundra species, but sparse sampling highlighted a need to expand survey coverage. Boreal forest species declined, and temperate forest species increased, presenting contrasting conservation challenges and opportunities for forest birds. Our results provide new perspectives into the status of many species and could help inform conservation efforts to help bring back the nearly three billion birds lost across North America since 1970.

Emperor Geese of the Seward Peninsula: same same but different?

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The Seward Peninsula is the only significant breeding area in North America for Emperor Geese outside their primary breeding grounds on the Yukon-Kuskokwim Delta. Historical accounts suggest that the northern side of the Seward Peninsula had a sizeable breeding population of Emperor Geese in the past; however, by the 1960s the population was anecdotally estimated at fewer than 500 breeding pairs. Since that time, the size and health of this small breeding

population has not been formally monitored. To assess this population, we (1) conducted aerial surveys of Emperor Geese on the northern Seward Peninsula during the breeding season in 2018 and 2019, (2) marked 32 Emperor Geese from this region with satellite transmitters, and (3) collected blood samples for assessment of genetic differentiation from the Yukon Delta breeding population. Using a double-observer technique that accounted for detection probability, we estimated a population of 1226 (95% CI: 792–1660) Emperor Geese on the Seward Peninsula, raising some conservation concern due to its small size. Moreover, preliminary analysis of our telemetry data indicates high breeding site fidelity and little use of the area by Emperor Geese of Yukon Delta breeding origin, suggesting that any future growth of this small population will need to come from within. Lastly, telemetry data shows spatial overlap of Yukon Delta and Seward Peninsula breeding stocks outside the breeding season, suggesting potential for genetic mixing via formation of pair bonds on wintering and staging grounds. This potential will be verified via future genetic analyses.

Optimizing sea duck research: computer vision-based behavior and nest survival analysis

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The rapid increase in annual average temperatures across the Arctic continues to drive ecosystem-wide changes in unexpected ways. This underscores the need for efficient, detailed, remote monitoring of bird populations for ecological shifts. Imagery data generated by camera traps are rich with potential insights into incubation behavior and disturbances, but manual review can be cumbersome and slow. We have developed a proof-of-concept computer vision pipeline to accelerate analyses of Common Eider (*Somateria mollissima*) incubation behavior. The model is trained on images from nest camera recordings taken around the North Slope of Alaska. Our model can identify and track the movements of female Common Eiders in novel videos with over 99% accuracy, which automates measurements of incubation constancy. The coordinate-based tracking capability of the model allows us to categorize probable behaviors based on anatomical changes (*e.g.,* threatened posturing, actively incubating, flushing). This approach is a promising step towards creating methods that can be applied to quickly process imagery data for different sea duck species. We plan to build on this project by testing how the model performs on imagery where birds are filmed at various differences from the recording device.

Lending an ear: incorporating acoustics into an existing shorebird monitoring framework

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The Program for Regional and International Shorebird Monitoring (PRISM) is a collaborative research effort focused on facilitating shorebird conservation via surveys across breeding, migration, and wintering areas. Since 2001, PRISM has been deployed in the Arctic to estimate population size and distribution of tundra-breeding shorebirds via a double sampling method that includes both intensive surveys at a few sites and rapid surveys at a wide range of sites. These efforts have greatly contributed to our understanding of shorebirds on their breeding grounds but come at great financial and logistical cost. In 2022, passive acoustic monitoring (PAM) using Audiomoths (v1.0.0 and v1.1.0, OpenAcousticDevices) was introduced into Arctic PRISM to assess whether this technology can mitigate these difficulties. Here we present the status of PRISM acoustic efforts in the Alaskan Arctic. We describe our planned analyses, including comparing detection probabilities for PRISM's rapid surveys (90 minutes per plot) and PAM (5-minute recordings every 30 minutes throughout the breeding season). We also discuss plans to evaluate whether species identity and site affect acoustic estimates of shorebird density. Finally, we highlight PAM efforts in the Willow Development Project focused on evaluating the soundscape as development progresses. In addition to saving money and person-power, we anticipate that PAM will provide novel and critical insights into breeding shorebirds. Such advancements in monitoring are key for successful conservation of these fast-declining populations in a warming Arctic.

Thursday, December 14th - Scientific Program Agenda (At-a-Glance)

The Hotel Captain Cook (Fore Deck)

*Denotes student presentation

TIME	TITLE	PRESENTER	SECTION
10:00-10:15 am	Changing foraging conditions for molting Steller's Eiders in Izembek Lagoon, Alaska	Anastasia Maliguine*	Habitat
10:15-10:30 am	Red-tailed Hawk and Short-eared Owl summer habitat use	Jonah Rothleder*	Habitat
10:30-10:45 am	Phenological asynchrony between onset of green-up and spring arrival for 21 migratory songbirds of conservation concern in Alaska	Melinda Wood*	Habitat
10:45-11:00 am	Rapid growth of the Lesser Snow Goose population in Arctic Alaska	Tim Obritschkewitsch	Habitat
11:00-11:15 am	What was the price paid in migratory shorebirds for development of the Prudhoe Bay oilfields?	Martin Robards	Human Dimensions
11:15-11:30 am	Efficacy of placer mine reclamation for breeding birds	Morgan Brown	Human Dimensions

Thursday (Morning): Habitat & Human Dimensions

Session Moderator: Grey Pendleton

Changing forage conditions for molting Steller's Eiders in Izembek Lagoon, Alaska

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Izembek Lagoon, in the southern Bering Sea, is designated as critical molting and wintering habitat for the Alaska-breeding population of Steller's Eiders (*Polysticta stelleri*), listed as threatened under the U.S. Endangered Species Act. Since the 1980s, Steller's Eiders have declined in their known nonbreeding range in the southern Bering Sea, especially in Izembek Lagoon where eiders undergo their remigial molt during fall. The cause of decline is unknown; however, in recent years higher sea temperatures have been observed in Izembek Lagoon and warming ocean temperatures have been associated with shifts in benthic community structure elsewhere. In 2018 and 2019, we replicated a benthic sampling effort conducted in 1998 to understand if prey availability could be less favorable to eiders during their molt in Izembek Lagoon. We compared forage conditions based on the relative biomass (%) and overall biomass (g/m^2) of marine benthic groups: Bivalvia, Gastropoda, Crustacea, and Polychaeta, and size (mm) of organisms of these groups between the two time periods. Our results suggest a shift in benthic community composition and change in biomass and size of benthic prey. This study provides a contemporary assessment of forage conditions in a critical habitat for Steller's Eiders.

Red-tail Hawk and Short-eared Owl summer habitat use

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In 1995, Joint Base Elmendorf-Richardson (JBER) experienced the deadliest aircraft bird strike in U.S. history when a military aircraft ingested a flock of birds upon takeoff, resulting in 28 human lives lost. Since that event a Bird/Wildlife Aircraft Strike Hazard mitigation plan for JBER has been in place, with one component involving capture, banding, and translocation of raptors away from the airport environment. Of the translocated raptors at JBER, Short-eared Owls (*Asio flammeus*) and Red-tailed Hawks (*Buteo jamanicensis*) are the most frequently captured. With the decreasing weight of global positioning system tags, we can gain insights on seasonal movements for these species by tagging them and tracking post translocation movement

from the airfields. As these species are present in the Arctic and breed in summer when resources are most abundant, a deeper understanding of how they utilize habitat to fulfill their needs is necessary. Utilizing data from these translocated raptors, as well as data from previous studies, and by applying core area analysis, we will present a comparison of summer habitat use for Red-tailed Hawks and Short-eared Owls. This research increases the understanding of how these species use the landscape in a time of a rapidly changing Arctic.

Phenological asynchrony between onset of green-up and spring arrival for 21 migratory songbirds of conservation concern in Alaska

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Accelerated climate change at high latitudes may be outpacing the ability of Alaska's breeding songbirds to synchronize spring migratory arrival with onset of green-up. Our project aims to quantify the degree of phenological asynchrony between these two events during 2011–2023 for 21 "Species of Greatest Conservation Need" identified in Alaska's State Wildlife Action Plan. We use a published Bayesian modeling approach to estimate spring arrival of migratory species by fitting logistic GAMs (generalized additive models) to eBird checklist data. The direction and magnitude of phenological asynchrony for each species, is then calculated as the different between estimated spring arrival and spring green-up (i.e., "onset of greenness increase" from MODIS products). We also plan to quantify spatial patterns, such as intra-specific differences in timing between central Alaska (Fairbanks) and southcentral (Anchorage) populations. Our work builds on previous work which suggested that birds in central Alaska tend to arrive after green-up, whereas those in southcentral arrived before green-up. Our analysis will inform conservation and management actions by identifying species or populations with the most extreme phenological asynchronies, as these may be at relatively greater risk of breeding failure and/or adult mortality.

Rapid growth of the Lesser Snow Goose population in Arctic Alaska

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The population of Lesser Snow Geese (*Chen caerulescens caerulescens)* in northern Alaska has increased dramatically over the past two decades. Most nesting currently occurs in two large colonies located on the Ikpikpuk and Colville River deltas. We conducted photo surveys for brood-rearing Snow Geese annually between Utqiaġvik and Fish Creek Delta (west of the Colville) during 1992–2023, and in the Colville River Delta during 2005–2023. Numbers of brood-rearing adults west of the Colville increased from 198 birds in 1995 to ~24,000 birds in 2019; and in the Colville River Delta they increased from 412 birds in 2005 to ~36,000 birds in 2021. We also conducted visual and photogrammetric censuses of the Ikpikpuk nesting colony during 1992–2023, where nest numbers increased from 60 nests in 1992 to ~13,000–16,000 nests since 2018. Nest success at that colony varied between 1 and 97%, with low success in some years attributed to widespread nest predation by brown bears (*Ursus arctos*); however, the trajectory of these colonies may ultimately be determined by changes in habitat, and the future is uncertain. Degradation of saltmarsh habitats from early-season grubbing by Snow Geese is evident at both colonies, but wide-ranging climate effects such as increased storm surges, permafrost thaw, and flooding of coastal habitats may also lead to changes in nesting and brood-rearing habitats, and studies are ongoing at both colonies.

What was the price paid in migratory shorebirds for development of the Prudhoe Bay oilfields?

Martin Robards[1]
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Development of Alaska's North Slope oilfields has come with a demonstratable loss, alteration, and fragmentation of shorebird habitats. However, despite over five decades of research and monitoring, conclusions as to the impacts on breeding shorebirds range from minimal, involving a few "displaced birds," to models that suggest over 100,000 shorebirds may have been lost from the oilfields. Uncertainty centers around what the impacts are for shorebirds that would have nested where infrastructure was placed—are they able to find new territories, or are required habitats saturated with territories of conspecifics? Further, do shorebirds that remain to breed near infrastructure experience reduced productivity or survival? A literature review and consideration of the best available scientific and monitoring evidence from the North Slope oilfields suggests that the reductions in overall quantity and quality of breeding habitat, and the cumulative effects of fragmentation and other factors have led to: 1) fewer shorebirds on the landscape (non-empirical data); 2) fewer shorebird nests each year (empirical data), and 3) fewer fledged shorebird chicks from nests that are near busy infrastructure (empirical data). Population resilience for some shorebird species has likely been reduced due to reductions in the numbers of adults and/or recruits entering the population that migrates south. I build from earlier insights by Cathryn Moitoret that identified key ecological, methodological, and political factors that contribute to a lack of conclusive action and make recommendations for moving forward.

Efficacy of placer mine reclamation for breeding birds

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In Central Yukon, the primary source of surface disturbance is placer mining and associated roads, which disturbs wetland and riparian areas that provide valuable wildlife habitat, particularly for many bird species. Reclamation is required following mining, which entails spreading topsoil to promote vegetation regrowth and contouring to encourage formation of open water wetlands. However, it remains unknown whether this is sufficient to return mined sites to a state where they provide suitable wildlife habitat, and how long this recovery takes. Our objectives are to 1) determine how long it takes reclaimed mines to reach a mature avian community, by surveying avian species across a chronosequence of time since disturbance, and 2) to determine whether mature reclaimed placer mines support comparable avian communities to those in unmined riparian corridors or other undisturbed habitats in central Yukon. During the 2023 breeding season, we conducted point counts and deployed autonomous recording units (ARUs) across a chronosequence of 25 mined sites that range from 1 to 36 years since disturbance. We additionally surveyed 16 unmined riparian corridors, covering waterways both within the same watershed as surveyed placer mines and from un-mined watersheds to compare mine communities to natural reference areas. We will present preliminary findings from our 2023 field season and future plans for this project, which will ultimately be combined with a larger dataset to determine cumulative effects thresholds for breeding birds in the regions. We will discuss the relevance of these results for regional land use planning.

Thursday, December 14th (1:30-5:00 pm)
Special Session: Indigenous Partnership in Bird Co-Stewardship

The objective of this session is to foster bird research and conservation that is inclusive of Indigenous and subsistence communities in Alaska. By bringing together people involved in these topics, we hope to build on current efforts, expand collaborations, and empower people to get involved. The session will include topics such as:

- Birds as food and cultural resources in Alaska Native and subsistence communities;
- Local and traditional knowledge about birds;
- Practical steps for communicating & working with communities and Native organizations;
- Reaching out to foster collaboration with Indigenous and subsistence communities; and
- Priority topics in bird research and conservation from the local perspectives.

TIME	TITLE	PRESENTER
1:30-1:35 pm	Session introduction and invocation	Liliana Naves and Christopher Tulik
1:35-2:05 pm	Partners in bird conservation: working with Alaska Native tribes, organizations, and the Alaska migratory bird co-management council	Patty Schwalenberg,
2:05-2:35 pm	Co-production of knowledge and healing: how healing catalyzes positive relations, leading to best practices	Crystal Leonetti
2:35-2:50 pm	The refuge information technician program: Native liaison supporting Indigenous partnerships in bird co-stewardship	Christopher Tulik
2:50-3:05 pm	Bird traditional knowledge and ethnography in the Chugach region	Willow Hetrick-Price
Break		
3:20-3:35 pm	Pribilof Island seabird youth network	Ram Papish
3:35-3:50 pm	Shorebirds for today and tomorrow: culture- and place-based learning at schools and communities in the Yukon-Kuskokwim Delta	Liliana Naves
3:50-4:05 pm	Weaving Indigenous and conventional science in shorebird monitoring	Claire Atkins
4:05-5:00 pm	Talking circle - Practical steps for communicating and working with communities about birds - Identifying priority topics for birds from the local perspectives	Facilitator: Michael Opheim Participants: Patty Schwalenberg, Crystal Leonetti, George Yaska, Mic Isham, Christopher Tulik, Subhankar Banerjee

Partners in bird conservation: working with Alaska Native tribes, organizations, and the Alaska Migratory Bird Co-Management Council

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Alaska Native peoples have harvested and interacted with birds since thousands of years. In Alaska, subsistence refers to Indigenous ways of life centered on harvesting, sharing, and using

wild resources for food, raw materials, and other cultural and traditional uses. Northern Indigenous peoples have traditionally harvested migratory birds in spring when other resources are scarce. The 1918 Migratory Bird Treaty Act (MBTA) outlawed harvest in March-August each year and did not account for subsistence uses. After decades of collaborative work, the MBTA was amended to allow the Alaska spring-summer subsistence harvest and a co-stewardship system was founded to collaboratively address topics related subsistence uses. The Alaska Migratory Bird Co-Management Council (AMBCC) includes the U.S. Fish & Wildlife Service, the Alaska Department of Fish & Game, and Native Caucus with representatives from ten regions. This presentation will overview Alaska Native peoples and their subsistence uses of birds, current management and conservation topics, types of information important to subsistence users, how the AMBCC and researchers interact, and some key partners. Finally, we will discuss successes and lessons learned from participating in a co-stewardship regime, where we rely on Indigenous and scientific knowledge for the successful conservation of migratory birds.

Co-Production of knowledge and healing: how healing catalyzes positive relations, leading to best practices

Crystal Leonetti[1], George Yaska[2], Mic Isham[3]
[1]Yup'ik, Alaska Native Affairs Specialist, U.S. Fish and Wildlife Service
[2]Koyukon Dine, Indigenous Knowledge Liaison, U.S. Fish and Wildlife Service
[3]Anishinabe, Indigenous Partnership Liaison, U.S. Fish and Wildlife Service

A monumental apology was delivered to Alaska Native peoples in 2018 on behalf of the U.S. Fish and Wildlife Service and the Alaska Department of Fish and Game for the harm caused to Indigenous Peoples of Alaska during the 1960s and 1970s implementation of the Migratory Bird Treaty Act. It was an act preceded by an acknowledgement on behalf of State and Federal government agencies of the true stories so seldom if ever told in society at large. These past events, a story in nearly every Native family, echo on in memories, stories, and in the continued fear of wildlife agencies. Should the data rich Indigenous Knowledges become a part of current research, assessment, monitoring programs, decision-making, policy, and governance of Alaska's bird stewardship, it is imperative that the management agencies become aware of the steps towards truth, reconciliation, and healing. Following these crucial trust building actions, the agencies and Indigenous peoples can take steps towards transforming bird research and management through best practices in co-production of knowledge.

The refuge information technician program: Native liaison supporting Indigenous partnerships in bird co-stewardship

Christopher Tulik[1]
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The US Fish and Wildlife Service in Alaska established the Refuge Information Technician (RIT) Program in 1983 to develop and conduct culturally appropriate outreach for geese conservation and recovery in southwest Alaska. RITs are local Alaska Native residents hired to disseminate management and conservation information to subsistence communities who remain dependent on birds and other wildlife and fish as food and cultural resources. RITs were instrumental in establishing bird harvest monitoring in rural communities. The RIT program's successes in southwest Alaska led to its expansion to most Alaska refuges and RITs continue to play a crucial role in fish and wildlife conservation in rural Alaska. In this presentation, I will share experiences and knowledge of RITs as community and Native liaisons to support bird conservation, including practical steps for working with communities and tribal organizations on conservation issues, examples of what has and has not worked based on the RIT program's 40-year history, and tips on how researchers and conservation organizations can engage with Yukon-Kuskokwim Delta communities moving forward. Finally, I will provide information on formal and informal cultural protocols to observe when working in Alaska Native communities, such as tribal council meetings, understanding local socio-economic contexts, and diverse communication styles that will allow more meaningful and productive engagements between conservation organizations and rural Alaskan residents.

Bird traditional knowledge and ethnography in the Chugach region

Willow Hetrick-Price[1], Brooke Mallory[1], and Priscilla Evans[2]
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Chugach Regional Resources Commission (CRRC) initiated a Southcentral Alaska Migratory Bird Wisdom Keeper's Workshop to collect Indigenous Knowledge about migratory birds in communities in the Chugach region. The purpose of the workshop was to encourage Alaska Native participation in the science and management of migratory birds, increase awareness of management issues, and promote regional partnerships and coordination within the Chugach region and beyond. From this workshop, an immense interest in migratory birds has blossomed and CRRC has been developing an ornitho-ethnography intended for use by the communities and bird hunters of the Chugach region to assist in identifying various bird species and to understand traditional knowledge, uses, and beliefs regarding birds. We have compiled information from various sources (e.g., literature and Project Jukebox), interviews with Chugach leaders and elders, stories in which birds figure prominently, and oral history. The guide includes illustrations of bird species and related traditional knowledge and values. Transmission of

Indigenous knowledge across generations has been historically disrupted, and more recently in the Chugach region due to interruptions in subsistence harvesting practices as a result of the 1964 earthquake and the Exxon-Valdez oil spill. Keeping Indigenous traditions and knowledge alive is important for the well-being of our communities. This project encourages Alaska Native youth to learn about traditional bird knowledge, hunting, and uses.

Pribilof island seabird youth network

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The Pribilof Seabird Youth Network (SYN) is a partnership between the Alaska Maritime National Wildlife Refuge (AMNWR), the Pribilof School District, St. George Island Traditional Council, Aleut Community of St. Paul Island Tribal Government, and the wider scientific community. This unique partnership provides youth (K-12 students on both Pribilof Islands) the opportunity to learn about the global importance of the seabirds breeding on the Pribilof Islands. The overall goal of SYN is to learn about seabirds while engaging and encouraging the scientific interests of local school kids. We use a multi-pronged approach that includes: winter school visits; cultural activities, theatre and art; internships for older students; a website platform; outreach for local seabird research projects, and annual Seabird Camps. 2023 was our tenth year of running Seabird Camp on St. Paul Island. This talk will share more about camp structure and focus, and what has been learned over the years.

Shorebirds for today and tomorrow: culture- and place-based learning at schools and communities in the Yukon-Kuskokwim Delta

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The Yukon-Kuskokwim Delta in western Alaska provides key habitat for millions of breeding and migrating shorebirds. To support Indigenous co-stewardship in shorebird conservation, we

developed a youth outreach program that focused on shorebirds, the Yup'ik culture, and the environments of the Yukon-Kuskokwim Delta. The program relies on collaboration with local educators and communities. Shorebirds are an engaging topic to learn about healthy habitats, food chains, geography, and the diverse peoples that occur along their migratory routes. The content has a strong emphasis on Yup'ik culture and language including diverse activities and audio-visual and online resources. The program so far has reached about 1,800 youth in 14 communities. We will discuss insights learned from collaboratively working with local communities and schools. High turnover of educators in rural Alaska highlights the need for a dedicated communication plan. In-person interaction is needed for successful program implementation. 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.

Weaving Indigenous and conventional science in shorebird monitoring

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Migratory shorebirds are declining worldwide, with serious implications for social-ecological systems. Indigenous stewardship, which is noted to facilitate an ability to sustain abundance of biocultural resources, could play a role in recovery of migratory shorebirds. Our co-developed research wove Indigenous science methodologies with those of conventional science, within the context of a biocultural restoration area, to understand patterns for five species of shorebirds who connect Alaska with Hawai'i through their migratory pathways: Kōlea (*Pluvialis fulva*); 'Ūlili (*Tringa incana*); 'Akekeke (*Arenaria interpres*); Kioea (*Numenius tahitiensis*); and Hunakai (*Calidris alba*). A layered exploration of Indigenous observation methodologies from a loko i'a (Hawaiian aquaculture system) and regional eBird data suggest: (1) decreases in juvenile recruitment of shorebirds across the Hawaiian Islands; (2) dissimilarities in 'Akekeke over summering patterns between the loko i'a and those of the eBird dataset; (3) environmental characteristics which support large/diverse assemblages of migratory shorebirds. Co-interpretation of data showed correlations between climatic shifts and the phenologies of seasonal anchor events. Our findings strengthen and inform stewardship, conservation, and management practices for shorebirds at both ends of the migratory pathway.
