Waterbird Society 2021

2nd Virtual Meeting • 45th Annual Meeting

Dear Waterbird Society members and guests,

Welcome to our 45th annual meeting!

The events of the past few years have impacted each of us, both personally and professionally. The pandemic, now in its second year, has represented some unique challenges, and for some of us, brought personal tragedies and struggles as well. It has also brought to the forefront many pre-existing disparities and injustices that are ingrained in the societies we are part of, and challenged our assumptions about life, work and collective membership in organizations and society-at-large. However, change can also be positive and necessary; adversity bringing self-reflection, growth, renewal and resilience. The Waterbird Society is no exception.

Over the coming months, the Waterbird Society will be reviewing and updating our long-term strategic plan - affirming our shared values, defining our goals as a group, and plotting a path forward. The success of this process depends on including a diversity of experiences and perspectives. Everyone is welcomed and will have an opportunity to contribute. Make your voice heard! Be creative, constructive and advocate for the things you think are important. I specifically encourage our younger members to actively engage in this process – you are our future, and have the opportunity to reimagine and shape the future of our Society.

In the face of some challenges this year, we persevered and accomplished much as a group. We revitalized the entire editorial process for Waterbirds, which will increase the quality, reputation and visibility of our journal.

The Code of Conduct policy is ratified and in force, enshrining our shared values of kindness and respect. Membership voted to include a second student seat on Council, which will increase early-career representation in decision-making and foster greater ownership in the Society. We made initial steps toward making the Waterbird Society a more inclusive and equitable organization; this will continue to be a commitment and will be an over-arching theme that guides our strategic planning.

There are many accomplishments to be proud of, especially for a volunteer-based organization. Thank you to everyone whose efforts have contributed to making the Waterbird Society a better, more vital and relevant organization!

A big thank you (!) and much appreciation to Patty Szczys and the many other volunteers who have taken on additional work, and incorporated new technologies, to put together an amazing scientific program, a wide variety of social & professional development events and ensure a positive virtual meeting experience.

For me, the Waterbird Society meetings have always been a time to celebrate our collective and personal accomplishments, share research with colleagues who are also passionate about aquatic birds, to visit with old friends and make new ones – time spent with my 'second family'. These meetings always leave me feeling reinvigorated, with many new ideas that I can incorporate into my own work and goals. I hope for that kind of positive experience for each of you!

Sincerely, Dave Moore

Welcome from the Scientific Program Chair

I'd like to extend a warm welcome to all participants of the 45th Annual Meeting of the Waterbird Society. Although we are not gathering in Texas as planned, we are happy to gather virtually to share our science and to reconnect with friends and colleagues.
An ad hoc virtual conference organizing committee was formed in the summer. Thank you to the members of this organizing committee for important contributions making this virtual meeting possible: Jonathan Cohen, Chris Custer, Clay Green, Nellie Tsipoura, Jenna Schlener, Kate Shlepr, Anna Vallery, Liz Craig, and Erica Nol. Susan Elbin, Liz Craig, Pat Baird, and Chip Weseloh are responsible for the ambitious Virtual Silent Auction - bid early and often to secure your favorite items and to support travel assistance to the 2022 meeting in south Texas! Juliet Lamb single-handedly put together the Virtual Field Trips and the Student Mentor Meet-Up. Marisa Martinez, Sara Schweitzer, Liz Craig, Ricardo Zambrano, Aliya Caldwell, and Juliet Lamb organized the Early Career Panel. Special recognition and a huge thank-you goes to Danielle D'Auria and Juliet Lamb, whose efforts went way above the call of duty to ensure our online meeting experience is excellent.

The scientific program includes 59 oral presentations, 12 lightning talks, one panel discussion, two symposia, and two plenary lectures. We have 19 student presentations, 5 virtual field trips, an early career scientist event, and our traditional student mentor-meet up. The 2021 Annual Meeting will close with a committee Fair, Business Meeting and the Award Ceremony.

Warm Regards, Patty Szczys, Chair of the Scientific Program and Vice President

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Waterbirds Career Panel

The Waterbird Society is excited to present Flight Paths: Finding your place in waterbird science and conservation, a multi-panel discussion about waterbird-related careers, which will take place on 10 November 2021 from 12:00 - 1:40 p.m. EST.

The event will be divided into multiple sub-panels to discuss different career paths. Please use this form to indicate which sub-panels you are interested in attending, as well as to submit questions for the panelists. Please indicate at the start of the question if it is directed to a specific group or panelist.


FLIGHT PATHS
Finding your way in waterbird science and conservation
November 10th, 2021 12:00 – 1:40 pm EST
A multi-panel conversation on waterbird careers featuring panelists in:
FEDERAL AGENCIES, STATE AGENCIES, NGOs, ACADEMIA, CONSULTATION,
and LATIN AMERICAN ORGANIZATIONS
THE WATERBIRD SOCIETY
Sign up:
tinyurl.com/wbsflightpaths
Waterbird Society
2021

About the Waterbird Society

Our mission: The Waterbird Society is an international scientific, not-for-profit organization whose mission is to foster the study, management and conservation of the world's aquatic bird s. The Society's primary goals are to: (1) promote basic andapplied research on waterbirds and their habitats, (2)foster science-based waterbird conservation globally, and (3) enhance communication and education at all levels -among professionals, policy makers, and citizens. To accomplish these goals, the Society publishes an international peer-reviewed journal, hosts scientific meetings, provides grants and awards, and facilitates other activities.

Our history: The Society was established in 1976 following the North American Wading Bird Conference held in Charleston, South Carolina, USA, and named the Colonial Waterbird Group. The organization changed its name to the Colonial WaterbirdSociety in 1986. In 1999, the org anization became The Waterbird Society to reflect an expanded interest in all aquatic birds.

Waterbird Society Council

Officers

President: Dave Moore
Vice President: Patty Szczys
Secretary: Kate Shlepr
Treasurer: Christine Custer

Editor of Waterbirds: Andrew Kasner

Council Members

Clay Green Past President
Erica Nol Past President

2019-2021 Councilors

Danielle D'Auria
Miyuki Mashiko
K.S. Gopi Sundar

2020-2022 Councilors

John Anderson
Gail Fraser
Terry Master

2021-2023 Councilors

Don Lyons
Jim Lyons
Caz Taylor

2020-2021 Student Councilor: Caroline Poli

Plenary Speakers

Indra P. Acharja is currently the head of species conservation division at Royal Society for Protection of Nature (www.rspnbhutan.org), a conservation NGO in Bhutan. Indra's research focuses on studying the avian ecology, freshwater ecosystems, livelihoods, and their interlinkages in the Himalayan region. Currently, his work is largely focused on ecology, biology and conservation of the critically endangered White-bellied Heron (WBH) and management of conservation breeding center. Since 2015 Indra has been leading the WBH conservation and research in Bhutan and over the past six years, he has developed immense understanding on behaviour, ecology, and biology of the of the bird and has authored several scientific publications and reports. He is also the member of WBH IUCN-SSC Working Group. Indra holds Master of Forest Science (2019) from School of Forestry and Environmental Studies, Yale University, USA, M. Sc. Forestry (2014) from Forest Research Institute (FRI) University, India, and

Juliet Lamb is currently a Marie Curie Post-Doctoral Research Fellow at the Center for Functional and Evolutionary Ecology in Montpellier, France. She holds a PhD from Clemson University, a MS from the University of Massachusetts Amherst, and an AB from Harvard University. Her research links individual-level spatial, energetic, and breeding ecology of coastal marine birds with population- and landscape-scale demographic patterns and risk factors using a variety of approaches including tracking, diet sampling, behavioral observations, molecular analysis, and quantitative modeling. She is passionate about applied ecology and conservation of seabirds and coastal systems, as well as improving communication of science and accessibility of conservation careers. Her research on nesting habitat restoration for terns in the Gulf of Maine won the 2015 Outstanding Contribution to Conservation award from the Waterbird Society, and her research on brown pelican movements in the Gulf of Mexico was a finalist for the 2019 Presidential Migratory Bird Stewardship Award. She serves on the editorial board of Ornithological Applications and is the incoming Secretary of the World Seabird Union. Outside of research, she enjoys non-scientific writing, playing classical French horn, and introducing her 2- and 1-year-olds to as many seabird islands as possible.

Robert Cushman Murphy Prize

The Robert Cushman Murphy Prize highlights either a lifetime of exceptional, published research, or a single extraordinary research accomplishment that has resulted in a major redirection of studies on waterbirds. It honors the memory of one of the giants in the field, the author of Oceanic Birds of South America, a landmark first published in 1936 and still an essential reference 60 years later.

Dr. Erica Nol's career exemplifies a lifetime of exceptional, published research that has resulted in major contributions to the study and conservation of shorebirds.

Dr. Nol has a long publication history, spanning from 1978 to present, focused on the ecology and conservation of shorebirds and landbirds. She published 154 papers in peer-reviewed journals, acting as first author of many. She has maintained a continuous output, averaging 3.7 peer-reviewed publications per year, with additional non-referred publications (book chapters, reports, etc.). Her body of work on shorebirds (and other waterbirds) includes 90 peer-reviewed papers; averaging 2.1 shorebird papers/year), and these are the basis for bestowing this award.

A significant proportion of Erica's shorebird papers have been published in high-tier science, ecological and conservation journals, including: *Nature, Science, Nature Scientific Reports, Ecological Monographs, Journal of Applied Ecology, Ecosphere, Biological Conservation, The American Naturalist, J. of Wildlife Management, Frontiers in Ecology & Evolution, Polar Biology, Movement Ecology,* and *Behaviour.* The remainder of her papers have been published in top-tier ornithological journals, and she has been a regular contributor to *Waterbirds*.

The journals in which Dr. Nol has published her work reflects a career of relevant, high quality and rigorous research. Dr. Nol's research and publications have made significant contributions to our understanding of the full-cycle ecology (breeding, foraging, migration and non-breeding) and demography of sub-arctic and arctic-breeding shorebirds. She has also made important contributions to understanding the impacts of a warming climate on the habitats and life histories, and conservation of, these species.

Distinguished Service Award

This award recognizes those members who have made significant contributions by serving the Society and its members. Recipients of the Service Award have promoted the goals of the Society in their efforts that extend above and beyond their duties as teachers, researchers, and administrators.

Former Editor in Chief of *Waterbirds,* **Dr. Stephanie Jones** came out of retirement in 2021. She worked heroically for many months to address the COVID-caused bottleneck, moving our journal, *Waterbirds*, back to on-time publication.

Schedule-at-a-Glance
Abstracts Follow in Order of Appearance

Monday, November 8, 2021
9:00 – 13:00 EST Council Meeting
18:00 – 22:00 EST Council Meeting

Tuesday, November 9, 2021
8:00 - 8:30 EST Virtual Field Trip: Ntsikeni Nature Reserve, Belfast Wetlands, and community waterbird conservation in South Africa (Kyle Lloyd)
8:45 – 9:00 EST Welcome and Announcements
9:00 – 10:00 EST Plenary Address: Indra Acharja
10:00 – 12:00 EST Herons of Worldwide Conservation Concern
12:00 – 13:20 EST Student Mentor Meet-Up
13:20 – 17:00 EST Herons of Worldwide Conservation Concern
17:15 - 17:45 EST Virtual Field Trip: Wading birds in the Liuwa Plain, Zambia (Jonah Gula)

Wednesday, November 10, 2021
8:00 – 8:30 EST Virtual Field Trip: Terns, guillemots, and lighthouse life on the Isles of Shoals, New Hampshire (Gemma Clucas)
8:45 – 9:00 EST Welcome and Announcements
9:00 – 10:00 EST Plenary Address: Juliet Lamb
10:00 – 12:00 EST Dynamics of Waterbird Migration
12:00 – 13:40 EST Early Careers Panel
13:40 – 15:00 EST Behavior
15:30 – 17:00 EST Lightning Talks
17:15 – 17:45 EST Virtual Field Trip: Rice and lotus paddies with egrets and ducks in Ibaraki, Japan (Miyuki Mashiko)

Thursday, November 11, 2021
8:00 EST Welcome and Announcements
8:20 – 10:00 EST Conservation, Foraging, & Movement
10:00 – 12:00 EST General Session
13:20 – 15:20 EST Focus on the Gulf Coast
15:40 – 17:00 EST Avian Die-Off Panel Discussion
17:30 – 18:00 EST Virtual Field Trip: Gulls and history in the Frioul Archipelago, France (Juliet Lamb)

Friday, November 12, 2021
8:00 EST Welcome and Announcements
8:20 – 10:00 EST Conservation
10:00 – 12:00 EST Conservation, Habitat, & Restoration
13:20 – 15:40 EST Conservation, Habitat, & Restoration
16:00 – 16:40 EST Committee Fair
16:50 – 18:00 EST Business Meeting
18:15 – 19:30 EST Award Ceremony & Conservation Paper Award Presentation

Saving the critically endangered White-bellied Heron from extinction: two decades of conservation efforts and the way forward.

Abstract Summary:

The White-bellied Heron (*Ardea insignis*) is critically endangered and one of the rarest heron species in the world.

While 50–249 adults are estimated to be surviving over the extent of 165,000 km^2 of the Himalayan freshwater ecosystems, fewer than 60 are confirmed to exist today, spanned over Bhutan, India, Myanmar, and China. Since 2015, after the preparation of the conservation strategy and hosting of the first international conference for the species, range countries have been putting efforts to protect the fragmented populations and restore their habitats. In Bhutan, conservation started in 2003 soon after the discovery of the first active nest for the country and rediscovery for the world after more than 7 decades of the previous record. Over the last two decades, we have monitored the population trend, distribution & habitat use, nest, and active breeding population and mapped major threats to the bird and their habitats. In Bhutan, we conducted the annual population survey for the last nineteen consecutive years and recorded 28±4.8 (*n*=19) individuals. The average active nests (number of breeding pairs per year) of 2.6±1.4 (*n*=50) with an average clutch size of 2.7±1.4 (*n*=28), the hatch success rate of 1.9±1.1(*n*=40) and 1.8±1.1 (*n*=42) of fledgling success per nest were recorded. While we observed a high nesting survival rate of 86% (n=50), very little information is available on predators, fledgling survival post-fledging, dispersal, and mortality. Despite high breeding success and annual juvenile recruitment, considering the small overall population size, the population in Bhutan has remained low and potentially declining. The small and fragmented population with a restricted range and small gene pool is further threatened by habitat loss due to infrastructure development, hydropower dams, extractive industries, and climate change in the region. Our long-term monitoring and conservation filled many information gaps and provides important implications including the call for securing ex-situ gene pool, conservation breeding, more coordinated and impactful in-situ conservation efforts to save this species from extinction.

Keywords: Conservation

Author Name : Indra Acharja [1] *

Affiliation : Royal Society for Protection of Nature

Author Name : Tshering Tobgay [2]

Affiliation : Royal Society for Protection of Nature

Author Name : Lungten Lungten [3]

Affiliation : Royal Society for Protection of Nature

Author Name : Thinley Phuntsho [4]

Affiliation : Royal Society for Protection of Nature

Author Name : Tshewang Lhendup [5]

Affiliation : Royal Society for Protection of Nature

Author Name : Sonam Tshering [6]

Affiliation : Royal Society for Protection Nature

A Coordinated response to the plight of the White-bellied Heron (Ardea insignis)

Abstract Summary:

The Critically Endangered White-belliedHeron (Ardea insignis) is the one of the world's rarest birds and is the second largest heron. As such, a group of international and range-state based conservationists, government representatives and scientists, came together in Guwahati, India in December 2014 for a Conservation Strategy Workshop. As a result, the White-bellied Heron Working Group was formed under the IUCN SSC Heron Specialist Group; International and Regional Coordinators were appointed and a global Conservation Strategy was produced in November 2015. This was followed by a second International Workshop held in Bhutan in late November 2015. Survey work in China got underway in 2015 to try and understand the likelihood that a population still survived in China or not; while in India the White-bellied Heron Coordinator held national meetings and field work increased. Soon after, one of the top priority actions was implemented when two birds were fitted with satellite transmitters in Bhutan in June 2016. The IUCN SSC White-bellied Heron Working Group, has been working through its members to provide multi-pronged support at levels ranging from funding, to capacity support in satellite telemetry (since 2016), captive breeding (with training at international zoos starting in 2017, a breeding centre built in 2020 in Bhutan and birds brought into captivity in Bhutan in 2021) and assistance with identifying areas of survey priority and survey techniques (since 2018). This small yet committed community continues to strive to protect the species from the on-going and growing threats to the species. This talk explores the challenges and hope for such a species and attempts to centralise information and support through a Working Group model.

Keywords: Conservation

Author Name : Gemma Goodman [1] *

Affiliation : Synchronicity Earth/White-bellied Heron Working Group

Setting up protocols to monitor the Critically Endangered White-bellied Heron, *Ardea insignis* with focus on threats to the species in the changing landscapes around Namdapha Tiger Reserve, Arunachal Pradesh, India

Abstract Summary:

The White-bellied Heron (WBH), *Ardea insignis*, is one of the most threatened birds in the world. India may host the largest population of WBH, but there have been limited population surveys. Namdapha Tiger Reserve (NTR), in the north-east of the Indian state of Arunachal Pradesh, has been noted as a strong-hold for the species where sightings have been recorded and estimates thus far are of 5-6 individuals remaining. However regular monitoring of the species has been a challenge due to lack of resources and with more attention being given to monitoring large and charismatic mammals found in the Tiger Reserve. 3 line transects measuring 1-2 Km were identified in areas where there have been records through opportunistic sightings by tourists, wildlife enthusiasts and NTR staff. These will be used for monitoring White-bellied Heron in collaboration with the Reserve staff and local communities residing in the fringe area of the Reserve. As a trial measure these transects were monitored in the summer of 2021 by surveying along these trails in the mornings and evenings. Various environmental parameters, activities of the birds and habitat characteristics were recorded during these surveys. 2 pairs of birds were recorded in two of these transects during these surveys which are known WBH habitats. Anthropogenic activities like fishing, construction of temporary check dams, built up area, habitat being used as a thoroughfare and general presence of people were observed along all these known habitats. While areas in core areas of NTR may provide a better habitat for the species in terms of lesser threats and disturbances, it is imperative to monitor the species in its known habitats as establishing its presence in unknown areas will be challenging considering the terrain and the shy and elusive nature of the bird. We will continue to use the monitoring protocols by training the NTR staff and involving them in monitoring the species seasonally.

Keywords: Habitat

Author Name : Yumlam Benjamin Bida [1] *

Affiliation : ATREE

Author Name : Rohit George [2]

Affiliation : ATREE

Observations and conservation implications of a newly discovered White-bellied Heron nesting site in India

Abstract Summary:

The White-bellied Heron, *Ardea insignis*, is on the verge of extinction, with residential populations presently distributed only in Central Bhutan, North-East India and Myanmar. The Namdapha Tiger Reserve is the only breeding site of the species in India, holding a population of at least 7-8 individuals. In India, there is a huge knowledge gap in understanding the occurrence and distribution pattern of the White-bellied Heron, due to limited survey efforts in probable areas. The majority of areas in Arunachal Pradesh remain largely unsurveyed for White-bellied Heron. Therefore, the recent discovery of its nesting site in Walong area of Arunachal Pradesh is significant. It is the second nesting record after Namdapha and the easternmost record of White-bellied Heron in India. Here we present the preliminary findings of our surveys in Walong which was carried out from April to August. The surveys were carried out to record their feeding sites, documentation of potential threats and disturbances, behaviour towards human and other relevant aspects. Our findings show differences in White-bellied Heron behaviour towards humans, contradictory to the established perceptions in the Indian context. The White-bellied Herons appeared tolerant to human presence. We conducted semi-structured questionnaire surveys with 64 respondents in nearby villages to understand the historical occurrence of the species in the area and also to document the demography of the fringe communities. The documentation of White-bellied Heron in Walong is important due to the strategic location of Walong with other key White-bellied Heron sites.

Keywords: Conservation, Behavior, Habitat

Author Name : Samiran Patgiri [1] *

Affiliation : Samiran Patgiri

Nest predation of the critically endangered White-bellied Heron Ardea insignis by Masked Palm Civet Paguma larvata in Bhutan

Abstract Summary:

The White-bellied Heron *Ardea insignis* isverging extinction, but very little is known about their basic ecology and biology, hindering effective implementation of the conservation actions. Although the nesting failure rate of the White-bellied Heron recorded in Bhutan seems widespread, to date, nothing is known about the predators of this species, nor its causes sufficiently understood. We carried out a systematic survey method to locate the nests of the White-bellied Heron. The active nests were monitored continuously until the fate of the nests was confirmed. Then, the camera traps were set up on the failed and abandoned as well as the artificial nests baited with dyed chicken and dummy eggs. The evidence strongly suggests that Masked Palm Civet *Paguma larvata* is an egg predator of the White-bellied Heron responsible for a single nest failure at Burichu, Tsirang. Also, potential bird egg predators belonging to at least eight genera were documented. To this end, conservation management should implement evidence-based nest protection methods from their natural predators to reduce and prevent further nesting failures. Additionally, an intensive study is required to glean vital information on the causes of nesting failures, including the nesting predation from their breeding sites and its impacts on their nesting behavior.

Keywords: Conservation, Behavior, Predation

Author Name : Pema Khandu [1] *

Affiliation : Department of Science, Biology and Environmental Sciences, Wangbama Central School, Thimphu 11001, BHUTAN

Habitat requirement of the Madagascar Pond-heron *Ardeola idea* in Madagascar

Abstract Summary:

Foraging habitat of the Madagascar Pond-heron, *Ardeola idae*, were investigated in Madagascar using data collected over the last 23 years through literature reviews, field monitoring and surveys undertaken from 1993 to 2016. Data from 220 localities were collected and analyzed for the study using bird abundance and habitat characteristics variables to determine foraging habitat needs. Madagascar pond-heron was present at 106 localities (48,18 % of the visited localities). Based on wetlands classification used by the Ramsar convention, the species occurs at nine types of wetlands out of 32 identified in Madagascar. The habitat indices of frequentation ($^{I}hab^{M}$) by the pond-heron were determined and the result show that the species give priorities to freshwater lakes ($^{I}hab^{M}$ = 2.61) rice field ($^{I}hab^{M}$ =1.06), and rivers ($^{I}hab^{M}$ = 0.50), with significant difference between habitat types (Levene test: $\alpha=0.05$, $p < 0.0001$). In terms of abundance, freshwater lakes and rice field were the most frequented by the bird with respectively 21.11 and 10,47 bird per km². Principal Components Analysis revealed that positive correlation exists between bird density and the height of vegetation at habitat shore, the vegetation cover on watershed, and the water pH, and inversely correlated to aquatic vegetation cover and altitude. Pond-heron were absent or had no preference for both non-vegetated wetlands and wetland with high level of human activities. The main threats of the species are habitat destruction such as conversion of wetlands for agricultural land, watershed deforestation, and urbanization at all its foraging area. Urgent actions are needed to reinforce action to limit wetland degradation especially at species foraging area.

Keywords: Foraging

Author Name : Rivo RABARISOA [1] *

Affiliation : Member

Author Name : Hajanirina Rakotomanana [2]

Affiliation :

Current status of the Madagascar Heron, *Ardea humbloti* (Milne-Edwards and Grandidier, 1885) in Madagascar

Abstract Summary:

The Endangered species Madagascar Heron, *Ardea humbloti* breeds in Madagascar with a recent records in Mayotte. In order to strengthen its conservation, investigations were carried out through literature reviews and field expeditions undertaken from 1993 to 2020 for population assessment and trend evaluation. Trend analyses were conducted using Trends and Indices for Monitoring data (TRIM) software based on 25 years survey and population estimates from 2015 to 2020. The species occurred in various type of wetlands throughout Madagascar with higher concentration along the western coastal area, it becomes rare in the southern part and absent along the eastern part of the country. The current population was estimated between 1300 and 1500 individuals with a minimum of 750 breeding pairs. The species was recorded nesting in colony but most of the time seen alone with one record in Mayotte. The population showed a moderate declination, but significantly did not exceed 5% per year (95% CI , $p < 0.01$).The main threats are habitat destruction, disturbance and persecution at its breeding site. Action plan for conservation are needed to preserve this species.

Keywords: Conservation

Author Name : Rivo RABARISOA [1] *

Affiliation : Member

An update on the status of Slaty Egrets in southern Africa

Abstract Summary:

A single species action plan was produced for Slaty Egret *Egretta vinaceigula* in 2005. This paper updates the known distribution of Slaty Egrets to 2020 and provides information on recently discovered breeding sites. Since the first record in Angola - four specimens in the Lubango Bird collection - there have been 11 sightings of Slaty Egrets during May 2015 and August 2018, all in the Okavango catchment. Further surveys have been carried out in Zambia notably in the Barotse floodplains in Liuwa National Park where birds are not uncommon. Large counts of up to 100 birds have also come from the Kafue Flats and the Simungoma area of the Zambezi floodplain with recent sightings too from Bangweulu in the Zambian Congo system. However, there is no evidence of breeding in Zambia. Regular wanderers occur in South Africa, Namibia and Zimbabwe, with breeding only very rarely recorded in the former two countries. The presence of the species in Mozambique and the DCR is discussed.

In Botswana where the main population of Slaty Egrets occur, three breeding sites were known up to 2000 but since then a further nine colonies have been located. The locations of these are described and threats to the species are described. Some information is provided on roosting behaviour.

Keywords: Restoration/Management

Author Name : Stephanie Tyler [1] *

Affiliation : Birdlife Botswan

Targeted water management is key to recovery of the endangered Australasian bittern

Abstract Summary:

The Australasian bittern (*Botaurus poiciloptilus*) is a cryptic, globally endangered waterbird and the most threatened bittern in the world. Over the past decade, concerted efforts, including substantial public funding, have promoted the species as a flagship for wetland conservation and provided new insights into the conservation status, key threats and required conservation actions. The global population appears to be around 2000 individuals and still in decline, particularly in New Zealand. The new Action Plan for Australian Birds (Garnett and Baker, Eds., CSIRO Publishing) estimates the national population at 1300 birds, concentrated in the Riverina region of New South Wales, where rice fields support 500-1000 birds, with the most important natural wetlands comprising the Barmah-Millewa, Lowbidgee and Fivebough-Tuckerbil systems. Northern Victoria, especially around the Kerang region, contains several key wetlands, like Hird and Johnson Swamp, while south-western Victoria, including adjacent parts of south-eastern South Australia, can also support relatively large numbers, notably at Bool and Hacks Lagoon, and Pick Swamp. With the exception of rice fields, almost all of these occur in protected areas and game reserves. Tasmania and south-western Australia each support a small, relatively isolated subpopulation of less than 100. In Australia, the increasing severity and frequency of drought is now considered the key threat, emphasising the importance of drought refuges and impacts of climate change. Dry periods reduce the environmental water available for key bittern sites in the Murray-Darling Basin and amplify water-use efficiency measures in rice fields that are undermining successful breeding opportunities. Improved water management across all wetland types could maximise the benefits to bitterns. For example, providing a sufficient hydroperiod for successful breeding that also incorporates a drying phase can maintain the preferred early successional stages of vegetation and maximise prey abundance. Incentives for bittern-friendly rice farming and targeted environmental water management at key wetlands should be prioritised, while the potential impact of fox and cat predation needs to be assessed. Despite increased attention, the conservation status of the Australasian Bittern remains grave and greater management effort is urgently required.

Keywords: Conservation, Habitat, Restoration/Management

Author Name : Matthew Herring [1] *

Affiliation :

Reddish Egret Conservation: A 15-year history of the Reddish Egret International Working Group

Abstract Summary:

In 2005, a group of biologists met during the 29th Annual Meeting of the Waterbird Society to discuss conservation and research needs for Reddish Egrets (*Egretta rufescens*). Subsequent to that meeting, a species status review was conducted in 2006 and the Reddish Egret Working Group (REWG) was established. From 2006 – 2011, significant research was conducted on the species including establishment of long-term banding program, movement ecology studies using satellite telemetry and several range-wide population genetics study commenced. Also during this period, the REWG began capacity-building to establish a network of biologists, natural resource managers and other stakeholders invested in the conservation of Reddish Egrets and their associated habitats. In 2012, the REWG held its first meeting of the working group in Corpus Christi, Texas with stakeholders from U.S.A and Mexico. Using the Open Standards for the Practice of Conservation model, the REWG developed and drafted the first Conservation Action Plan for the species published in 2014. While various objectives of the Plan were being implemented, the REWG continued capacity-building to add partners and stakeholders from throughout the species range. During this period, ProNatura received funding from the Neotropical Migratory Bird Treaty Act Grant to conduct wintering surveys in Mexico and ultimately the completion of the Mexican Business Plan for Reddish Egret Conservation. The REWG also began meeting on annual basis to further advance conservation and research for the species. In 2018, the REWG secured funding from National Fish and Wildlife Foundation to update the Conservation Action Plan to include the development of range-wide strategies and objectives as well as the U.S. Business Plan for Reddish Egret Conservation. Various workshops were held during the drafting of these documents and included partners from U.S.A., Mexico, Cuba, Honduras, Belize, Bahamas and Colombia; at these workshops, the REWG officially changed its name to Reddish Egret International Working Group (REIWG). In 2021, the REIWG completed the range-wide Conservation Action Plan with seven over-arching conservation strategies for the next 10-year period.

Keywords: Conservation, Restoration/Management

Author Name : Clay Green [1] *

Affiliation : Texas State University

Agonistic behavior between Reddish Egrets *Egretta rufescens* in Northern Colombia

Abstract Summary:

The Reddish Egret *Egretta rufescens* inhabits shallow coastal flats, lagoons, and salt pans. It is distributed from the southern coast of the United States and the Pacific coast of Mexico, through the Caribbean islands and the Central American coast to northern Colombia, Ecuador, and Peru. Among the herons of the Americas, the Reddish Egret is the most solitary forager and the one that is most aggressive defending its feeding territories. Observations were made in a wetland habitat located in Laguna Buenavista (118340N, 728510W) in La Guajira state, Northern Colombia. This report describes the first observation of an adult Reddish Egret killing a juvenile conspecific. The possible reason for the killing was the invasion of the adult's foraging territory.

Keywords: Foraging

Author Name : OSCAR ALDANA ARDILA [1] *

Affiliation : Laboratório de Sistemática e Ecologia de Aves e Mamíferos Marinhos UFRGS

Author Name : Caio Carlos [2]

Affiliation : UFRGS

Observations of the largest known breeding colony of Agami Herons at Tapiche Reserve in the Northeastern Peruvian Amazon

Abstract Summary:

The Agami Heron (*Agamia agami*) is widespread in the Neotropics but remains a poorly understood species; little has been confirmed regarding population sizes and trends, seasonal migration patterns, and the Agami's role in the wetland communities it inhabits. In this paper, we explore these topics through observations made from 2013 to 2021 of a large mixed-species heronry including Agami Herons located at the Tapiche Reserve in northeastern Peru. Situated in seasonally flooded forest at the edge of a lagoon, the two-hectare breeding ground is observable by eye and binocular via boat and was estimated to contain several thousand Agami nests in 2017 and 2019. As seasonal breeders, the Agami are typically present at this site between January and July, outside of which the rookery is deserted. The Agami were completely absent in 2018, when the nesting area did not flood, and 2020, when the flood was low and delayed. The Agami were the first to occupy the breeding ground during years of breeding success, with Boat-billed Herons arriving later in approximately equal numbers to the Agami. The Boat-billed Herons appeared to use existing Agami nests rather than building new structures, and, in the years that the Agami did not nest, the Boat-billed also failed to breed. Eight additional waterbird species are resident in the rookery area, some breeding concurrently with the Agami. Primates, raptors and reptiles were seen preying upon Agami eggs and young. Prior to reserve establishment in 2010, local people exploited the rookery by collecting eggs. The Agami responded rapidly and positively to protection of the rookery and showed resilience to isolated episodes of drought. Some observations suggest, however, that these birds are challenged by consecutive years of adverse climate conditions. An understanding of the Agami's foraging behavior and range while breeding, movement patterns outside the breeding season, and alternate breeding locations, if any, during atypical flood years would be of immense value to conservation efforts for this iconic heron species.

Keywords: Conservation, Migration, Reproduction

Author Name : Deborah Chen [1] *

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Affiliation : Drexel University

Update of the conservation status and distribution of herons in Paraguay

Abstract Summary:

Herons are closely related to humid environments, and are bioindicators of the quality of their habitats, mainly because of their fidelity to their nesting sites and being predictable in their reproductive phenology. Paraguay holds 14 species of herons, which occur in wetlands of local and international importance such as those found in the south of the country, the capital, the Central Chaco and the Paraguayan portion of the pantanal, thus embracing diverse ecosystems at the national level. The status of conservation and distribution of the herons was updated, using as a basis data collected in the free platforms eBird (www.ebirg.org) at national level, *Heron Conservation* (https://www.heronconservation.org/) and *Waterbird population estimates* (http://wpe.wetlands.org/) at regional level, complemented by a revision of threat categories at national and international level. Currently, no species is under a threat category at the national or international level, with all species being recorded in the last two years. However, there are increasing threats such as the conversion of wetlands to rice crops and other uses, and the construction of infrastructure works that directly affect the ecosystems used by the Ardeidae family. Species such as *Egretta caerulea*, *Ixobrychus involucris* and *Cochlearius cochlearius* are the less recorded and more range-restricted species where a focus should be placed on.

Keywords: Restoration/Management

Author Name : Alberto Yanosky [1]

Affiliation : Independent Research, Pronii-CONACYT

Author Name : Tatiana Galluppi [2] *

Affiliation :

Author Name : Rebeca Irala [3]

Affiliation :

Overview on the diversity, biogeography, and conservation of Herons in Ecuador

Abstract Summary:

Twenty-three species of herons have been reported in Ecuador, including Agami Heron (*Agamia agami*) classified under the IUCN threatened category of Vulnerable and Zigzag Heron (*Zebrilus undulatus*) considered as Near Threatened. Few studies have focused explicitly on the herons of the country, and little information is available about their current distribution, natural history and ecology, population trends, and conservation status. We produced an integrated and updated assessment of the species richness and biogeographic patterns for all species and subspecies of herons of Ecuador. This study is based on a large species occurrence dataset obtained from different sources, including fieldwork, scientific literature, grey literature, natural history museums, open data biodiversity databases, and private expert databases. Analyses emphasise on wetlands and other localities that are part of the National System of Protected Areas of Ecuador or are classified as Important Bird Areas or RAMSAR sites. We identified causes driving population changes (declines or increases), including habitat changes, illegal hunt, invasive species, or human-heron conflicts. Finally, we applied the IUCN Red List categories and criteria to evaluate the extinction risk for all species at the national level and provide suggestions for implementing research and conservation actions.

Keywords: Conservation, Habitat

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Overview and wrap-up of Herons of World-wide Conservation Concern

Abstract Summary:

This presentation will examine the papers presented in the symposium from the standpoint of the Working Group as well as the goals of the Heron Specialist Group, as part of the International Union for the Conservation of Nature (IUCN).

Keywords: Conservation

Author Name : James Kushlan [1] *

Affiliation :

Wednesday, November 10, 2021

8:00 – 8:30 EST Virtual Field Trip: Terns, guillemots, and lighthouse life on the Isles of Shoals, New Hampshire (Gemma Clucas)

8:45 – 9:00 EST Welcome and Announcements

9:00 – 10:00 EST Plenary Address: Juliet Lamb

10:00 – 12:00 EST Dynamics of Waterbird Migration

12:00 – 13:40 EST Early Careers Panel

13:40 – 15:00 EST Behavior

15:30 – 17:00 EST Lightning Talks

17:15 – 17:45 EST Virtual Field Trip: Rice and lotus paddies with egrets and ducks in Ibaraki, Japan (Miyuki Mashiko)

Odd ducks or birds of a feather? From individual variation to population-level patterns in waterbird migration

Abstract Summary:

Migratory waterbirds face many unique challenges. Their migrations are among the world's longest, spanning multiple countries and ecosystems and requiring significant energy expenditure. Waterbird migration routes also depend on availability of high-quality coastal and wetland habitats, which are frequently degraded due to development, disturbance, or climate change. Furthermore, many waterbirds are subject to harvest, bycatch, and other anthropogenic sources of mortality during migration. This combination of interacting risk factors make migration a particularly vulnerable period of the annual cycle for waterbirds. At the same time, migration is a complex process guided by finely-tuned intrinsic and extrinsic conditions and cues, and can vary within and among both individuals and populations. In order to assess risk exposure, predict how waterbird migration will change under future conditions, and develop conservation strategies, it is first necessary to understand how internal and external factors interact to shape present-day waterbird migration patterns.

This talk will provide an overview of conservation issues associated with waterbird migration and introduce the major themes of this symposium. I will also present case studies assessing individual and spatial variation in migratory behavior in partially migratory (brown pelicans) and fully migratory (sea ducks) waterbird species in North America, with examples of how these effects scale up to population patterns and mediate risk exposure.

Keywords: Conservation, Migration, Movement/Tags

Author Name : Juliet Lamb [1] *

Affiliation : CEFE-CNRS

The migration of Icelandic whimbrels: recent findings and fitness consequences

Abstract Summary:

Many shorebird species perform long-distance migrations and within populations, individuals are likely to vary in their use of space and time during the annual cycle. Such inter-individual variation may result in different fitness, for example through breeding success. As several shorebird populations are declining, detailed knowledge on individual migratory behaviour might be important to understand population level changes.

The Icelandic whimbrel (*Numenius phaeopus islandicus*) is a long-distance migrant that breeds mostly in Iceland and winters in West Africa. From 2012 to 2020, we tracked 38 individuals with geolocators, 18 of which for over one year, and monitored their breeding success. Using these data, we (1) determined their migratory timings and routes, (2) explored individual timing consistency during the annual cycle and (3) linked weather and phenology to pre-nuptial stopover behaviour. Here, we will present these recent findings, and explore how Icelandic whimbrel migratory behaviour may have fitness consequences at the individual level.

Keywords: Migration, Behavior, Reproduction

Author Name : Camilo Carneiro [1] *

Affiliation : South Iceland Research Centre, University of Iceland, Lindarbraut 4, IS-840 Laugarvatn, Iceland

Drought at a coastal wetland affects refuelling and migration strategies of shorebirds

Abstract Summary:

Droughts can affect invertebrate communities in wetlands, which can have bottom-up effects on the condition and survival of top predators. Shorebirds, key predators at coastal wetlands, have experienced widespread population declines and could be negatively affected by droughts. We explored, in detail, the effects of drought on multiple aspects of shorebird stopover and migration ecology by contrasting a year with average wet/dry conditions (2016) with a year with moderate drought (2017) at a major subarctic stopover site on southbound migration. We also examined the effects of drought on shorebird body mass during stopover across 14 years (historical: 1974 – 1982 and present-day: 2014 – 2018). For the detailed comparison of two years, in the year with moderate drought we documented lower invertebrate abundance at some sites, higher prey family richness in shorebird faecal samples, lower shorebird refuelling rates, shorter stopover durations for juveniles, and, for most species, a higher probability of making a subsequent stopover in North America after departing the subarctic, compared to the year with average wet/dry conditions. In the 14-year dataset, shorebird body mass tended to be lower in drier years. We show that even short-term, moderate drought conditions can negatively affect shorebird refuelling performance at coastal wetlands, which may carry-over to affect subsequent stopover decisions. Given shorebird population declines and predicted changes in the severity and duration of droughts with climate change, researchers should prioritize better understanding how droughts affect shorebird refuelling performance and survival.

Keywords: Migration, Movement/Tags, Foraging

Author Name : Alexandra Anderson [1] *

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Affiliation : Department of Biology, Trent University, Peterborough, Canada

Author Name : Paul Smith [9]

Affiliation : National Wildlife Research Centre, Environment and Climate Change Canada, Ottawa, Canada

Tracking fall migration routes and stopover behaviour of Semipalmated Plovers using the Motus Wildlife Tracking System

Abstract Summary:

Arctic breeding shorebirds spend a significant portion of their lifecycle on migration, yet our understanding of ultimate and proximate drivers of migration behavior remains limited. For small-bodied (< 60g) species, this is largely due to weight limitations imposed by currently available tracking devices. Here, we used small (< 0.8g) VHF transmitters and the Motus Wildlife Tracking System to monitor individual semipalmated plovers (*Charadrius semipalmatus*) across two key periods, breeding and fall migration, with the aims of identifying migration routes and stopover behaviour, and understanding migratory patterns in the context of preceding parental investment. Birds with higher reproductive investment (i.e., males and successful breeders) departed breeding sites near Churchill, Manitoba later than birds with lower investment (i.e., females and failed breeders), but did not use different migration routes or stopover locations. Most birds stopped in three distinct locations along the Atlantic coast, with stopover lengths varying from four hours to 26 days. Males had longer stopovers than females. Males may stopover for longer to compensate for energy deficits acquired during extended periods of parental care. This study identifies high variation in migration strategies within a single breeding population, highlights areas of conservation importance, and validates the use of automated radio-telemetry in a subarctic shorebird system.

Keywords: Migration, Movement/Tags

Author Name : Marley Aikens [1] *

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Author Name : Erica Nol [2]

Affiliation : Department of Biology, Trent University, Peterborough, Canada

Author Name : Glen Brown [3]

Affiliation : Ontario Ministry of Natural Resources and Forestry

Migration efficiency sustains connectivity across agroecological networks supporting sandhill crane migration

Abstract Summary:

Preserving avian flyway connectivity has long been challenged by our capacity to meaningfully quantify continental habitat dynamics and bird movements at temporal and spatial scales underlying long-distance migrations. Waterbirds migrating hundreds or thousands of kilometers depend on networks of wetland stopover sites to rest and refuel. Entire populations may rely on discrete wetland habitats, particularly in arid landscapes where the loss of limited stopover options can have disproportionately high impacts on migratory cost. Here, we examine flyway connectivity in water-limited ecosystems of western North America using 108 GPS tagged greater sandhill cranes. Bird movements were used to reconstruct wetland stopover networks across three geographically unique sub-populations spanning 12 US-Mexican states and Canadian provinces. Networks were monitored with remote sensing to identify long-term (1988-2019) trends in wetland and agricultural resources supporting migration and evaluated using network theory and centrality metrics as a measure of stopover site importance to flyway connectivity. Sandhill crane space-use was analyzed in stopover locations to identify important ownership and landscape factors structuring bird distributions. Migratory efficiency was the primary mechanism underpinning network function. A small number of key stopover sites important to minimizing movement cost between summering and wintering locations were essential to preserving flyway connectivity. Localized efficiencies were apparent in stopover landscapes given prioritization of space-use by birds where the proximity of agricultural food resources and flooded wetlands minimized daily movements. Model depictions showing wetland declines from 16-18% likely reflect a new normal in landscape drying that could decouple agriculture-waterbird relationships as water scarcity intensifies. Sustaining network resilience will require conservation strategies to balance water allocations preserving agricultural and wetlands on private lands that accounted for 67-96% of habitat use. Study outcomes provide new perspectives of agroecological relationships supporting continental waterbird migration needed to prioritize conservation of landscapes vital to maintaining flyway connectivity.

Keywords: Conservation, Migration, Movement/Tags

Author Name : Patrick Donnelly [1] *

Affiliation : US Fish and Wildlife Service

A year in the life of a Lesser Yellowlegs: The trials and tribulations of a declining species

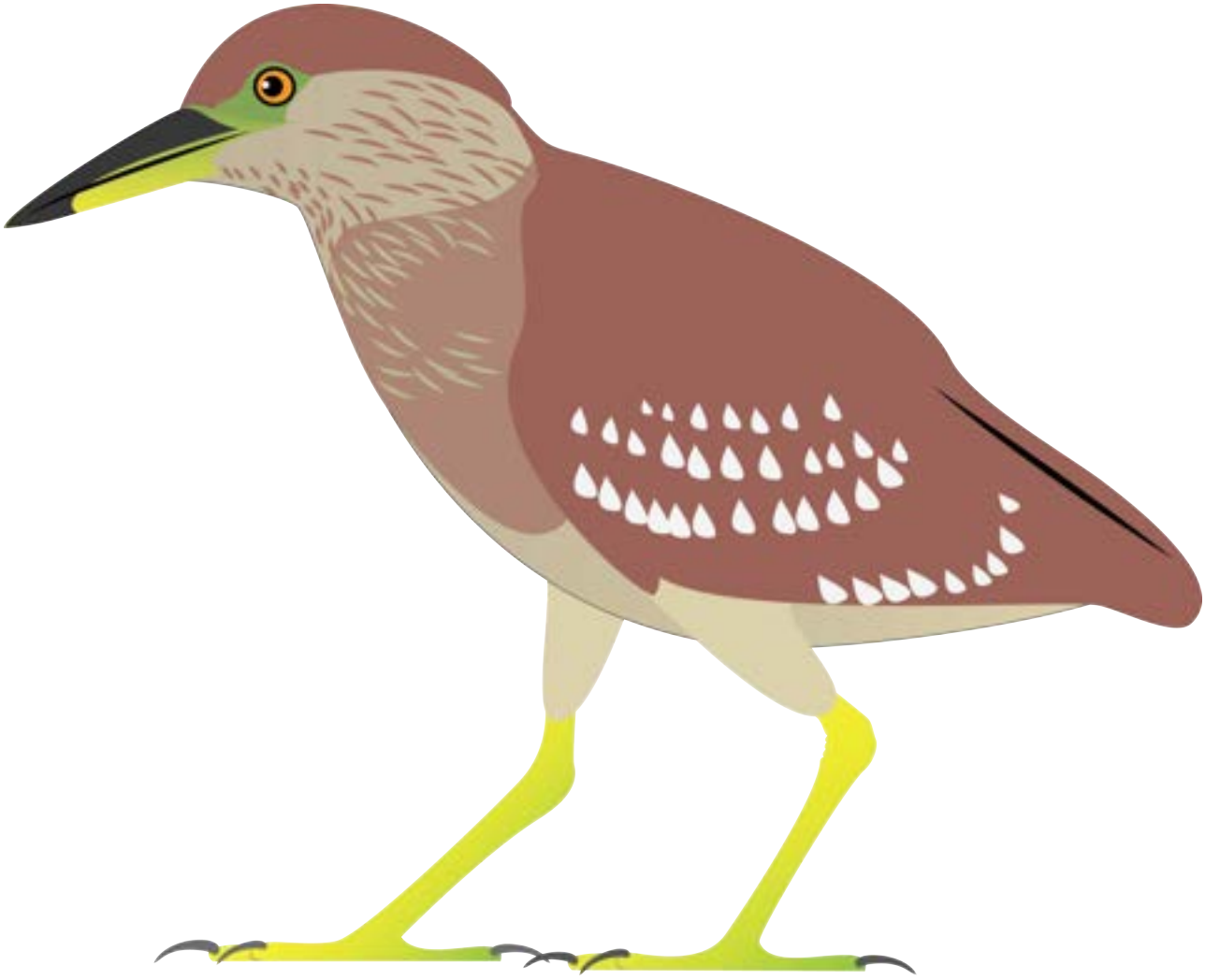
Abstract Summary:

The Lesser Yellowlegs (*Tringa flavipes*) has experienced a precipitous population decline since the 1970s. The causes of this decline are complex and interrelated and include the probable threats of habitat alteration, agrochemical application, and climate change, as well as the know threat of unregulated sport and subsistence harvest. Using PinPoint GPS Argos satellite transmitters, we tracked the migratory movements of breeding and migratory Lesser Yellowlegs from across Alaska and Canada. We examined the annual spatial and temporal distributions of migratory Lesser Yellowlegs and their probability of occurrence within geographic regions that participate in shorebird harvest. We found that birds migrating from eastern Canada experience a higher probability of occurrence within jurisdictions that practice shorebird harvest than birds breeding in Alaska and western Canada. This study has helped to provide the crucial information required to develop and implement targeted and effective conservation priorities for the Lesser Yellowlegs.

Keywords: Migration, Movement/Tags

Author Name : Laura McDuffie [1] *

Affiliation :



The Wood Stork as an “urban commuter”: a new view of how large-ranging species utilize urban environments

Abstract Summary:

Species are commonly classified as an "urban exploiter", "urban avoider", or "suburban adapter" based on their response to urban environments. However, species with large home ranges may within a single day utilize a variety of habitats along the urban-wildland gradient. Therefore, the traditional classification of species fails to capture the behavior of those that rely on both urban and wildland resources for population persistence. Here, we use the Wood Stork (*Mycteria americana*), a species that can make daily foraging trips up to 80 km away, as an example of a fourth type of response to urbanization, the "urban commuter." We monitored nests and sampled diet at stork colonies in South Florida, USA 2014-2020, and compiled nesting records from the entirety of the stork's U.S. breeding range 2002-2019, to investigate whether storks use (or avoid) urban habitats. We found that urban development now comprises up to 38.9% regionally of the land cover within the 10-km core foraging area surrounding colonies, and that storks access alternative prey types within these urban areas. Our results also showed that urban-nesting storks outperformed wildland-nesting storks when the hydrologic condition of the wetlands were suboptimal. We conclude that, whereas the Wood Stork still requires healthy wetlands and coastal systems for population persistence, the availability of urban habitat benefits storks when hydrologic patterns are not ideal for the concentration of prey in wildland habitats. This "commuter" response to urbanization, where individuals utilize both highly urban and wildland resources over short time periods, likely applies to many waterbirds and other animals with large home ranges.

Keywords: Behavior, Habitat, Foraging

Author Name : Kate Shlepr [1] *

Affiliation : Florida Atlantic University (Boca Raton, FL) & Harte Research Institute for Gulf of Mexico Studies (Corpus Christi, TX)

Vocalization differences between species in the oystercatcher family: Haematopodidae

Abstract Summary:

Animal vocalizations are one type of behavioral trait that has been shown to have the ability to greatly diversify within a family, and similar vocalization patterns do not necessarily equate to greater relatedness. Species in the oystercatcher family (Haematopodidae) are morphologically very similar and occupy similar habitat niches throughout their widespread range. Here, I aim to explore differences in the vocalizations of ten species in the family Haematopodidae, and investigate whether these differences stem from ecological relatedness or other factors such as habitat, feeding behavior, breeding behavior, or plumage forms. If differences in vocalization behaviors between species mirror phylogenetic relationships, then these genetic patterns may have accumulated over time, but if they are not correlated, then other forces such as sexual selection could be contributing to species divergence. I used recordings from the Cornell Lab of Ornithology's Macaulay Library and the Xeno-Canto database to investigate my question. I used the software RavenPro 1.5 to extract data from each recording, exploring variables such as high frequency (Hz), low frequency (Hz), max frequency (Hz), delta time (secs). After collecting these parameters from individual call notes for each species, I then used general linear models to compare the differences among species in vocal behavior, and to test whether similarities in vocalizations mirror phylogenetic relationships.

Keywords: Behavior

Author Name : Hannah Mirando [1] *

Affiliation : Cornell University

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Affiliation : Cornell Lab of Ornithology

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Affiliation : Cornell Lab of Ornithology

Age effects on foraging are sex-specific in a breeding seabird

Abstract Summary:

Environmental effects on reproduction are often indirect, acting through an influence on resource availability: high prey availability and/or quality improves breeding outcomes. Age also affects breeding outcomes and can condition an animal's performance under environmental variation. We examined how foraging traits, measured across five breeding seasons (2011–2012, 2014–2016), change with age, environment, and their interaction, in incubating Nazca boobies (*Sula granti*) of both sexes. A male-biased sex ratio in this population constrains males' breeding opportunities; accordingly, females may accumulate costs of reproduction faster across the lifespan, motivating examining foraging traits in each sex separately. We evaluated the hypotheses that 1) foraging outcomes improve from young to middle age, 2) foraging performance declines in old age, and 3) age-related differences in foraging performance are attenuated under good environmental conditions. Birds aged 4–24 years (covering much of the observed lifespan) were tagged with GPS loggers (N = 840). Age x environment interactions were examined with respect to environmental predictors (e.g., sea surface temperature, cloud cover). We found sex-specific patterns of aging in foraging performance: male Nazca boobies showed early-life improvement in flight speed and females showed late-life declines in foraging traits. Older females took longer foraging absences and traveled farther than younger birds did (e.g., on average, a 24-yr old female traveled 17 hrs and 250 km farther than a 17-yr old). We found marginal support for age x environment effects: under cloudy skies, older females gained mass slowly compared to prime-age and young breeders, with no age effect under clear conditions. In the relatively "poor" environment of 2016, young birds foraged in distinct areas from old birds, while spatial overlap was higher under the "good" conditions of 2015. The "poor" environment increased foraging effort, supporting (age-dependent) links between environmental change and reproductive outcomes. This is the first study examining age x environment interactions in foraging of a tropical seabird, expanding our understanding of aging patterns in long-lived vertebrates.

Keywords: Behavior, Foraging

Author Name : Jennifer Howard [1] *

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Author Name : Emily Tompkins [2]

Affiliation : Wake Forest University

Author Name : Felipe Estela [3]

Affiliation : Pontificia Universidad Javeriana - Cali

Author Name : David Anderson [4]

Affiliation : Wake Forest University

The spring re-occupation of a Ring-billed Gull colony at Toronto, Ontario: February to May, 2021

Abstract Summary:

This study documents the spring re-occupation of a large colony of Ring-billed Gulls on Lake Ontario at Toronto Harbor. It is based on 119 observation periods of up to 12 hours each (Ave. = 2.0 hrs/period) from 16 January to 21 May 2021. Observations were made during the early morning (pre-sunrise, 60.5%), mid-day (15.1%), early evening (22.7%) and dusk to dawn (1.7%). Full colony occupation was a gradual process that took approximately 80 days from the gulls' return to the harbor in mid-February to their continuous 24-hr occupation of the colony site in mid-late May. The stages of re-occupation included: daily pre-sunrise amassing on the ice or water of Toronto's outer harbor (to Feb. 25), nightly roosting offshore in Lake Ontario, daily pre-sunrise amassing on the aquatic embayments close to the breeding areas (Feb. 26 - Mar 2), daily pre-sunrise amassing on the land areas of the colony (Mar 3 onwards), 1st egg laying (Apr. 18), complete departure from the colony each evening (sunset +/-), daily return to the colony (pre-sunrise)(up to May 6), and, finally, 24-hr occupation of the colony with occasional predator event interruptions (May 6 onwards). Morning arrival events were rapid and intense involving hundreds (and then thousands) of individuals in spectacular aerial gyrations and deafening vocalizations; in contrast, departure events were usually subtle, gradual and quiet. The presentation will conclude with a 2-3 minute video of the pre-sunrise arrival at the colony.

Keywords: Behavior

Author Name : Chip Weseloh [1] *

Affiliation : Canadian Wildlife Service

Identifying personality and its fitness consequences in razorbills (*Alca torda*)

Abstract Summary:

Animal personality is defined as consistent behaviour over time and across contexts whilst remaining consistently different from other individuals in the population. These between-individual differences can result in divergent foraging behaviour and reproductive success and influence how individuals respond to environmental change, with the potential to alter population dynamics. Although personality has been found in numerous taxa throughout the animal kingdom, few studies have focused on seabird species. We aimed to identify personality and possible fitness consequences of personality in razorbills (*Alca torda*), a pursuit diving seabird from the family Alcidae. Three tests of personality were conducted on chick-rearing razorbills (n=30) during July 2021 in coastal Newfoundland, Canada, to quantify the frequency of personality traits along the shy-bold continuum. Personality tests involved quantifying behavioural responses to extraction from the breeding rock crevice, a period of restraint, and handling by researchers. Razorbills exhibited a wide range of behavioural responses along the shy-bold continuum, indicating that these tests may be successful at identifying personality in this species. Consistent between-individual differences were shown by significant correlations among test scores, indicating bold/shy individuals were consistently more bold/shy than other birds in all tests. Additionally, boldness scores were highly consistent among two/three researchers (Kendall's W = 0.795/0.830). A Principal Component Analysis (PCA) combined all test scores into a boldness index (PC1) for each individual. Successful breeders had significantly higher boldness scores (PC1) than failed breeders (Pairwise Wilcox Test, p = 0.028), suggesting fitness consequences of personality. Next steps include repeating personality tests on these individuals in subsequent years to test behavioural consistency over time as well relating personality differences to dietary consistency (stable isotope analysis) and foraging/movement patterns during breeding and non-breeding seasons in a multi-year context. This study represents a first step in quantifying personality in this alcid species, which will provide insight into intraspecific behavioural diversity and the ability of razorbills to cope with future environmental change.

Keywords: Behavior

Author Name : Matthew Legard [1] *

Affiliation : University of Manitoba

Estimating nest productivity and identifying sources of nest failure in Least Tern colonies in the Outer Banks

Abstract Summary:

Least Terns are a beach nesting species, and their breeding sites are especially vulnerable to both human and non-human impacts. Least Terns are listed as a species of Special Concern in North Carolina. We are assisting the National Park Service at Cape Hatteras National Seashore to evaluate the efficacy of their existing Least Tern protection protocols by measuring daily survival rates for Least Tern nests and identifying human and non-human sources of nest failure. Least Tern nests were monitored to determine fate in the summers of 2019, 2020, and 2021 utilizing two monitoring methods: ground-nest counts and incubating-adult counts. Along with nest fate, we recorded data on potential sources of nest failure. We plan to use nest survival analyses included in the R package RMark along with Bayesian statistical approaches to estimate daily survival rate (DSR) for Least Tern nests and to identify causes of nest failure.

Keywords: Conservation, Reproduction, Restoration/Management

Author Name : Erin Gallagher [1] *

Affiliation : University of North Carolina Wilmington

Author Name : Raymond Danner [2]

Affiliation : University of North Carolina Wilmington

Least Tern behavioral responses to natural and anthropogenic disturbances on Hatteras Island, NC

Abstract Summary:

Breeding Least Terns (*Sternula antillarum*) exhibit behavioral responses to both anthropogenic and natural sources of disturbance. On Hatteras Island, we recorded potential sources of disturbance at eight colonies and behavioral responses of birds toward disturbances at multiple nests per colony. Preliminary results show that the most prevalent potential sources of disturbance around colonies were pedestrians and natural factors (e.g. predatory birds, mammals, and intraspecific aggression). Disturbance response behaviors were greater when responding to anthropogenic factors compared to natural factors. The count of potential disturbance factors and location of nests within a colony (e.g. center or edge) did not affect the probability of a nest being disturbed.

Keywords: Behavior, Reproduction, Restoration/Management

Author Name : Alexander Smith [1] *

Affiliation : University of North Carolina Wilmington

Assessing the value of created marshes for wetland birds in southeast Louisiana

Abstract Summary:

Habitat loss from natural and anthropogenic processes threatens waterbird populations along the northern Gulf Coast. In Louisiana, marsh creation and restoration projects are utilized to combat marsh loss, however, the effectiveness of such efforts on wetland dependent wildlife is not well understood. Our study compares bird species richness and occurrence between natural and created marshes across southeastern Louisiana. During the spring of 2021, we conducted point counts and vegetation surveys at 6 created marshes and 6 natural marshes. Our preliminary results suggest that bird species richness and detection rates are similar between created and natural marshes. However, we had higher detection rates of common gallinule (*Gallinula galeata*), purple gallinule (*Porphyrio martinicus*), seaside sparrow (*Ammospiza maritima*), and king rail (*Rallus elegans*) at natural sites. This could be a result of infrequent flooding and inundation of created marshes which leads to a more upland/woody plant community than observed in natural marshes.

Keywords: Restoration/Management

Author Name : Aylett Lipford [1] *

Affiliation : Louisiana State University

Habitat use of wading birds during the non-breeding season in the northern Gulf of Mexico

Abstract Summary:

Most knowledge about habitat use by wading birds are obtained during the breeding season. However, knowledge on habitat use during non-breeding seasons could also be important for at least two reasons. First, the condition of habitats in pre-breeding seasons can influence the size of breeding bird population in the following year. Second, the investigation of non-breeding habitat use helps identify important habitats for conservation planning. To better understand the habitat use of wading birds in non-breeding seasons, we deployed Argos-tracking devices on fledging white ibises and tricolored herons in coastal Alabama at their breeding colonies. We applied Brownian Bridge Movement Models (BBMM) to estimate home ranges and calculated Manly's Selection Ratio to describe habitat use after they left their natal colonies. This study will promote the understanding of movement ecology of wading birds in this region and help guide population restoration in the northern Gulf of Mexico.

Keywords: Habitat, Movement/Tags

Author Name : Ke Zhang [1] *

Affiliation : University of Florida

Author Name : Chris Gulick [2]

Affiliation : University of Florida

Author Name : Abby Powell [3]

Affiliation : USGS Florida Cooperative Fish and Wildlife Research Unit

Using game cameras to monitor disturbance events at protected seabird colonies

Abstract Summary:

Second Chance is a dynamic sandbar in the Rookery Bay NERR of southwest Florida that is a nesting site for protected Least Tern (*Sternula antillarum*), Black Skimmer (*Rynchops niger*), and Wilson's Plover (*Charadrius wilsonia*) shorebird species and is therefore certified as a Critical Wildlife Area (CWA) by the Florida Fish and Wildlife Conservation Commission (FWC). While regular monitoring occurs, we do not know what happens on the island when we are absent. The main objective of this study was to determine if game cameras could provide data for wildlife managers on disturbances to the Second Chance nesting sites. We used Spartan GoCam cellular game cameras to wirelessly monitor nesting colonies. To our knowledge, this is the first use of Spartan game cameras on an entire colony. This summer, we found that disturbances occurred most often in mornings and on weekends, and that fishermen had the greatest impact on the colonies.

Keywords: Behavior, Predation, Restoration/Management

Author Name : Helen St. John [1] *

Affiliation : Grinnell College

“Flamingos do Sul”: Integrating ecology and ethnobiology in favor of the conservation of Chilean Flamingos in southern Brazil

Abstract Summary:

The Lagoa do Peixe National Park is an important area for many species of birds, including the Chilean Flamingo (*Phoenicopterus chilensis*), that use the area during its non-breeding season. The Lagoa do Peixe National Park is the only conservation area in Brazil where Chilean Flamingo can be seen all year round. Despite that, little is known about the ecology and ethology of the population that occurs in the park. Studies of these animals can be an important tool to the conservation of the species in the region and to the protection of all the Lagoa do Peixe, threatened by the agricultural, fishing and tourism sectors. The Flamingos do Sul project aims to build knowledge about the Chilean Flamingos in the park to promote the construction of more effective management and conservation plans, as well as actions of environmental education, focusing in three different areas: ecology, ethnobiology and conservation.

Keywords: Conservation, Behavior, Restoration/Management

Author Name : Henrique Delfino [1] *

Affiliation : Federal University of Rio Grande do Sul

Author Name : Caio Carlos [2]

Affiliation : UFRGS

Annual trends in mercury concentrations in American Oystercatchers (*Haematopus palliatus*) in southeastern North Carolina

Abstract Summary:

American Oystercatchers (*Haematopus palliatus)* are a species of greatest conservation need in North Carolina. With only 11,000 birds in the United States, this species is threatened by loss of beach habitat, recreational disturbance, predators that thrive in the presence of people, and the presence of anthropogenic pollutants. One such pollutant is the heavy metal mercury (Hg) which bioaccumulates in food chains and can lead to impaired reproduction and decreased survival. We monitored levels of mercury in the American Oystercatcher population in southeastern North Carolina to serve as a baseline for future comparisons. Chick feathers were analyzed through direct thermal vaporization. Mercury levels ranged from 0.35 ppm to 3.40 ppm across 2017–2020 and differed among years ($p < 0.0001$). Continued monitoring is needed to understand the cause of annual variations, health implications, and conservation needs.

Keywords: Contaminants

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Modeling wading bird habitat changes in response to rising seas: temporal availability of habitat as a spatial attribute

Abstract Summary:

Resource availability for waterbirds is likely to be constrained temporally when these species occupy ephemeral habitats. Niche-based models that rely on traditional structural habitat measures, such as vegetation type, may perform poorly in this situation unless temporal constraints are a quantifiable feature of the habitat (i.e., time-integrated habitat availability). Therefore, we tested whether time-integrated resource availability in an intertidal zone explained more variation in habitat use patterns of Little Blue Herons and Great White Herons than did traditional measures of habitat structure. For both species, time-integrated resource availability and water depth were the most important determinants of habitat use. The probability of use was highest for sites where water depths stayed within an accessible range for the longest time, indicating that temporal availability is a spatial attribute. Moreover, the loss to rising seas of these relatively uncommon sites may disproportionately impact foraging habitat in coastal areas.

Keywords: Habitat

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Combatting Cat Depredation in Hawai’i through Communication

Abstract Summary:

This year, the Kaua'i Wildlife Coalition launched the Wildlife Friendly Business initiative. The project targets business owners and asks them to agree to simple conditions including refraining from feeding feral cats and adhering to wildlife-friendly lighting guidelines. A key aim is to make the feeding of feral cats outdoors in Kaua'i socially unacceptable, as a first step to reducing feral cats on the landscape and saving hundreds of threatened and endangered waterbirds and seabirds annually from cat depredation. In this lightening talk, we will briefly explore the deepening problem that outdoor cats pose to highly endangered Hawaiian waterbirds and explore how the WFB project is one of the solutions we are using to mitigate for it.

Keywords: Behavior

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A snapshot of Saddlebill Stork population structure

Abstract Summary:

The Saddlebill Stork (*Ephippiorhynchus senegalensis*) is an understudied species in sub-Saharan Africa.W initiated a mark-resight study on the Saddlebill in Liuwa Plain National Park, Zambia. The first year of the study, 2019, was the worst drought in recorded history and we consequently found very few storks in the park. Conversely, in 2021 we identified 87 individual storks using their unique bill patterns, as well s 30 juveniles from 11 broods. Immatures made up 73% of storks observed. We also recorded immatures associating in groups as large as 23. Our observations represent the first snapshot of population structure for Saddlebills anywhere in Africa. This simple, low-cost method will continue to be used to study population dynamics in Liuwa and can be applied elsewhere in the species range, too.

Keywords: Conservation, Behavior, Reproduction

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Automating large-scale waterbird monitoring using drones and deep learning

Abstract Summary:

Monitoring wildlife is necessary for making well-informed conservation decisions to protect species of interest. This can often be expensive and logistically difficult to conduct. Along the Texas Gulf Coast, several organizations and partners survey colonial waterbird nesting islands. Historically, boat-based surveys have been conducted monthly using binoculars and scopes to estimate the number of nesting birds. Unfortunately, these surveys can be prone to missing nests given the low vantage points, particularly on larger or higher islands. In recent years, use of an unmanned aerial vehicle (UAV), or drone, during the boat-based surveys have allowed for more accurate estimates of nesting; however, manually digitizing UAV footage is incredibly time-consuming. Deep learning-based object detectors utilizing convolutional neural networks can be used to automate the digitization of UAV footage. We explore how drones and deep learning can enable efficient and accurate censusing of our critical waterbird nesting areas.

Keywords: Conservation, Reproduction, Restoration/Management

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Thursday, November 11, 2021

8:00 EST Welcome and Announcements

8:20 – 10:00 EST Conservation, Foraging, & Movement

10:00 – 12:00 EST General Session

13:20 – 15:20 EST Focus on the Gulf Coast

15:40 – 17:00 EST Avian Die-Off Panel Discussion

17:30 – 18:00 EST Virtual Field Trip: Gulls and history in the Frioul Archipelago, France (Juliet Lamb)

Waterbird Foraging Habitat Selection in Balikpapan Bay: Water Depth and Patch Area as Important Factors

Abstract Summary:

Balikpapan Bay is one of the wetlands providing potential foraging habitat for waterbirds in Indonesia. Potential habitat loss due to oil industry expansion, recent waterbird occurrence, and co-occurrence of two closely related species with similar foraging characteristics led to habitat selection. Habitat selection could be affected by food as an intrinsic factor and extrinsic factor, for example, accessibility to the physical and biological components of the habitat. This study aimed to measure the foraging habitat selection, identify significant habitat quality parameters for the habitat selection and predict the foraging habitat selection model. We used one-zero sampling for collecting foraging habitat selection data, corer sampling for prey data, and collecting the abiotic environment, and Generalized Linear Modelling (GLM) to build the model. We identified four species as the migrant Little Egret (*Egretta garzetta*), Great Egret (*Ardea alba*), Purple Heron (*Ardea purpurea*), and Lesser Adjutant (*Leptoptilos javanicus*). All species, except Purple Heron, selected foraging habitats. A simple mathematic model of foraging habitat selection was significantly affected by two factors: water depth and patch area. A large patch area may provide primary prey abundance for waterbirds, while a low water depth level may give easy access to the prey.

Keywords: Behavior, Restoration/Management, Foraging

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Moving with the Monsoon: Rains influence spatial use and movement of two obligate filter feeders in the arid plains of Western India

Abstract Summary:

Arid plains of Western India are a stronghold for Greater Flamingo (*Phoenicopterus roseus*) and Lesser Flamingo (*Phoeniconaias minor*), and the 'Flamingo city' in the Rann of Kachchh is the largest known breeding site in South Asia. The unique Rann habitat remains dry for most of the year and gets flooded only during the monsoon. The extent of habitat use during the breeding and non-breeding season is not known, hence for the first time in South Asia, we initiated tagging and tracking of flamingos to understand their spatial use and fine-scale movement. During April-May 2019, four Lesser and two Greater Flamingo were tagged with a solar-powered GPS-GSM back-pack transmitter weighing 30 gm, using a Teflon harness. During the tracking period (April 2019- August 2021), flamingos primarily remained in the Kachchh landscape. The Greater Flamingo primarily remained in the west while the Lesser Flamingo used the eastern landscape, indicating the tagged birds to be the resident-breeding population. A Kernel Density Estimates (KDE) was performed to identify the high use areas which revealed that Lesser Flamingo uses a much larger area than Greater Flamingo. The area of utilization distribution (95% KDE) of Lesser Flamingo during two breeding seasons was 1211 and 2212 sq. km, while for Greater Flamingo was 487 and 5187 sq. km. This difference in the area was due to the significant increase in the amount of rainfall across the two seasons (48% increase) which provided suitable habitat for a longer period. Additionally, net displacement was found to be positively correlated with the NDWI and tagged flamingos moved to breeding areas only after the arrival of monsoon rains. Throughout non-breeding phase tagged Lesser Flamingos primarily used saltpans (41%) and coastal wetlands (35%), while Greater Flamingos extensively utilized coastal (50%) and inland wetlands (48%), and during the breeding season, all birds used spatially segregated Rann habitat. The data represented here is based on the tracking data of few individuals, and hence more flamingos are required to be tagged to understand the movement and habitat use better.

Keywords: Behavior, Habitat, Movement/Tags

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Recent advances in the ecological study of the endangered Diablotin Black-capped Petrel: at-sea distribution, diet, and threat exposure

Abstract Summary:

The Diablotin Black-capped Petrel (*Pterodroma hasitata*)is a highly endangered seabird in the western North Atlantic, listed as globally Endangered by the International Union for the Conservation of Nature, and currently being reviewed for listing under the U.S. Endangered Species Act. There are an estimated 2,000 pairs of Petrels nesting at five documented sites on Hispaniola, although to date only 100 nests have been located. Two phenotypes have been described, a smaller dark form and a heavier light form, which are genetically distinct and show temporally distinct molting patterns, suggesting distinct phenologies. Here we report on recent advances in the study of this species. In May 2019, we captured 10 adult Black-capped Petrels (5 dark phenotypes and 5 light phenotypes) at sea in Gulf Stream waters and equipped them with satellite trackers. In April 2018 and May 2019, we also collected fecal samples and feathers for analyses of diet and contaminants, respectively. Using tracking data, we assessed any differences in the utilization distributions (UD) of both phenotypes. We also quantified form-specific exposure to potential marine threats such as marine pollution (mercury and plastic), interaction with fisheries, and attraction and/or collision with ship traffic. Dark and light forms petrels had significantly distinct non-breeding distributions. Dark forms used a core area (i.e. 50%UD) entirely in the US EEZ, and a home range (i.e. 90%UD) overlapping with US EEZ (80%), international waters (14%), and Bahamas EEZ (5%). Light forms had a more northeasterly distribution, with a core area shared between US EEZ (78%) and international waters (22%), and a home range overlapping with US EEZ (60%), international waters (37%), and Canada EEZ (2%). Off the coast of the North America, the dark form is more exposed to mercury, plastic, and ship traffic, while the light form is more exposed to fisheries. Although limited in scope, our preliminary analysis of prey DNA showed a higher occurrence of fish than cephalopods in collected fecal samples. Finally, we will also report on an ongoing analysis of mercury levels in petrel feathers.

Keywords: Conservation, Movement/Tags, Foraging

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Individual Variation in the Foraging Personality and Plasticity of an Arctic Seabird

Abstract Summary:

Behavioral plasticity is a key mechanism by which species respond to environmental change. Though studies of individual-level differences in behavioral plasticity are rare, highly plastic individuals could contribute disproportionately to population persistence under rapidly changing environments. Here, we quantified persistent individual behavior across environmental conditions in a breeding colony of thick-billed murres in Hudson Bay, Canada. We applied mixed models to high-resolution foraging data to examine individual foraging behavior, including both personality (mean behavior expressed across environmental gradients) and plasticity (behavioral change across environmental gradients). We aggregated foraging and environmental data into spatially discrete foraging patches using hierarchical clustering. Thick-billed murres show considerable individual diet variation, so we predicted high individual variation in foraging behavior.

Thick-billed murres exhibited individual differences in mean foraging behavior and foraging behavioral plasticity, independent of sex and breeding status. The magnitude of these effects were, however, behavior-specific. Random intercepts, a measure of personality, were significant drivers of behavioral variability for all but one foraging behavior (% of time spent in the bottom phase). Random slopes, a measure of plasticity, were only significant for one foraging behavior, the time individuals spent in a foraging patch (duration).

Among the behaviors we tested, foraging patch duration showed the highest individual variability (39% of total behavioral variance); this foraging behavior was positively correlated with the distance of the foraging patch from the colony. The percent of the time foraging that was spent in the bottom phase, however, showed no individual variation and only a weak correlation with the distance of the foraging patch from the colony. A previously developed measure of patch quality, which is calculated using foraging metrics, showed a positive correlation with sea surface temperature and moderate individual variation (27% of total behavioral variance). Future work will link individual foraging to fitness and explore its consequences for population demography in a time of climate shifts and extremes.

Keywords: Behavior, Movement/Tags, Foraging

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Dynamics of Black Skimmer migration along the Atlantic Coast

Abstract Summary:

Optimal migration theory posits that bird migration coincides with conditions that balance the cost of migration based on energy and migration speed within the framework of other annual cycle requirements. Current research has documented that migration speeds are faster for some species in the spring than in the autumn, demonstrating that time constraints may be relaxed under autumn migration. Energy minimization may have greater relevance in fall, whereas in the spring migration timing and speed is a greater selective influence on migration strategies. If minimization of time during migration is a more selective factor, birds will generally travel the shortest possible route to and from nonbreeding areas, make few stopovers that are short in duration, and have high migration speeds. If minimization of the energetic cost of migration is a stronger influence, birds will increase the duration of migration, have lower flight speeds, and maximize the number of stopover locations and duration spent at the stopover locations. For this research we tracked a New York breeding population of the Black Skimmer (*Rynchops niger*) during autumn and spring migration and collected information on route, timing, migration speed, and stopover location use. While migration route was similar, we detected differences in migration speed, distances traveled, and stopover use. These results suggest that the Black Skimmer uses a combination strategy of minimizing energetic costs of migration during the fall and minimizing travel cost during spring migration.

Keywords: Migration, Behavior, Movement/Tags

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Prolactin and corticosterone concentrations in a species with female offspring desertion – the case of Whiskered Tern Chlidonias hybrida

Abstract Summary:

To understand the proximate mechanisms regulating brood desertion, we studied hormonal and behavioural stress responses during the chick-rearing period in adult Whiskered Terns (*Chlidonias hybrida*),a socially monogamous, semi-precocial species with prolonged post-fledging parental care. In contrast to males, almost all females of this species desert during the chick-rearing and post-fledging periods. Because of the expected link between corticosterone, prolactin and parental investment, we hypothesized that males and females should differ in circulating prolactin and corticosterone concentrations. Baseline hormone concentrations did not differ between males and females. In both sexes, prolactin and corticosterone concentrations decreased and increased in response to acute stress (30 min after capture), respectively. Baseline and stress-induced prolactin concentrations decreased significantly in both sexes with advancing brood age. As expected, males had significantly higher stress-induced prolactin concentrations than females. None of the nine males released after being held in captivity for 24 h deserted, whereas four (29%) of the 14 females kept in captivity for 24 h did so. Altogether, these results suggest that higher prolactin concentrations may be involved in the maintenance of parental care under stress. However, there was no statistically significant difference in stress-induced hormone levels in males or in females that deserted and those that returned to the nest after prolonged stress (24 h). Our data indicate that males are probably more resistant to stress as regards the continuation of parental care. The pattern of male and female behavioural and hormonal responses to stress partially predicts their behaviour in terms of natural desertion.

Keywords: Reproduction

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Ingestion of microplastics by Common Terns (*Sterna hirundo*) and Roseate Terns (*S. dougallii*) breeding along the Northeastern U.S. Atlantic coast

Abstract Summary:

Ingestion of microplastics (MPs) has been documented in countless marine species. As sensitive top predators, seabirds are of particular conservation concern when it comes to the pollutant. Despite this, MP ingestion by many groups of seabird, including terns, remains under-described globally. Our study aims to fill part of this knowledge gap in the Northwestern Atlantic by assessing MP and other anthropogenically-derived fiber ingestion in Common Terns (*Sterna hirundo*) breeding off of NH, MA, and NJ, and in Roseate Terns (*S. dougallii*) breeding off of NH. Suspected anthropogenic fibers were isolated from fecal samples (n=92) collected at the three colony sites in 2019, and were identified via µFTIR analysis. While MP size did not differ between the three colonies sampled (p=0.281), the abundance of the pollutant ingested differed between NH- and MA - breeding Common Terns (p=0.002). MP load did not differ between NJ and NH (p=0.109) nor between NJ and MA (p=0.194). Common Tern chicks ingested significantly smaller anthropogenic fibers than adults (p=0.015), and the two age classes did not differ in the overall abundance of MP particles ingested (p=0.590). Common and Roseate tern chicks ingested plastics of similar size (p=0.531), but Roseate Terns were found to ingest a significantly higher MP load than Common Terns (p=0.007). Our study is one of few papers that describe tern MP ingestion globally, and provides the first baseline quantification of MP ingestion in terns in the Northwestern Atlantic. Further, this study identifies trophic dynamics of MP ingestion in terns, which is key to understanding the risk of MP pollution across species and regions, as well as their potential use as bioindicators for the pollutant.

Keywords: Contaminants

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Population genomics and hybrid detections between King and Clapper Rail populations in the eastern United States

Abstract Summary:

The Clapper Rail (*Rallus crepitans*) and the King Rail (*Rallus elegans*) are secretive marsh birds with declining populations. These species freely hybridize, but the extent of hybridization and the genomic characterization of introgression are understudied. Unlike other marsh birds, surveys for Clapper and King rails using acoustic monitoring are hampered by substantial overlap in vocalizations between the two species, limiting the utility of auditory survey data. Hence, to increase our understanding of the connectivity of Clapper Rail populations and their introgression with King Rail, we adopted a genomic approach using molecular markers from populations along the East Coast of North America. We obtained Clapper Rail samples from Connecticut (n = 24), Delaware (n = 46), North Carolina (n = 22), South Carolina (n = 22), Georgia (n = 10), and Louisiana (n = 30) and King Rail samples from North Carolina (n = 30) and Louisiana (n = 18). We also included known hybrid birds from Louisiana (n = 15). Preliminary genomic analysis using RAD-seq on 80 individuals from Delaware, North Carolina, and Georgia identified two hybrid rails, both captured in Delaware saltmarshes. Our results suggest cryptic and on-going hybridization in Delaware.

Keywords: Genetics

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Birds of different feather flock together: Spatial and temporal nesting patterns in a mixed-species heronry in Southern India

Abstract Summary:

Kokkarebelluru a small village in southern India is a mixed-species heronry and has been a historically known breeding site of two Near Threatened Species: Painted Stork *Mycteria leucocephala* and Spot-billed Pelican *Pelecanus philippensis*. Three other species recorded nesting at this heronry are the Black-crowned Night Heron *Nycticorax nycticorax*, Little Cormorant *Microcarbo niger* andLittle Egret *Egretta garzetta.* Nesting occurs within the village and on young and old trees of primarily *Thespesia populnea, Tamarindus indica, Delonix elata, Ficus beghalensis.* With a history of active protection by local people this heronry has been declared as a Community Reserve. A study to document the nesting associations among the waterbirds in the area was undertaken during the breeding season of 2018-19 and 2019-20. A direct count of the nests, arrival time, nesting tree species and nest site characteristics were recorded. Spatial and temporal nesting by the waterbirds at the heronry was observed with Spot-billed Pelicans commencing nesting much earlier than the others and also formed single species nesting colonies, nesting primarily on large Ficus and tamarind trees. The Painted stork with more than 800 nests each year was the most numerous of the waterbirds in the area, and nested predominantly on *Thespesia populnea.* The Black-crowned Night Heron with the second most number of nests showed a strong nesting association with Painted Storks, though segregated themselves in terms of nest height and inter distance. The relatively small number of Little Cormorant and Little Egret at the heronry tended to nest together with storks and primarily on *Delonix elata*. This study provides the first detailed insights of nesting associations among waterbirds at this heronry.

Keywords: Behavior, Habitat

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Brown pelicans and the fasting endurance hypothesis of partial migration

Abstract Summary:

Partial migration occurs when some portion of a population migrates while some other portion does not, and is often considered an evolutionary stepping stone to full migration. Understanding the maintenance and mechanisms behind partial migration is therefore critical to understanding the ecology of migration as a whole. GPS tracking of adult pelicans conducted throughout the range of the species has shown many populations to be partially migratory, yet the ecological underpinnings of this strategy remain unresolved, particularly for pelicans along the Eastern coast of the United States. We used tracking data of adult pelicans from the South Atlantic Bight to determine the influence of both extrinsic and intrinsic factors on the decision to migrate using a time-to-event modeling framework. Results align closely with the fasting endurance hypothesis of migration. This hypothesis states that individuals unable to withstand periods of reduced foraging will migrate, while those able to maintain body condition in the face of foraging reductions will remain resident. In the South Atlantic Bight, the primary forage of brown pelicans is Atlantic menhaden. We posit that reductions in menhaden availability, as precipitated by their own ontogenetic migration from estuaries to the pelagic environment, causes pelicans in poor body condition to undertake migrations to new ecosystems.

Keywords: Migration, Movement/Tags

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Post-breeding season movements of wading birds are linked to use of anthropogenic resources

Abstract Summary:

Globally, wading bird habitat is being extensively altered by human development. The full effects of these changes on wading birds are unclear, but some species have shifted and shortened their movement paths to exploit anthropogenic resources. The alteration of individual movements can then scale upward to influence immigration rates and gene flow among remote portions of populations. We require a better understanding of wading bird movements in response to human-altered landscapes, so that we can more effectively predict the impact that these features might have on their populations. To determine the impacts of human-altered landscape features on wading bird movement, we tagged two differently adapted wading birds at breeding colonies on the northern coast of the Gulf of Mexico. Using Argos doppler data, we tracked the movements of juvenile and adult white ibises (*Eudocimus albus*) and tricolored herons (*Egretta tricolor*) as they dispersed from their fledging and breeding sites. We hypothesized that the net displacement from their breeding colonies to their nonbreeding home range would be influenced by species, individual body size, and departure date. Further, we expected that individual displacement distance would be negatively correlated with the proportion of human-altered landscapes in the individual's subsequent nonbreeding season home range. White ibises were more likely to travel farther to nonbreeding home ranges, and birds that departed their natal or breeding colony earlier were more likely to travel farther to nonbreeding sites. Contrary to our expectations, individuals that moved greater distances during the nonbreeding season were more likely to be associated with human-altered landscapes in their nonbreeding season home ranges. This indicates that white ibises and tricolored herons are not shortening their nonbreeding season dispersals to exploit resources in human altered landscapes, a pattern opposite to that seen in some European and Australian wading birds. This study is based on the first year of data from an ongoing study on wading bird movements and resource selection.

Keywords: Migration, Habitat, Movement/Tags

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Eastern Black Rail in Florida: Assessing Occupancy in the Panhandle and Identifying State-wide Priority Areas and Research Needs

Abstract Summary:

The Eastern Black Rail is one of the most secretive birds in North America, often referred to as a 'feathered mouse' for its tendency to run inconspicuously underneath thick vegetation in dense marshes. Despite challenges in studying this elusive bird, recent evaluations suggest a > 85% range-wide decline and have led to a recent listing of the Eastern Black Rail as threatened under the Endangered Species Act (October 2020). Although Florida has historically been a stronghold for Eastern Black Rails, threats from sea level rise, changes in hydrology, and habitat loss persist and are expected to worsen over time. We provide a literature review summarizing state-wide surveys and research needs for these secretive marshbirds. Additionally, as part of a multi-state grant studying Eastern Black Rails on the Gulf Coast, we present results of an occupancy study conducted in the Florida Panhandle. Occupancy (0.154 ± 0.036) and detection (0.206 ± 0.048) rates were comparable with other studies and provide evidence that that surveys require multiple visits (≥6) and that these visits should take place between mid-April to early Augustin the Florida panhandle. We also developed an Eastern Black Rail hotspot map for the state from compiled detection histories (1885-2021) that suggests 4 priority areas in Florida likely support comparatively large breeding populations. Prescribed fire is an essential tool for maintaining suitable breeding habitat, but additional research is needed to determine the appropriate interval, extent, and ignition techniques. Additional surveys in interior wetlands should be prioritized to document potentially unknown breeding populations. The recent listing will hopefully result in research that sheds more light on the ecology and management needs of this mysterious bird.

Keywords: Habitat, Restoration/Management

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Comparison of call types in Eastern Black Rail response in the Gulf of Mexico

Abstract Summary:

Eastern Black Rails (*Laterallus jamaicensis jamaicensis*) have recently been federally listened as threatened and are among the most challenging to detection of the secretive marsh birds. Call broadcast surveys are often used to maximize the chances of a bird vocalizing during the survey window. The NOAA Firebird project is currently working in the US Gulf of Mexico States to evaluate the impact of prescribed fire on Eastern Black Rails found in high marsh habitats. During our pilot season we tested three different call sequences in call broadcast units to determine whether there was a difference in response rate between them. We completed 1-6 repeat surveys at 400+ locations across the 5 US Gulf of Mexico States in spring and summer 2021. We will present the results of our comparison of call types and discuss how we will implement those results for future Eastern Black Rail Surveys.

Keywords: Conservation

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The Gulf of Mexico Avian Monitoring Network (GoMAMN): a strategic plan for monitoring birds in the Gulf of Mexico and translating stakeholder values into priorities

Abstract Summary:

Conservation planning for large, dynamic coastal and marine ecosystems has multiple benefits but is often challenging to implement. Murky objectives and synthesizing multiple stakeholder values and concerns can hamper decision-making and lead to suboptimal outcomes. Prior to the Deepwater Horizon oil spill, avian monitoring projects frequently used study designs inconsistent with understanding species' population trends, species response to management actions (or restoration projects), and understanding ecological processes at larger scales. In response to this, the Gulf of Mexico Avian Monitoring Network was created. GoMAMN subsequently, used the principles of structured decision making (SDM; see Fournier et al. 2020) to identify stakeholder objectives and values, which in turn led to the identification of bird monitoring priorities. The Strategic Bird Monitoring Guidelines for the Northern Gulf of Mexico (Wilson et al. 2019) was an application of these goals into a series of monitoring guidelines designed to improve the utility of monitoring efforts. By using stakeholder objectives and values to identify bird monitoring priorities, practitioners and decision-makers have: (1) a set of agreed upon objectives and core values; (2) a transparent means of setting priorities across political and jurisdictional boundaries; and (3) a framework to facilitate communication and collaboration of data needs. We will provide: (1) a brief history of GoMAMN, (2) application of SDM towards bird monitoring priorities, (3) identify some relevant GoMAMN products, and (4) how the group plans on connecting with the broader avian monitoring Community of Practice towards achieving explicit objectives identified in the Guidelines.

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Keywords: Conservation, Restoration/Management

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The way we count counts: using waterbird data to investigate the effects of counting error on abundance estimates

Abstract Summary:

Population size estimates are ubiquitous in ecology and are crucial to fields such as conservation biology, invasive species biology, and game management. Count data (i.e., the number of individuals detected at a given location and time) are frequently collected to estimate population abundance and are also increasingly used to estimate demographic rates. However, counting can be difficult. Some organisms are mobile and may therefore be unavailable to observers during a survey, and other species are cryptic or inconspicuous. For highly gregarious species such as waterbirds, group sizes can reach hundreds or thousands of individuals. These challenges are likely to result in counting errors, including non-detection and inaccurate counting of individuals (particularly in groups). Unless the extent and magnitude of these counting errors are consistent through time and space, observed data (i.e. counts) will not directly correlate with the abundance estimates they are meant to inform. Various modeling approaches have been developed or modified to address counting errors, most commonly non-detection of individuals. However, the specific case of inaccurate counting has received relatively little development, and the extent to which (or circumstances under which) inaccurate counts may bias abundance estimates remains unclear. Using a case study focused on Gulf of Mexico waterbirds, we develop simulations to examine how counting errors, specifically inaccurate counts, affect abundance estimates obtained via different modeling approaches (negative binomial GLM and ordinal GLM). To illustrate a potential path forward, we use the Gulf of Mexico survey data to highlight ordinal modeling as a means to account for various sources of counting error when this type of error is unavoidable.

Keywords: Conservation

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Seabird vulnerability to oil spills and knowledge gaps: exposure, susceptibility, and uncertainty in the northern Gulf of Mexico

Abstract Summary:

The northern Gulf of Mexico (nGoM) is a globally important oil extraction region and an important habitat for a wide array of avifauna, including seabirds. Interactions with spilled oil can have significant negative impacts on seabirds. Interactions with oil can occur through acute events like oil spills or chronic exposure, including the release of fluids and byproducts of oil extraction (e.g., produced waters). Given current levels of acute and chronic exposure of seabirds to oiling in the nGoM, assessing the risks to seabirds from oiling appears warranted. Analyzing seabirds' risk to oiling can be done using indices that synthesize information from multiple sources, allowing managers to compare species rapidly. Seabird-oil indices can vary widely in complexity but often include variables associated with seabird exposure potential and sensitivity to oil. Exposure potential characterizes the probability of co-occurrence with oil presence and is often described through metrics of overlap. Sensitivity characterizes the probability of mortality due to contact with spilled oil and the relative impact of mortality on the population. Sensitivity variables often incorporate reproductive and demographic information. Building on existing frameworks, we tailor a vulnerability to oil index by characterizing a range of variables affecting the exposure and sensitivity of nGoM seabirds to oil. Data were collected through a literature review, oil and gas platform locations, and newly available vessel-based seabird observations through the Gulf of Mexico Marine Assessment Program for Protected Species (GoMMAPPS). This index ranks the relative vulnerability to oil of 24 seabird species in the nGoM. We also incorporate uncertainty in the data to provide lower and upper vulnerability estimates for each variable. We then compare the average uncertainty of each variable, identifying key data gaps. This index is the first characterization of the relative vulnerability of seabirds to spilled oil in a notably understudied region. Managers and researchers could use species vulnerability ranks and the identified data gaps when setting research priorities related to future offshore energy development.

Keywords: Conservation, Habitat, Restoration/Management

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Friday, November 12, 2021

8:00 EST Welcome and Announcements

8:20 – 10:00 EST Conservation

10:00 – 12:00 EST Conservation, Habitat, & Restoration

13:20 – 15:40 EST Conservation, Habitat, & Restoration

16:00 – 16:40 EST Committee Fair

16:50 – 18:00 EST Business Meeting

18:15 – 19:30 EST Award Ceremony & Conservation Paper Award Presentation

Functional responses of breeding wetland birds to habitat degradation and climate change

Abstract Summary:

Human-caused habitat degradation and global climate change affect birds worldwide, altering their community structure and delivery of ecosystem services. We investigated how breeding wetland bird communities responded to two decades of wetland loss and degradation and climate change in Konya Closed Basin in Turkey, a closed basin larger than the Netherlands. We found that the loss of functional diversity at the basin scale was three times more intense than the loss of taxonomic diversity. Changes in taxonomic and functional compositional beta diversity contrasted with a decreasing taxonomic nestedness and an increasing functional nestedness, a pattern that was caused by a combination of the decrease in functional diversity at the local scale and loss of functionally original species. Taxonomic turnover increased significantly, while its functional counterpart did not change. We also found that the larger species, late-breeders, reed-nesters, diving species, and species with smaller relative brain mass were the losers and that higher trait plasticity did not confer any advantage to their bearers. Lastly, by using satellite imagery dating back to the mid-1980s, we discovered that the lakes in the basin have started to dry earlier, probably because of climate change and water abstraction. We offer the earlier shrinking/drying of lakes and resulting potential increases in competition as a novel mechanism for the decline of breeding populations of some late-breeding endangered diving ducks such as the White-headed Duck (*Oxyura leucocephala*).

Keywords: Conservation, Habitat

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The White-winged Flufftail Conservation Project: three decades of saving Africa's most threatened waterbird

Abstract Summary:

The White-winged Flufftail (*Sarothrura ayresi*) is listed as a globally Critically Endangered bird endemic to Africa. It is considered the rarest and most threatened rallid species on the continent. The total global population was estimated at no more than 250 breeding adults in 2013. Ethiopia and, more recently, South Africa are the only two countries where the White-winged Flufftail is known to breed. The White-winged Flufftail is a wetland specialist preferring healthy, intact, dense sedge habitat. Population abundances and distributions have likely decreased over the years due to wetland destruction and degradation by activities such as mining, water drainage, agriculture, afforestation, grazing, pollution, and peat fires. Little was done to conserve the species in South Africa until 1992 when a group of citizen scientists formed the Middelpunt Wetland Trust to safeguard the only known site where the bird was regularly seen. BirdLife South Africa began administering the trust in 2011 and has since then made leaps in studying and understanding White-winged Flufftail ecology. The project is now in the phase of implementing conservation tools at an international level through applied research and adaptive management. The main objectives of BirdLife South Africa's White-winged Flufftail Conservation Project are to: (1) reduce uncertainty about White-winged Flufftail biology to better inform conservation efforts; (2) protect core White-winged Flufftail habitat from anthropogenic threats, manage key wetland sites, and restore habitat that is degraded by engaging with landowners across private and public sectors; and (3) raise awareness about the importance of water and wetland conservation among communities across socio-economic classes using the White-winged Flufftail as an ambassador for healthy wetlands. By protecting and promoting healthy wetlands for White-winged Flufftail, intact habitat for other wildlife species and the ecosystem services that people derive from wetlands are preserved. Our presentation details the past success and means by which the above objectives are being met.

Keywords: Conservation

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Survivorship of a migratory long-distance Arctic-breeding shorebird: Working to improve adult survival estimates of arcticola dunlin

Abstract Summary:

The subspecies a*rcticola* dunlin (*Calidris alpina arcticola*) is a shorebird which breeds in Arctic-Alaska and migrates along the East Asian-Australasian Flyway (EAAF). Unlike other dunlin subspecies, and, sympatric Arctic-breeding shorebird species, *arcticola* dunlin have been experiencing population declines for inconclusive reasons. We used a Cormack-Jolly-Seber survival model to estimate annual adult survival rates of this subspecies using 16 years of capture, recapture, and resight data collected in Utqiagvik, Alaska. We examined effects of several breeding-site variables (predator counts, invertebrate abundance, climactic data) and individual variables (sex and morphological-measurements) on adult survival. Previous research indicated breeding-site conditions minimally impacted adult survival, and regardless of comparable detection rates, this subspecies survival rate remained lower than other subspecies. We found survival estimates differed between sexes, and that rates were higher than previously published estimates of apparent survival, with female average apparent survival at 0.61 (range 0.40–0.92) and male average apparent survival at 0.66 (range 0.47–0.94). Weak relationships were detected between breeding site variables and apparent annual adult survival. Our findings suggest adult survivorship may be more affected by conditions experienced during the non-breeding life stages than during the breeding phase. Our results are similar to survival studies on other migratory shorebirds that use the EAAF, which are known to exhibit low adult survival in addition to declining populations. Future work will include using a Barker modeling approach to estimate "true" adult survival of this subspecies by using both breeding-site capture and recapture/resight data with supplemental non-breeding site resight data.

Keywords: Conservation

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Now that we know so much more: Updating the Diablotin Conservation Plan

Abstract Summary:

The International Black-capped Petrel Conservation Group has updated its 2012 conservation action plan for the species (*Pterodroma hasitata*), a Caribbean endemic seabird. A decade of field work has provided opportunities to study threats and to implement various forms of management, yet resources for research and conservation remain limited at about $60K/year. To update the action plan, we used the Open Standards for the Practice of Conservation as a framework for strategic decision-making. We used the Miradi software to document our discussions and decisions, support adaptive implementation, and to track progress. A core planning team of individuals from seven organizations met online weekly for eight months in 2020 as an alternative to a live meeting, due to cost constraints and limits on travel due to Covid. The team assessed the relative importance of various threats to species viability, articulated the factors driving these threats, and shared assumptions about conservation actions meant to counteract them. We identified Key Ecological Attributes (KEAs) as measures of conservation success and serve as the basis of a monitoring plan. This plan serves as an important milestone for the partners collaborating on Black-capped Petrel conservation and will guide future conservation activities.

Keywords: Conservation

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Current status and population trends of resident and migratory seabirds in the Virgin Islands

Abstract Summary:

Data from long-term monitoring (LTM) programs can provide important insights into wildlife population trends and aid in the conservation of declining species. However, there is a paucity of such LTM data for many taxa in the Caribbean, which can make accurate identification of population dynamics challenging. When rigorous LTM data is not available, comparison of snapshot temporal count data can still provide valuable insights into population trends, even when data are collected by different methods. In the Virgin Islands, widespread seabird declines have been noted across species groups, but few estimates of temporal trends exist. We compared estimated compiled population sizes from two time points in the early 21st century to more rigorous count data collected from 2016–2018 for 6 seabird species. In the U.S. Virgin Islands, we found widespread declines, with magnitude of declines greater for resident species (Brown Boobies [*Sula leucogaster*], Masked Boobies [*Sula dactylatra*], and Brown Pelicans [*Pelecanus occidentalis*]) than for migratory species Royal Terns (*Thalasseus maximus*), and Sandwich Terns (*Thalasseus sandvicensis*). Red-footed Boobies (*Sula sula*) have been extirpated from the region. We also quantified Roseate Tern (*Sterna dougallii*) population growth rate using time series data from 1993–2019 and found that the population was declining in both territories, with population growth rates decreasing more quickly in the British versus the U.S. Virgin Islands. Our results suggest that immediate management intervention is needed in the region to prevent further seabird declines and potential extirpations.

Keywords: Conservation

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Vital rate estimates for the common eider *Somateria mollissima*, a data-rich exemplar of the seaduck tribe

Abstract Summary:

Many seaduck species are in decline, albeit with substantial uncertainty in forecasts. Even the best-studied, the Common Eider (*Somateria mollissima*), has an 'Unknown' global population trend. The abundance of available demographic datasets for this species motivated our data synthesis, which aimed to provide a life-history parameterisation reference standard for the less-studied seaducks. Such data are needed to inform population models, which can advise conservation practitioners on which life stages to prioritise for conservation interventions.

We collated estimates of: 1st year, 2nd year, and adult annual survival; recruitment (both age-specific recruitment probability, and breeding propensity across potential recruitment ages); breeding propensity of established female breeders; clutch size; hatching success; and fledging success. In subsequent work, these vital rates are meta-analysed to parameterise matrix population models exploring the demographic consequences of different breeding assumptions. Searching scientific and grey literature, cross-referencing personal reference libraries, and 'citation snowballing' led us to identify >100 studies quantifying at least one vital rate. Additionally, co-authors Aevar Petersen (Iceland), Grigori Tertitski (Russia), and Tony Diamond & Heather Long (Canada) directly contributed three previously inaccessible clutch size datasets in response to a call for data through the IUCN Species Survival Commission's Duck Specialist Group (https://ducksg.org/).

Although clutch size has been much studied, the contributed datasets expanded coverage of studies reported in non-English languages, which were otherwise only represented when cited in English-language publications. In contrast, breeding propensity has been little-studied, perhaps because adult females are often assumed to attempt breeding every year; we obtained a mean of 0.72 across six independent studies (range: 0.45-0.92). Our synthesis highlighted additional gaps in data availability: juvenile and male survival; estimates of population change (even qualitative); and further studies from Russia (at least accessible in English; we acknowledge that more needs to be done to reduce bias from monolingual research).

Given that complete datasets of life-history parameters are purported unavailable for "most avian species, including sea ducks" (Flint, 2015, p. 65), this database condenses the 'burden of knowledge' faced by modellers and managers involved in the policy and practice of seaduck conservation.

Keywords: Conservation, Reproduction, Restoration/Management

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Efforts to maintain a newly colonized Piping Plover population on Lake Ontario

Abstract Summary:

The federally-endangered Piping Plover (*Charadrius melodus*), once common in the Great Lakes, became extirpated from Lakes Ontario and Erie as of the early 1980's. At that time, the Great Lakes-wide population had dropped to only 17 nesting pairs. Three decades of conservation efforts for the remnant population in the western Great Lakes pulled the species from the brink of extinction and has led to re-colonization of some eastern areas including Lake Ontario's New York shoreline. New York has maintained one to two nesting pairs since its re-colonization in 2015. Efforts to maintain and increase nesting pairs in New York has required building partnerships between several federal, state, local and non-governmental organizations and organizing this newly formed working group to perform monitoring, research, advocacy, and nesting habitat restoration. These efforts led to an increase in pair numbers and site use in 2021.

Keywords: Conservation, Habitat, Restoration/Management

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Understanding widespread declines for Common Terns across inland Canada: Insights from ground surveys of Common Terns breeding in the large lakes of Manitoba

Abstract Summary:

Breeding populations of Common Terns (*Sterna hirundo*) in inland North America have declined significantly since the 1970s. Abundance on the large Manitoba lakes, previously the largest inland population stronghold, declined by 57-67% between the 1990s and 2012. This was followed by a further 38% decline by 2017, highlighting the urgent need for research and management. Here we report a 2012 study of 6 breeding colonies in this region to provide detailed insight into the status of this population. We recorded productivity in fenced plots, counted nests and fledglings, documented predators and floods, and collected blood samples for comparison with population genetics of terns from the Great Lakes and Atlantic Coast. Productivity ranged from total colony failure to 2.0 chicks-fledged-per-nest, being greatest at large colonies far away from human settlements. Large-scale breeding failure occurred at smaller colonies close to human settlement because of predator activity. We recorded two common predators of Common Tern colonies: Black-crowned Night Herons (*Nycticorax nycticorax*) and Great Horned Owls (*Bubo virginianus*). We also report three predators of Common Terns not previously described in the literature: Bald Eagles (*Haliaeetus leucocephalus*), grey wolves (*Canis lupus*), and river otters (*Lontra canadensis*). Black-crowned Night Herons and Bald Eagles were the most common predators. Microsatellite analysis of blood samples indicated that within-region movement has increased and terns now appear to frequently switch between breeding colonies, possibly in response to predation, flooding and/or eutrophication. Little eastward emigration was detected from the region, but there was a 100-fold increase in immigration from the Great Lakes between 1990s and 2010s. Substantial population declines in the Manitoba Lakes despite this influx suggest that net declines are occurring within inland-breeding populations, not just regional movements. Although some colonies achieved productivity during this 1-year study, continued population decline indicates that further basic monitoring and research (especially, adult survival and additional productivity estimates) are needed. Only by coupling these data with future efforts in poorly-studied boreal regions can the status of inland-breeding Common Terns be determined and strategies developed to curb apparent, large-scale population declines.

Keywords: Conservation, Reproduction

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Twenty-year status of the eastern migratory Whooping Crane reintroduction

Abstract Summary:

The reintroduction of endangered Whooping Cranes (*Grus americana*) into the eastern flyway began in 2001 with the first cohort of captive-reared cranes migrating behind an ultralight aircraft (UL) from Wisconsin to Florida, USA. The first decade of the reintroduction focused on establishing a population and a migratory path, while the second decade focused on improving reproductive success and natural recruitment. During 2001-2020, 295 captive-reared Whooping Cranes were released; 253 costume-reared (167 in UL and 86 in the Direct Autumn Release program) and 42 parent-reared. There were no significant differences in 1- or 3-year survival rates based on rearing technique. The population size grew to about 100 cranes during 2001-2010, remained at that size during 2010-2018, but then decreased to about 80 cranes during 2018-2020 due to a reduced number of releases of captive-reared cranes and low natural recruitment. Predation was the leading cause of death, followed by impact trauma (particularly powerline collisions), gunshot, and disease. Widespread nest abandonments were attributed to disturbance by avian-feeding blackflies during the first decade of the reintroduction. As a management response, the first clutch of eggs was removed from nests which increased renesting rates from 42% to 79% as well as overall nest success. However, recruitment remains low and a total of 153 cranes were confirmed to have hatched in the wild, only 28 of which survived to fledging. Current research is focused on management tools to increase chick survival and recruitment. This includes better understanding breeding season habitat use to inform management actions (e.g. drawing down wetlands and mowing woody vegetation) and choosing release sites with appropriate habitat and fewer blackflies. As this reintroduction is an on-going process, we continue to use adaptive management to assess and modify our techniques to help ensure the successful down-listing of the species.

Keywords: Conservation, Habitat, Restoration/Management

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Local versus broad-scale population drivers: A Bayesian state-space analysis of long-term American white pelican colony dynamics

Abstract Summary:

Environmental conditions play a critical role in avian population dynamics, but interactions between broad-scale and local conditions are poorly understood for most species. Broad-scale climate oscillations impact bird populations, with known influences on inland environmental conditions. Concurrently, inland-breeding waterbird population dynamics may also be tied to local environmental variables. The Great Salt Lake supports a large breeding colony of American white pelicans *(Pelecanus erythrorhynchos)* that acts as an important source colony for the western metapopulation of this inland species. Located in the arid Great Basin, this colony is subject to water limitations and temperature extremes, but other factors, including broad-scale environmental patterns, may influence annual variation in colony dynamics.

We used a Bayesian state-space model to quantify the influence of broad-scale environmental indices (El Niño–Southern Oscillation, ENSO; and the Pacific Decadal Oscillation, PDO) and local environmental variables (mean annual spring temperature and water levels) on 34 years of colony counts and to conduct a population viability analysis based on projected future environmental data. Unlike the dynamics of some seabird and songbird populations, which have been found to be influenced by broad-scale variables, we found no evidence that pelican colony dynamics were influenced by ENSO or PDO. We did, however, find evidence that the dynamics of the colony are strongly density dependent and influenced by Great Salt Lake water levels. Population viability results suggest that colony size will continue to decrease under projected future lake levels. Our findings suggest that the long-term health of the Great Salt Lake may be critical to the future of this colony and the western metapopulation as a whole, and improve our understanding of inland waterbird population dynamics in response to environmental factors.

Keywords: Conservation, Habitat, Restoration/Management

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Site persistence, re-nesting probability and movement patterns of urban-nesting Ring-billed Gulls in relation to egg removal and its timing

Abstract Summary:

Over the past decade, there has been a marked increase in the number of Ring-billed Gulls (*Larus delawarensis*) nesting in urban areas in Ontario, leading to an increase in human-gull conflicts. As part of a larger study, we were interested in assessing some of the common management practices employed for mitigating these conflicts. Egg removal is employed routinely as a management technique to displace nesting gulls from rooftops and other urban sites; however, very little research has been done to assess its efficacy. We examined this experimentally during 2019 and 2021 at an urban breeding site in Hamilton, ON. Three-egg clutches were randomly assigned to one of three groups (plots): controls (n=56) and nests where eggs were removed (under permit) shortly after clutch completion (n=21) or at mid-incubation (after the egg-laying refractory period; n=53). One pair member at each study nest was captured and received a field-readable plastic leg band. Within each plot, approximately half of the marked birds (assigned randomly) also received a backpack harness and GPS pinpoint tag (Ornitela OrniTrack-10; control, n=29; early egg removal, n=10; late egg removal, n=25). We used a capture-mark-recapture approach (daily re-sighting effort) to assess the effect of egg removal (and its timing) on site persistence; we used tracking data to examine effects on movement patterns and habitat use; both data sets were used to estimate re-nesting probabilities and identify re-nesting locations. Overall, egg removal was only partially effective in displacing adults and preventing re-nesting. Most pairs from managed nests remained at the colony site for weeks post egg removal. A significant proportion of pairs re-nested: some at the original colony and others at nearby urban sites. Detailed results from this experiment will be presented and discussed.

Keywords: Reproduction, Movement/Tags, Restoration/Management

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Contribution of citizen science in the knowledge of occurrence of herons in Paraguay

Abstract Summary:

Paraguay holds 123 species of waterfowl, of which 14 are herons (11.4%), and which have been surveyed since 2004 within biannual voluntary monitoring through the Neotropical Waterbird Census (NWC). Among herons, some of them have high counts, and, on the other hand, others have few records, although none of them are currently under any threat degree at the national or international level. Data were collected from the free eBird platform, with a main focus on the NWCs (or CNAAs as known in Spanish), from 2004 to 2015 in order to quantify the number of volunteers who participated in the censuses, as well as to know which were the most abundant and least abundant herons. From 2004 to 2015, more than 100 volunteers and 22 institutions participated in 126 counting sites. In the last 10 years, the number of users on eBird has increased by 93%. A 73% of the waterfowl had at least 1 record. The most registered herons were *Ardea alba, Ardea cocoi, Egretta thula* and *Syrigma sibilatrix*. On the other hand,three species (*Egretta caerulea*, *Ixobrychus involucris* and *Cochlearius cochlearius*) are the ones with the smaller number of records. The creation of volunteer groups in the country and the development of dissemination materials on waterbirds in Paraguay is highlighted. There are still challenges to overcome, such as the expansion of observers outside the country's capital and trainings on the use of the eBird platform.

Keywords: Restoration/Management

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Indigenous ornithological knowledge on herons in Paraguay: implications for public policies

Abstract Summary:

An Oxford-Paraguay Exchange for Indigenous Community and Science for Conservation Policy has pioneered in Paraguay in collaboration with five Indigenous groups. We explored how Indigenous ornithological knowledge and ecological priorities can help build public policy, inform tools for a green recovery and advance Paraguay's commitments to combatting environmental degradation and climate change. In this preliminary exercise of traditional knowledge and scientific knowledge exchange, we pilot-tested the Ethnoornithological World Atlas (EWAtlas.net) as an online space to make discussions and ecological details openly disseminated, controlled by local leaders, and contributing to global data sets. We interviewed five leaders of different Indigenous nations from four ecoregions, each associated geographically with distinct Key Biodiversity Areas (KBA) in Paraguay and this analysis has a focus on herons in particular and waterbird in general. Information provided has been adapted to a non-specialist audience and disseminated in social networks by a national newspaper. The project was financially supported by the University of Oxford and is implemented in collaboration with the University of Pittsburgh, BirdLife International, and the University of Oxford with the Paraguayan leadership of the Federation for the Self-determination of Indigenous People (FAPI).

Keywords: Conservation

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Piping plover brood space use following habitat creation in Delaware, USA, and benefits for the wider recovery unit

Abstract Summary:

The Atlantic Coast Recovery Plan (USFWS, revised 2016) was established to ensure the long-term viability of the Atlantic Coast population of piping plovers (*Charadrius melodus*). Delaware is part of the Southern Recovery Unit (including Maryland to South Carolina) which has shown an increase in pair numbers since 1986 (maximum of 386 in 2016) but has failed to reach the unit's recovery goal of 400 pairs and has had consistently low productivity. Numerous studies have described piping plover population growth following habitat creation through natural processes such as storms or hurricanes, and human-created habitat such as engineered sandbars or beaches. Approximately 35 ha of wide, sandy beach was created in 2016 as a restoration project at Prime Hook National Wildlife Refuge (PHNWR) in Sussex County, Delaware. We are unaware of any breeding piping plover records from Delaware Bay beaches, and Delaware's small piping plover population ($\bar{x}$=6 pairs, 1989–2015) had historically nested exclusively on Atlantic Coast beaches (primarily at Cape Henlopen State Park, CHSP). However, in 2016 one pair nested in the newly created habitat at PHNWR. Since then, the number of breeding pairs at PHNWR has increased annually (18 pairs in 2021). No chicks were produced in the first year of nesting but in subsequent years productivity at this site has ranged from 0.67–2.25 fledglings/pair. Average historic productivity on Delaware Atlantic Coast beaches was lower (1.37 fledglings/pair, 1989–2015) suggesting PHNWR may provide more optimal habitat for chick rearing. We have recorded color-banded plovers breeding at PHNWR that were marked and previously nested in New Jersey suggesting secondary dispersal and movement between states. Our objective is to describe habitat use and movements of plover broods at PHWNR and CHSP. In 2020, Delaware Division of Fish & Wildlife started collecting plover brood locations using handheld GPS and a digital survey tool, and this year we began trapping and uniquely color-banding adults and chicks. Preliminary, we observed a smaller average home range for birds at PHNWR and pairs nested closer together than the historic breeding grounds at CHSP. Our results provide useful information for restoration project design in the future.

Keywords: Reproduction, Habitat, Restoration/Management

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An examination of exclosures for protecting nesting Interior Least Terns in Indiana

Abstract Summary:

Management and monitoring of Interior least terns in Indiana has ebbed and flowed throughout its 35-year history, but every year we move closer to understanding what makes for a successful nesting season. One management strategy that has been used for many years is fence exclosures. With the help of trail cameras, I was able to closely monitor exclosure effectiveness for the past two years. Each nesting colony is protected by a different type of exclosure, and preliminary data suggest that some are more effective at deterring mammalian predators than others. In this talk, I briefly explain the exclosure types, their effectiveness, and issues that arose along the way. I rank fences by exclosure effectiveness and found two winners: electrified chain-link and high gates with electric; with each exclosure being suitable for different habitat types. Electrified chain-link is ideal for islands, and high gates with electric is ideal for gravel dikes surrounded by water. While the high gates with electric fence would not work for islands, the electrified chain-link fence would work for any location. This, plus unofficial data from a colony not included in this study makes electrified chain-link the best exclosure type for protecting nesting colonies of least terns in Indiana.

Keywords: Habitat, Predation, Restoration/Management

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Response of the Relative Abundance of Fire Ants to Coastal Island Restoration and Vegetation. Lightning S1

Abstract Summary:

Since the introduction of the red imported fire ant (*Solenopsis invicta*) to the United States their ecological activity in terrestrial ecosystems have been heavily studied, but their influence on coastal islands is less known. Nonetheless, they have been observed depredating on seabird nestlings. Our objective was to collect preliminary fire ant density data on select coastal islands to investigate which specific variables (e.g habitat, sample date) may be good predictors of their density. Surveys were conducted in coastal Louisiana during the summers of 2018, 2019, and 2021, using test tubes baited with Vienna sausages. Poisson regression analysis indicated a preference for marsh over dune habitat on both islands while other variables like restoration status had a more complex influence on our models and yielded inconclusive results.

Keywords: Restoration/Management

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SeeBird: Lessons from the first three years of a seabird community science project

Abstract Summary:

The SeeBird program is a community science project in coastal Seward, Alaska engaging high school students in a project with hands-on data collection on seabird communities and their habitats. This environmental science and stewardship program was initiated as a pilot project in 2018, as a way to enhance marine bird survey data collection and science education in our community. In the program, students are mentored to learn bird identification skills and data collection techniques. During the school year weekly surveys are conducted along a 2km transect of the local waterfront which is the same as the first transect of a monthly vessel based bird survey in Resurrection Bay. During the survey, the students collect environmental data including weather and sea conditions as well as water property data. As students walk the transect they record observations of every seabird and marine mammal within 100m of the shoreline, noting the behavior, recording the location using a GPS, as well as documenting age and sex if known. In addition to conducting surveys, students are challenged to create their own research questions and hypotheses, analyze data, and communicate the results to the community through a presentation. To date, three cohorts of students and community members have participated, over 50 surveys have been conducted and more than 1000 observations of marine animals recorded. SeeBird surveys have provided fine scale phenology and abundance data, which complement the monthly data from the Resurrection Bay surveys. Preliminary analysis suggests that these weekly shoreline SeeBird surveys mirror observations made in the broader survey. The first three years have provided us the ability to reassess how we present the information to students and community members as they enter the program and how to ensure data are recorded accurately and consistently as we plan to expand the project to other coastal communities.

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Keywords: Conservation, Restoration/Management

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Night birds at lotus fields meet a cinema camera

Abstract Summary:

Using a cinema shooting technique, we succeeded in shedding light on suspects damaging lotus roots at night. Bird damages to agricultural crops in Japan have been decreasing in the last three decades, but those believed to be caused by ducks remain $4-5 million every year. About a half of the so-called duck damages are against lotus roots cultivated in paddies around Lake Kasumigaura, located about 60 km northeast of Tokyo. Ducks visit the lotus paddies mainly at night for foraging, but their down hides them from being spotted even with infrared cameras. For this reason, farmers and researchers could only suspect ducks eat lotus roots without conclusive evidence. To reveal the foraging behavior of ducks at night on the lotus paddies, we conducted videography of wintering ducks using a high-sensitivity mirrorless digital single-lens reflex camera (DSLR) (Sony α7SIII, 35mm-full size/S-Log3/ISO409,600) during the lotus root harvesting period from Nov. 2020 to Mar. 2021. Since the original footages were dark enough and hard to analyze feeding behaviors of waterfowl, we performed color correction/grading with a video editing application (DaVinci Resolve) by extra-range tunings of parameters. The corrected/graded images revealed varying foraging behaviors among species: Mallards, Spot-billed Ducks, and Eurasian Coots fed pre-harvest lotus roots in the mud by repeating head submergence and digging. Common Teals, Eurasian Wigeons, Gadwalls, Falcated Ducks, and Northern Pintails mainly dabbed and fed lotus root wastes on the surface of the post-harvest lotus paddies. Common Pochards dived, but we could not confirm their diet. Northern Shovelers were straining the water surface for plankton. Thus, "night birds" of the lotus roots were Eurasian Coots and only a limited number of species of ducks. Using high-sensitivity DSLR cameras and color correction/grading would become a powerful tool for the night-field survey.

Keywords: Restoration/Management

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2021 Conservation Publication Award

Long-term monitoring and proactive habitat management: the story of a successful new nesting colony of Cassin's Auklets at Año Nuevo Island, California.

Abstract Summary:

Ryan Carle, Michelle Hester, Emily Coletta, Jessie Beck, and Rozy Bathrick

Responses to climate change by seabirds in the North Pacific may include range restrictions and require colonization of new habitats. To inform conservation actions supporting climate adaptations and general persistence of new breeding seabird colonies, we examined the colonization of Año Nuevo Island, California, by Cassin's Auklets (*Ptychoramphus aleuticus*), a species at risk from ecosystem shifts related to climate change. A long-term monitoring study at Año Nuevo Island (1993 to p resent) enabled us to capture the initial colonization of the island by Cassin's Auklets in 1995, and to follow multiple metrics concerning the ecology and conservation of this nascent breeding population. We quantified population growth, reproduction, band returns, mortality, and habitat metrics from 1995-2021. The Cassin's Auklet b reeding population grew to 158 birds by 2020, despite population declines during 2005-2007 and 2016-2017 concurrent with reproductive failures and die-offs that affected Cassin's Auklets regionally. The persistence and success of this breeding colony was related to active habitat management, mainly aimed to preventing erosion damage to burrows in the island's sandy soil. Innovate habitat management strategies, including a sea lion exclusion structure, installation of erosion control fabric, andinstallation of heat-insulated ceramic artificial burrows were used to protect Cassin's Auklet burrowing habitat. The ceramic nest burrows have now been adapted for sixspecies on multiple Pacific islands, with the goal of providing habitat stable habitat in dynamic environments, and nesting conditions insulated from globally rising temperatures. The story of Cassin's Auklets at Año Nuevo Island is an example of the value of long-term monitoring for capturing ecosystem changes, and of how applied management of nearshore islands with competing wildlife uses can facilitate movement and adaptation of species threatened by climate change.

Keywords: Conservation

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