KENT ISLAND ANNUAL REPORT 2022

-Patty Jones

Letter From the Director

I cannot state enough what a joy it was to be back on Kent Island with a crew of students and researchers for the first summer season since 2019. The COVID-19 closure of the Canadian Border forced the cancellation of our summer program in 2020 and 2021. In the fall of 2021 we brought students back to Kent Island for the first time on weekend trips, and their enthusiasm at being let loose from zoom classes and outside together was tangible on the ferry. This return to normalcy culminated in our 2022 summer on Kent Island, the busiest summer season we have had yet, flooded with visits from new and long-standing research collaborators, Bowdoin faculty and staff, and a fantastic group of students. We started in mid-April when former directors Bob Mauck and Ed ('70) & Midge Minot and I opened the field station for the savannah sparrow graduate students. Bob and I worked on our new collaboration to install load cell weigh bridges in petrel burrows to weigh incoming and outgoing birds. On May 30 we arrived on Kent Island for the official start of our summer with 10 Bowdoin summer student fellows. The month of June was atypically warm and sunny, resulting in our 16 occupied tree swallow nests fledging a total of 80 nestlings! Our students quickly mastered baking bread, cooking for 20+ people, identifying savannah sparrow song, catching bumblebees, and banding petrels. As you will see in their profile pages that follow, they each had their own research projects and associated challenges for the summer. We spent July 1 on Grand Manan for Canada Day. The greasy pole was unfortunately canceled but we all enjoyed a day in "the big city". We had a particularly memorable whale watch on Island Bound where we spotted a sunfish and the one Orca whale who runs with a pod of white sided dolphins in the Bay of Fundy.

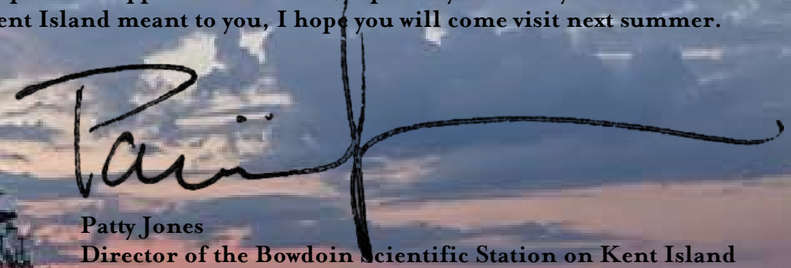
Ian's and my little boys Reid (3.5) and Felix (1.5) were consistently in the mix, always wanting to ride on the tractor, and Felix became obsessed with boats. We were very happy to have four PhD students (two from Guelph, one from Windsor and one from Yale) along with us for the summer, and wonderful visits from Prof. Heather Williams ('77) (Williams College), Prof. Richard Prum (Yale), Prof. Ryan Norris (U of Guelph), Prof. Glen Crossin (Dalhousie University), Prof. Dan Mennill and Prof. Stéphanie Doucet (U of Windsor).

Highly pathogenic avian influenza (HPAI) introduced a new worry this year, and Yale PhD student Liam Taylor ('17) monitored gull populations throughout the summer. Some of our herring gulls and a crow did test positive for HPAI, and we will continue to monitor the impact of HPAI on our populations for the field seasons to come. The KI petrels and passerines did not appear to be impacted by HPAI.

We had wonderful visits this summer by two professional artists in residence, Jonna McKone ('07) and Audrey Shakespear whose profiles you will find in this report, and a memorable day which our students spent reading and writing poetry with poet and emeritus Prof. Alison Hawthorne Deming.

Towards the end of the summer Bob Cunningham's son Jimmy Cunningham came to visit and work with Ian on thinking about the future of the weather station. Jimmy was in palliative care at that point and later died on September 2. Jimmy before his death endowed the Fog Seeker Fund to support weather and climate research on Kent Island. We are grateful to Jimmy for his lifelong support and engagement with Kent Island as well as his continued legacy.

Our 2022 season culminated with another round of class and outing club trips to Kent Island in the fall semester, which included almost 50 Bowdoin students. I am told that the outing club fall break trip to Kent Island filled up with quickest of all the fall break trips. It is so wonderful for us to experience the student enthusiasm for Kent Island, as there is no place that we would rather be. We are grateful for all the people who support Kent Island, especially those of you who reach out to me with your stories of what Kent Island meant to you, I hope you will come visit next summer.



Patty Jones
Director of the Bowdoin Scientific Station on Kent Island
Assistant Professor of Biology Bowdoin College

-Patricia Jones

A RETURN

2022 saw a full scale return to our summer program. After being unable to conduct our normal summer fellowship program because of Canadian and US border closures 2020-2021, the summer of 2022 saw a full compliment of undergraduate fellows, graduate students, wildlife conservation researchers, senior researchers, and artist-in-residence. We welcomed 16 undergraduates, seven graduate students and PI's from seven institutions.

The remoteness and isolation of Kent Island make for an ideal bubble, but precautions were taken to safe guard our community as well as the Grand Manan community that is so vital to our safety and success. Thankfully no serious sickness visited the island and participants were able to come and go feeling secure in our protocols.

Additionally, once classes were back in session at Bowdoin, we had a number of weekend trips to the island with 47 students from classes and the outing club getting to experience Kent Island, many for the first time. A marker that we use to track utilization and impact of the research station are number of unique visitors and "people days" on the island. Each day spent on island by an individual is counted as "people day", PD. 2022 saw a large uptick in both categories:

2019: 84 Visitors and 1163 PD
2022: 128 Visitors and 1741 PD

-Ian Kyle

PETRELS

Data on the petrel colonies in the Ditch and Shire were collected by Canadian wildlife researchers in 2020 and 2021. We are grateful for their support in maintaining the continuity of our long-term data. 2022 was a return to the daily monitoring and all inclusive data collection of the demographic dataset. However, 2022 also saw the furthering development of a collaborative effort by Bob Mauck, Mark Haussmann, and Patty Jones on their project to understand foraging efficiency and investment in reproduction in petrels. Accelerometers attached to foraging adults will give insight into energy expenditure at sea for the first time.

The photo included is of a installed load cell weigh bridge which measures the weight of adult petrels as they come and go from the burrows. This will give a better idea of foraging success as well as adult investment in chick feeding.

Kent Island has received a grant from Environment and Climate Change Canada to model Kent Island petrel survival and reproduction in a collaboration with other Atlantic breeding islands to understand long-term population trends in the species. We are digitizing historic index cards and working to understand how petrel populations are responding to anthropogenic change.

-Patty Jones

SAVANNAH SPARROWS

The savannah sparrows had a busy summer this year with visits from Professor Ryan Norris (Univeristy of Guelph) who continued monitoring the long-term population demographics, and his graduate student Sarah Mueller (pictured here) who attached radiotransmitters to savannah fledglings to study their behavior and survival rates after leaving the nest. Professors Dan Mennill and Stéphanie Doucet (University of Windsor) continued their studies of song-learning in savannah sparrows, with Dan's PhD student Sarah v leading the field work. Completing the trifecta of savannah sparrow PhD students was Hayley Wilson, a student of Professor Amy Newman at Guelph studying early-life stress in savannah sparrow nestlings. We were also very happy to have Professor Heather Williams ('77) from Williams College join us for two weeks to record savannah sparrow song. This year Heather published an article in the high impact journal Nature Communications demonstrating cumulative cultural evolution in savannah sparrow song. Overall the savannah sparrow team has published more than 6 peer-reviewed journal articles since 2019 on topics from lay-date plasticity to geographic songvariation, highlighting the scientific value of this study system on Kent Island.

-Patty Jones

POLLINATORS

This summer was a continuation of the long-term project to collect, catalog, and map all of the flowering plants on Kent Island as well as identifying and recording flower visiting insects. We are now able to put together plant-pollinator networks for Kent Island each summer. This study is a wonderful way to bring all of the student fellows together in small teams to explore the island in pursuit of the latest flowering species or uncharted part of the island.

In the summer of 2022 we brought a spectrophotometer to Kent Island allowing us to quantify the reflectance of different wavelengths of light by petals from each plant species. We are then able to map where each flower color falls in bee color vision space and better understand the plant community within the context of bee color perception. This project opens the doors to many more questions about which plants get visited and why.

- Rory Klewer

Senior Artist in Residence

Jonna McKone

Bowdoin Class of 2007

Jonna is a filmmaker, producer, artist, and journalist based in Baltimore, MD. She works with documentary, narrative, archives, and abstraction to explore connections between landscapes, the body, and memory.

This summer Jonna visited Kent Island as part of a larger project that is still taking shape. She is interested in what it takes to make a film that tells the story of the sea? How deep must one reach into its history of empires, shipwrecks and monsters to reach the many myths, islands, and communities lost to time, tides, and hurricanes? The sea is also an economy, a passage of goods and people, a site of extraction. It generates weather, clouds, humidity, and fog. The world is blue at its edges and depths, like the sea. McKone and Marnie Ellen Hertzler are developing a feature film that explores shifting coastal and island communities and their surrounding landscapes. The film chronicles the existential crisis of climate change and the ways history is etched on our water-filled bodies.

The Ocean Project (working title) will take audiences to roughly eight communities that include the northern archipelagos in Scotland, Kent Island, a visit with a Baltimore conservator who is questioning whether questioning mummified remains from across the Atlantic ocean belong in a museum, prom night on Fogo Island off the coast Newfoundland, and a tiny Japanese Island with no permanent residents aside from one thousand rabbits. Incorporating documentary verité, scripted scenes and folklore, The Ocean Project presents the audience with pressing issues of today: rising seas, the legacies of colonialism, the overlooked knowledge in rural communities and wisdom that comes from the ancient stories we tell.

"We feel that the work of artists is to challenge perception and convention. What meaning can be passed across the boundary of the frame, between filmmaker and subject or the intimate and the distant?"

We are very excited to have this be the first of many visits by McKone. Her perspective and inquisitive nature are part of what makes Kent Island a unique and enriching place.

-Megan Stretch

Back Row: Dan Mennill, Stéphanie Doucet, Sarah Dobney, Megan Stretch, Cayle Cross, Anna Brailey, Ingrid Pollet, Emma Olney, Liam Taylor, Neena Goldthwaite, Haley Wilson, Alison Ambrosio, Eric Diaz, Matt Hakida, Elena Sparrow, Sarah Meuller, Elizabeth Baker

Front Row: M. Mennill, A. Mennill, E. Norris, Ryan Norris, Jeremy Hoyne-Grosvenor, Ian Kyle, R. Kyle, Leila Trummel, Patty Jones, F. Kyle

In Absentia: Luna Soley

-Dan Mennill

An Oasis of Opportunity

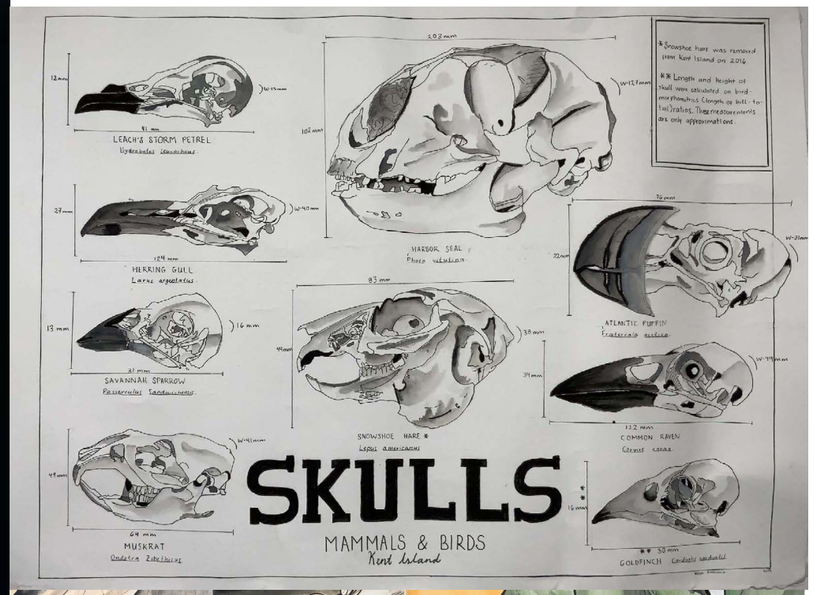
Watch the video

-Ian Kyle

Alison Ambrosio (‘22)

Bowdoin / Visual Arts (Biology Minor)
Los Angeles, CA

Alison came to Kent Island with a specific path in mind. With an acceptance to an MFA in Medical Illustration at Rochester Institute of Technology she sought to use her time on Kent Island to explore the type of detailed illustration common to the medical illustration field. Alison wanted to participate in hands on scientific research to inform her art. As with medical illustration, there is a skill and aesthetic to how identifying information is presented. Through her hands on work in the field and close observations of specimens she produced studies of skulls, pollinators, and many more using a variety of mediums. She also worked closely with Leila Trummel on a children’s book about animal scat, doing all the illustrations.



“…Observing nature and my surroundings might help me to understand more about our origins and our own bodies.”

-Ian Kyle

Jeremy Hoyne Grosvenor (‘22)

Bowdoin / Biology
Cabot, VT

This summer Jeremey added a survey of Hay Island to the ongoing forestry monitoring study. He sampled 10.0-meter by 10.0-meter plots throughout the entire island. It is the hope that this careful study of the islands as the forests respond to the elimination of the introduced snowshoe hare population will give us a high resolution picture of the dynamics at play in the Kent Island and Hay Island’s successional journey.

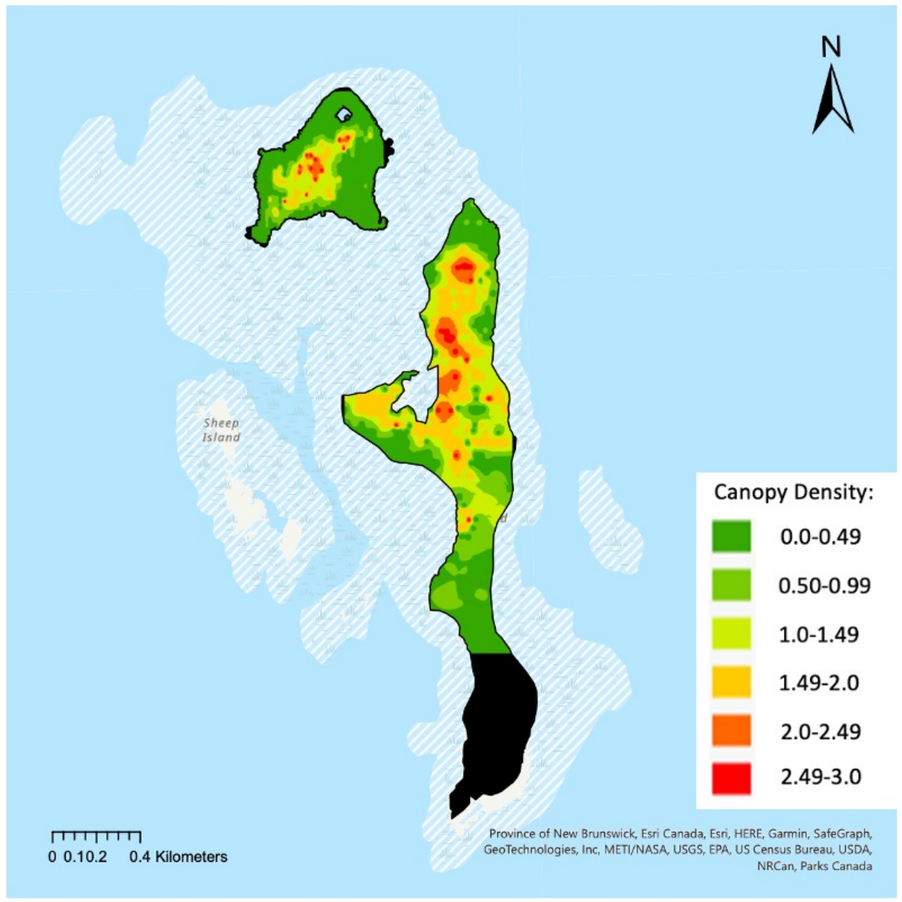


Figure 2. An inverse-distance weighted interpolation of canopy density on Kent (2019) and Hay Island (2022), New Brunswick, Canada. Canopy density values of 0, 1, 2, and 3 correspond to categorizations of none, sparse, broken, and dense, respectively.

"The Kent Island Fellowship allowed me to practice the skills of communicating science through a final manuscript as the culmination of my summer research. I believe that the greatest challenge in science is communicating complex topics and findings in a succinct and readable manner."

-Lucinda Bliss

Elizabeth Baker (‘22) & Elena Sparrow (‘22)

Bowdoin / Biology (English Minor) & Biology
Covington ,GA & Chicago, IL

This summer we were very privileged to welcome Elizabeth and Elena to the island as our Land Stewards and Research Assistants. They attacked with great gusto a wide variety of tasks from tree clearing to testing bumblebees in the lab, mapping Ditch petrel burrows to providing a much needed layer of paint to trim on island buildings. Their efforts, experience, and aptitude were essential to the success of both the infrastructure projects as well as every research project happening on the island this summer. There was no challenge they did not rise meet.

-Ian Kyle

Elizabeth is now working at Mount Desert Island Biological Laboratory as a Research Assistant using her extensive lab works skills to great effect.

Elena is working at Wabanaki Youth In Science with the University of Maine giving back and spreading knowledge gained at Bowdoin and during her summer on Kent Island.

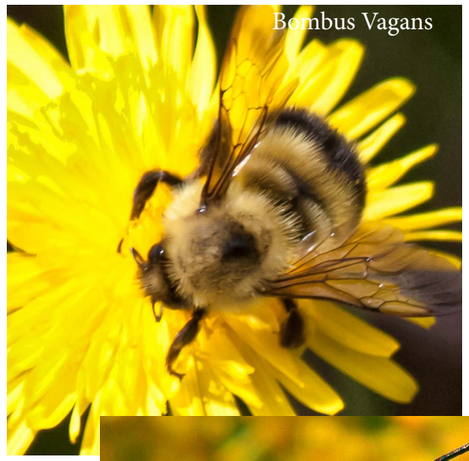
-Patty Jones

-Patty Jones

Eric Diaz (‘23)

Bowdoin / 2022 Peter Cannell Fellow / Molecular and Cell Biology
Los Angeles, CA

Do pollinators differ in color learning ability? The ability to learn flower colors may allow bees and wasps to forage more efficiently in a plant community, but these learning abilities likely vary between species. Eric spent the summer capturing wild foraging wasps and bumblebees and brought them to the lab where he trained each individual to associate a color, either yellow or blue, with a sucrose reward in a testing chamber. Eric compared their ability to learn positive associations with each color. Eric found that all of the bumblebee species learned colors faster than the wasp species. Leaf-cutter bees (*Megachilidae*) were intermediate between bumblebees and wasps. Eric also, measured the reflectance spectra of all the flowers on Kent Island, enabling us to compare the flowers available to these insects using models of bee color vision space.


Bombus Vagans


D. norvegicoides


Megachilidae


Dolichovespula arenaria

"As I continue my studies in Biology, I am slowly beginning to realize I am not as interested in purely clinical lab work and developing medicine due to the disconnect between the work and society. I'd like to see my work have an impact on the environment and or people in a positive way. Since my interest in field work has been growing relatively recently, I'm not quite sure of the opportunities before me and am always open to searching for new and unique ones to step out of my comfort zone."

-Patty Jones

Neena Goldthwaite (‘24)

Bowdoin / Biology (EEMB) & Environmental Studies
Andover, MA

The majority of lowbush blueberries, *Vaccinium angustifolium*, are grown in Maine, New Brunswick, and Nova Scotia. Lowbush blueberry depends on insect-mediated pollination to bear fruit. Due to widespread pollinator declines, lowbush blueberries increasingly rely on honeybees and commercial bumblebees (*Bombus impatiens*) for pollination. Native bees such as other *Bombus* species and solitary bees are often more efficient pollinators of blueberry than honeybees. Kent Island offers an isolated study site without the use of pesticides or presence of commercial bees to examine lowbush blueberry pollination by a community of only wild pollinators. Neena identified the pollinators and blueberry and other flowering plants this summer, taking charge of the plant-pollinator network data.

Fruit yields vary significantly between clones, but this disparity has not been adequately explained. Neena measured flower color variation in blueberry with a spectrophotometer and mapped them in bee color vision space which is represented as a hexagon.

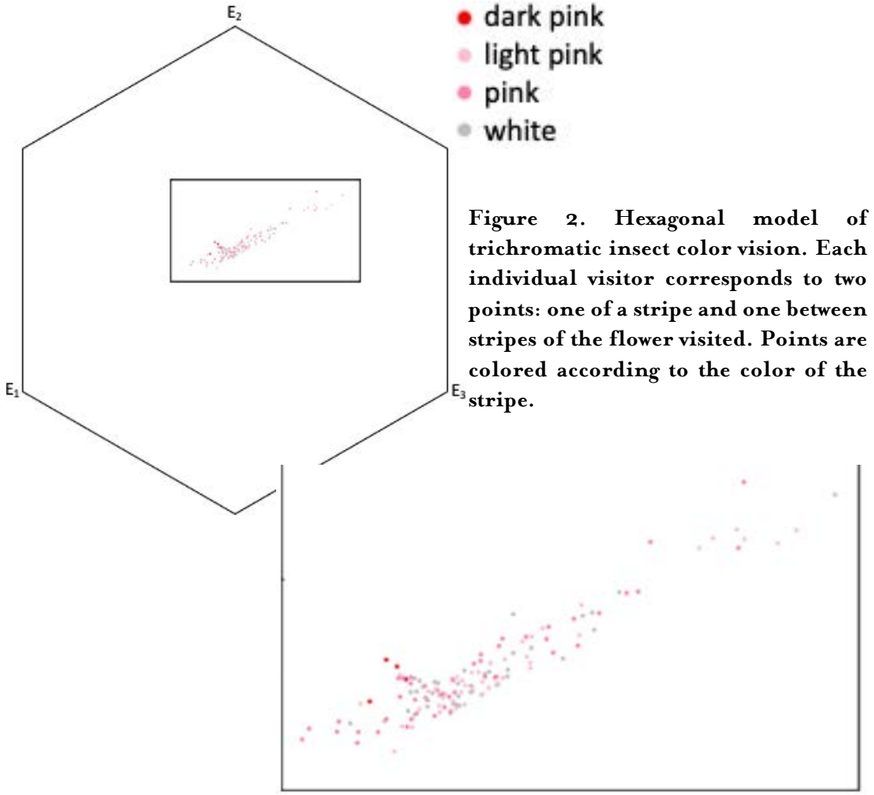
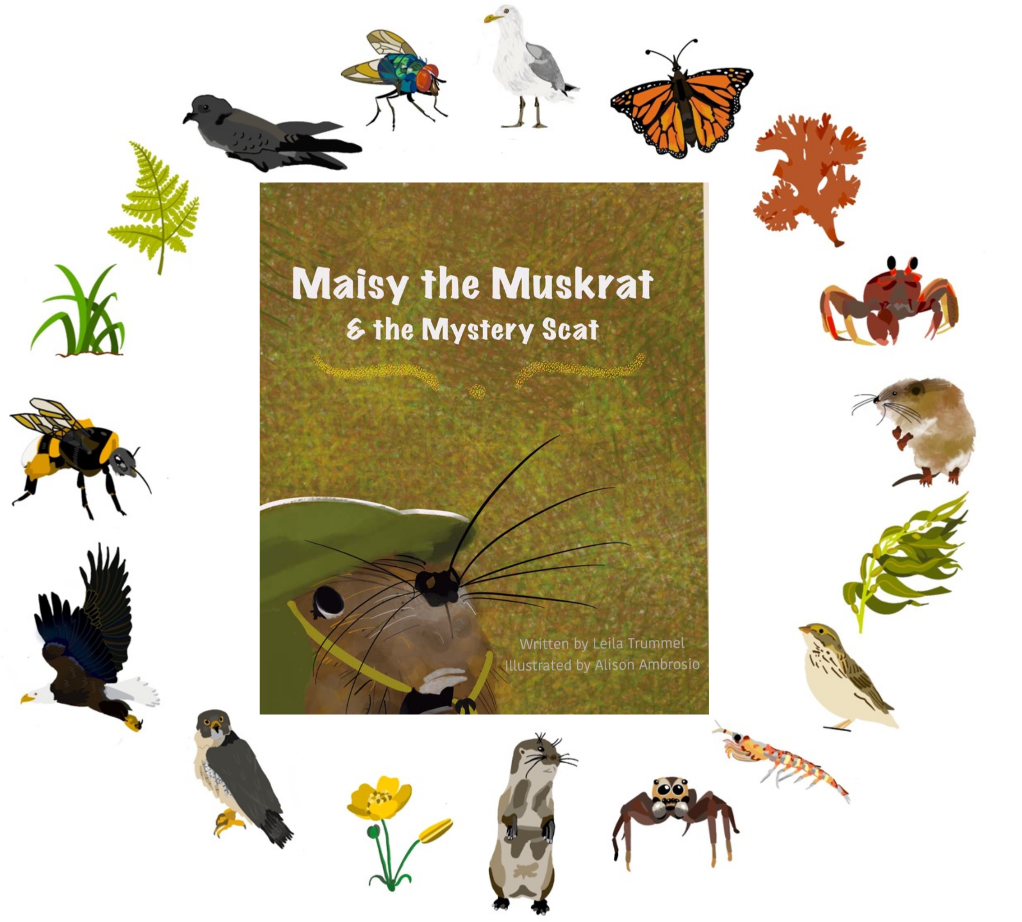


Figure 2. Hexagonal model of trichromatic insect color vision. Each individual visitor corresponds to two points: one of a stripe and one between stripes of the flower visited. Points are colored according to the color of the stripe.

Leila Trummel (‘23)

Bowdoin / ES & Government and Legal Studies (Biology Minor)
Hanover, NH

Leila took on a new fellowship opportunity at Kent Island this summer as a Science Education Fellow. Teachers are increasingly looking for real-world data to use in science classes. Additionally there is a call for place-based learning where students can engage with curriculum connected to the local ecosystem. Research has been taking place on Kent Island for the past 80+ years, and this initiative is a way to make the data more accessible to the general public. Leila spent her days working in the field with researchers and gaining a deeper understanding of how ecological research is conducted to incorporate into lesson plans. She then took that experience and used it to inform her design of a variety of lessons and videos on an array of different research topics for K-12 age groups. Leila is continuing to work during the school year to create connections to communicate science across Island communities and use educational methodologies founded in the literature to create her lessons.



"When I graduate from Bowdoin, I want to be a science teacher. The education and curriculum design fellowship was a perfect opportunity for me to be able to gain critical skills in the field."

-Patty Jones

Megan Stretch (‘23)

Bowdoin / Integrative Biology & German (Visual Arts Minor)
San Mateo, CA

Leach’s storm-petrels raise just one chick each year. One parent at a time will embark on a 3+ day journey off the coast of Cape Cod to forage while the mate stays to incubate the egg. Petrel populations are in rapid decline across the Atlantic colonies, likely due to a combination of factors including global climate change, fishery declines, near shore lights and offshore oil drilling. Megan spent the summer collecting our long-term demography dataset, which has been collected continuously on Kent Island since 1953. This dataset help us understand trends in petrel populations. Additionally Megan assisted in the implementation of our new load cell weigh bridge technology, with daily monitoring of burrows with deployed load cells. Below is a figure Megan created to study the relationship between the change in adult mass at sea (measured by mass from bird passage through the load cell when returning from a foraging trip minus mass when leaving for a foraging trip) and how much weight the chicks gained to see if birds with more successful foraging bouts fed chicks more food. This is a small sample size of a few burrows but we are excited about the potentials of this new method.

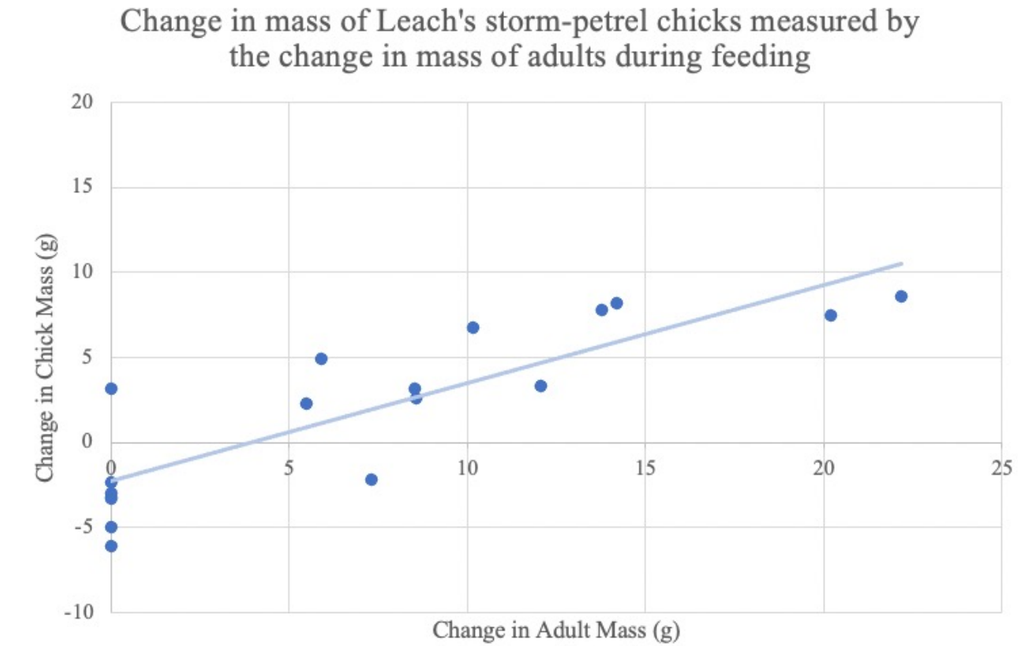


Figure:
The more mass lost between arrival and departure, the more mass the chick gains. If no adult visited (change in mass = 0), chicks lost weight overnight.

“Though I am undecided in what area of biology I would like to study, I know I want to work in a research-based field. I want to gain experience and discover a specific scientific field of interest by working/interning a few years after graduation, and afterwards I potentially see myself going to grad school for biology.”

-Patty Jones

Emma Olney (‘25)

Bowdoin / Environmental Studies & Government and Legal Studies
York, PA

The forests of Kent Island are in the process of recovering after the eradication of the snowshoe hares in 2007/2008. Our summer forestry fellows have been cataloging the change in forest communities as older trees age out, blow down, and seedlings gain a foothold.

Emma spent the summer building on the work of previous Kent Island forestry fellows Nathan Elliot (2008) and Max Muradian (2019). Emma was particularly interested in preliminary data showing higher seedling recruitment in areas with high moss coverage. Emma’s data confirms a positive relationship between the total percent of moss coverage at a site and the number of pine and balsam fir seedlings.

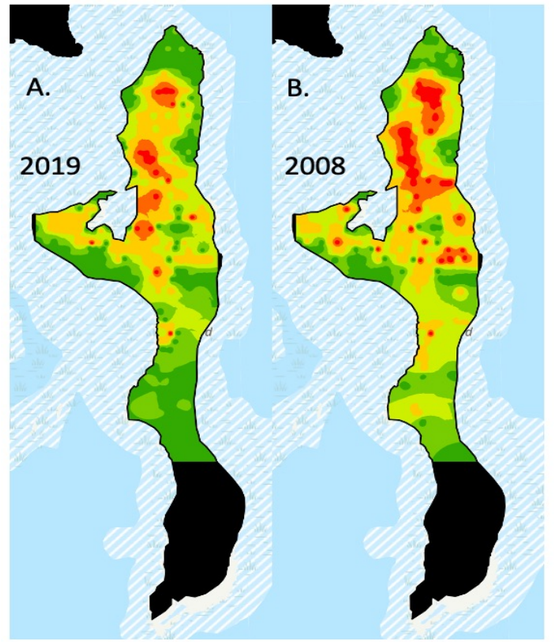
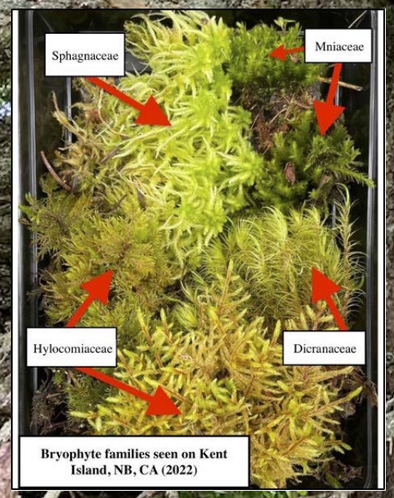


Figure 1. An inverse-distance weighted interpolation of canopy density on Kent Island, New Brunswick, Canada, in both 2019 (a) and 2008 (b). Canopy density values of 0, 1, 2, and 3 correspond to categorizations of none, sparse, broken, and dense, respectively.

“I aim to work in government, curating conservation legislation centered around wildlife and forestry. I would love to serve in any level of government, whether it be local, state, or federal, as long as I may ground my work in hands-on field experience.”



Bryophyte families seen on Kent Island, NB, CA (2022)

-Alison Ambrosio

Senior Artist in Residence

Audrey Shakespear

Visiting Professor Sculpture Bowdoin College

Audrey Shakespear is a visiting professor in the Visual Arts department at Bowdoin who teaches courses in sculpture and studio art. Audrey spent two weeks on Kent Island observing and sketching the changing shapes in the intertidal as the tide came and went, and providing invaluable mentorship to our student artist in residence. Audrey's work involves sculpture in sandstone and marble and the use of 3D scanning and printing to allow a broader audience to interact with the sculpture. Audrey was our first professional artist to live and work in the newly renovated Gillett, as she is pictured here watching the tide in the basin.

-Doug Cook

-Ian Kyle

-Ian Kyle

Infrastructure

On your next visit to Kent Island a few new features will great you. Firstly will be the new skiff dubbed "Carrie Chase", after Ernest Joy's long time house keeper. Built off of the original Sea Haus design for "Suzanna Kent" Carrie features a self bailing deck and improved payload capacity. Suzanna lives on as a working boat at Seal Cove in the care of Chris Ingalls.

Tucked away by the Cow Barn is the newest structure to the island, a tractor barn. With room enough for the tractor, trailer, bush hog, Gravely, ladders, staging, lawn mower, bucket attachment, and so much more the structure will enable us to keep essential equipment out of the elements while also freeing up much needed space in the shop.

A new deck/gathering space was added to the porch addition on the dorm. It has already served as lunch table, class room space, and clothes drying rack, exactly as intended.

-Ian Kyle

Doherty Kent Island Postdoctoral Scholar

The Henry L. and Grace Doherty Charitable Foundation, Inc.

Bowdoin alumni, families, and friends are invited to participate in the Doherty Charitable Foundation Match. A recent $1 million award from the Henry L. and Grace Doherty Charitable Foundation, which supports a new post-doctoral Scholar position at Kent Island, asks for a matching $1 million to fully fund the post-doc position and the research and scholarship it will produce. For more information about how you can support this vital work, contact Liz Armstrong, Senior Associate Director of Gift Planning, liz.armstrong@bowdoin.edu or (207) 607-9481.

FOG

SEEKER

Fogseeker Fund

Given in Memory of Bob Cunningham by his son Jim

Every Kent Island visit is not complete without a visit to the weather station to see the instruments that are now collecting much of the daily information about the atmosphere on the island. This data is the continuation of the longest of datasets established by Bob Cunningham in the 1937. When Bob retired the mantel was picked by his son James (Jim) Cunningham. This past year saw the most generous gift from Jim in memory of his father to ensure the perpetuation of this essential equipment with the "Fogseeker Fund" which will generate funds to go specifically toward weather data and supporting technology.

More on The Fogseeker Fund

In Collaboration With:

Daniel Mennill
Professor of Biology &
Associate Dean

Stephanie Doucet
Professor of Biology

Mark Haussmann
Professor of Biology

Ryan Norris
Professor of Biology

Amy Newman
Professor of Biology

Robert Mauck
Professor Emeritis

Glenn Crossin
Professor of Biology

Heather Williams
Professor of Biology

Rob Ronconi
Wildlife Biologist

Sarah Wong
Wildlife Biologist

Laura Tranquilla
Wildlife Biologist

Richard O. Prum
Professor of Biology