

## BOWDOIN SCIENTIFIC STATION

### KENT ISLAND

#### Statement from the Interim Director – Ed Minot

My grandfather, Prof Alfred Gross, and uncle, Bill Gross '37 were instrumental in establishing the Bowdoin Scientific Station (BSS) in the 1930's. After my first visit as a 12-year-old in 1960, I didn't hesitate to use those connections to get back to Kent Island as a high school student and then as a Bowdoin student in 1969. That summer I was studying bank swallows and Midge Chestnut, a student at Tufts, was investigating barn and cliff swallows. The following summer we married, beginning an almost 50-year affair with Kent Island. Since then we have returned on short visits and have done long-term research on birds. For the last 35 years we've called New Zealand home, but have always found ways to get back to the Bay of Fundy. Thus, when asked to be interim directors for 2017, we grabbed the opportunity.

We had incredible support from Don Dearborn and Nat Wheelwright, starting while we were still in New Zealand. Don gave us a virtual operation manual from his year as director in 2016. Meanwhile, Nat Wheelwright helped us to find the eight talented Bowdoin students who became the 2017 fellows on Kent Island. Together, they helped us to hit the deck running when we arrived in Brunswick in late April.

Once on Kent Island, we were further supported by Mark Murray '75, Russell Ingalls and four senior researchers from Guelph and Windsor Universities in Canada. Collectively, they represent years of BSS institutional knowledge that carried forward the best of past traditions while promoting new ventures. During the summer, we were all fortunate to have a string of great visitors, most of whom participated in our 'dessert night' talks and all of whom maintained the diversity of fresh ideas passing through a seemingly remote field station.



Finally, we are grateful for the contributions of the Bowdoin fellows, researchers and visitors whose good will, thoughtfulness and hard work made Kent Island a vibrant and enjoyable community throughout the 2017 season. As interim directors, we were at the tail-end of a long transition period for the Bowdoin Scientific Station. By this time next year, the BSS will have had four different directors in as many years. Despite these changes, Kent Island has enjoyed remarkable continuity due to continuing strong support from Bowdoin College, alumni, the support staff at the island and research scientists working there. The station is now emerging from this transition stronger than ever, with new director, Patty Jones, and her partner, Ian Kyle '06, who will serve as assistant director. Together, Patty and Ian bring a wealth of experience with field research, research stations, science communication, project planning and a liberal arts approach to education. We look forward to continuing our affair with the station, albeit more from the sidelines now that we know Kent Island will be in great hands for many years to come.

Ed Minot, 2017 Interim Director [ed@edminot.com]  
Midge Minot, 2017 Interim Assistant Director

## Statement from the New Director – Patty Jones

It is already very clear to me that Kent Island is an extraordinary place. My own undergraduate summers were spent at the Shoals Marine Laboratory in southern Maine. My Shoals experience taught me how to conduct scientific research, inspired me to become an ecologist, and was the initiation of close friendships that I continue to cherish. That is the promise of a field station, and my goal is to continue that tradition at Kent Island.

As an undergraduate at Cornell, I studied the foraging ecology of lobsters in the Gulf of Maine and published a scientific paper with the Shoals Program Director. That experience was invaluable in preparing me for graduate school and initiating my career. As a graduate student at the University of Texas at Austin I studied the behavior of bats, living and working at field stations in Germany, Bulgaria, Panamá, Switzerland, and Costa Rica. Time at such stations further convinced me not only of the importance of field stations to scientific research, but to education, mentorship, and public engagement. I returned to Cornell as a postdoctoral researcher, studying the impacts of plant chemical defenses on pollinating and herbivorous insects. I am excited to be able to employ my diversity of research backgrounds to research on Kent Island. Not only will we continue and build upon long-term research on storm-petrels, Savannah sparrows, and tree swallows, but I will further expand the research on the station in pollination ecology, intertidal biology, and forest regeneration. As a tenure-track faculty member at Bowdoin, my laboratory on campus will dovetail with research on the station to further develop research programs and engage students. My vision for Kent Island has four components centered around excellence in scientific research and undergraduate education: 1) conducting and publishing biological research on diverse organisms; 2) fostering and developing the intersection of art and science; 3) creating an inclusive, diverse and supportive learning environment; and 4) communicating science to the general public. As director, I am committed to these four concepts, and to pursuing new research directions, collaborations, and funding opportunities to ensure their success.

I am also very pleased to announce that my fiancé, Ian Kyle (Bowdoin '06), who spent the summer of 2005 on Kent Island as a student, has rejoined the Kent Island family as Assistant Director. Ian brings a wealth of experience gained helping to run his family's company in Upstate NY. Together we hope to continue the traditions that make Kent Island a touchstone for researchers, Bowdoin students, and alumni alike, while pursuing new opportunities to keep Kent Island running strong for decades to come.

We are very grateful to the interim directors and others who have kept the station in wonderful shape. Thank you especially to Mark Murray, Ed and Midge Minot, Don and Dre Dearborn, Damon and Janet Gannon, Bob and Susie Mauck, and Nat and Genie Wheelwright. Yours are big shoes to fill, but Ian and I are thrilled to have the opportunity, and already are looking forward to 2018!



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## Some Significant Events in the 2017 Calendar

- 13 April – Mark Murray opens the station.
- 15 April – Ian Thomas, Ines Moran and Kate McGuire arrive from Windsor University to begin work on Savannah sparrows.
- 14-15 May – Patty Jones, Ian Kyle, Dave Carlon, Ed & Midge Minot visit Kent Island. Patty had just interviewed for the BSS directorship and this was her chance to see the Bowdoin Scientific Station.
- 15-17 May – Don Dearborn came with a class of 12 from Bates College
- 28 May – Arrivals: Dan Mennill, Stéphanie Doucet with Amélie & Max Mennill from Windsor University. From Guelph University, Amy Newman and Ryan Norris with Evelyn Norris, also Michael Elza.
- 29 May – Arrivals: Eight Bowdoin students, Ed & Midge Minot
- 3-5 June – Nat Wheelwright, Haley Acker and Ben McCrave arrive
- 10-13 June – Bridgit Stutchbury visits from York University
- 25 June – 2 July – Heather Williams '77, Rebecca Smith and Jonah Levy from Williams College continued Heather's study of Savannah sparrows.
- 1 July – Most of those on the island went to Grand Manan to wash clothes and join in the celebration of the 150<sup>th</sup> Canada Day. Many Kent Islanders attempted the greasy pole contest at Seal Cove and at least three managed to reach the flag before falling into the water below.
- 4 July – USA Independence Day is usually celebrated with a beach cleanup at Kent Island. This year the beaches looked unusually pristine, so we did a terrestrial cleanup. Trails were cleared and we removed years of discarded research equipment including rusting chicken wire, glass, plastic and decaying wood.

- 5 July – Russell Ingalls took us to Machias Seal Island where we circumnavigated the island in two skiffs to see gannets, puffins, razorbills, seals, and a peregrine falcon.
- 9-10 July – John Anderson, Bill Carpenter and Donna Gold visited from the College of the Atlantic. John is director of the College of the Atlantic field station on Great Duck Island. Bill Carpenter spent three summers on Kent Island in the early 1950's helping Chuck Huntington.
- 11 July – First Leach's petrel chick hatches, so the Petrel Flag is flying.
- 11-13 July – Instructors Rob Ronconi, Sarah Wong, Erica Holland and Ingrid Pollet came with 13 students on a field course from Dalhousie University.
- 13 July – Visit by Alison Deming, University of Arizona with three of her creative writing students.
- 13 July – The Grand Manan Museum dedicated a life-sized mural depicting the Bay of Fundy's intertidal zone. The project began under BSS Director Damon Gannon, and was a collaboration between Tracy Faber '16, Isaac Jaegerman, '16, Grand Manan artist, Sara Griffin, and Museum Curator, M.J. Edwards.



- 18 July – David Anderson, Emma Greenberg and Ed Minot spoke at the Grand Museum. They discussed current research and showed footage of Kent Island from the 1930's (see item below). This now annual event recognizes the connection between the Bowdoin Scientific Station and the people of Grand Manan.



22 July – Whale watching trip from 3PM until sunset. Highlights included close encounters with humpback whales, greater shearwaters and Wilson's petrels.

24-27 July – Patty Jones, Ian Kyle, Fred Field and Tom Porter. Fred and Tom came from Bowdoin to take photos and write about the Bowdoin Scientific Station.

24-26 July – The eight Bowdoin Fellows gave oral presentations of their work at Kent Island.

28 & 29 July – Bowdoin students clean up, depart from Kent Island and return to Brunswick.

14-17 August – Memorial visit by family and friends of Prof C E (Chuck) Huntington.

19-20 August – Peter Cunningham, Ara Fitzgerald, Alison Deming and Carly Fleet.

28 August - 2 September – Bowdoin Coastal Studies Program led by Dave Carlon and Steve Allen. Merilee Lovit and Gart Bishop came on the same trip to continue their botanical survey of Kent Island.

3-14 September – Savannah sparrow fledgling banding. Four research students from Guelph and Windsor Universities: Ian Thomas, Mike Elza, Alex Sutton and William Oakley.

8-10 September – Biology 2319 Class from Bowdoin College led by Amy Johnson and Beth Whalon.

15-17 September – Stewardship visit hosted by Liz Armstrong and the Bowdoin Office of Development. Participants included: Patty '76 & Andy Towle, Amanda Cannell-Boone '77 & Peter Boone, Cynthia Kingsford, Liz Pierson, John Cross '76, Nat & Genie Wheelwright, Ed & Midge Minot, Mark Murray, Liz Armstrong, Patty Jones & Ian Kyle.

11 October – Mark Murray closes the station for the year



In addition to the above events, there were “dessert nights” on Monday, Wednesday and Friday. On these evenings, there was a general discussion or an informal talk by a student, visitor or resident researcher. As well as presentations by Bowdoin staff and students, there were talks by Bridget Stutchbury (York Univ.), Heather Williams (Williams College), Dan Mennill & Stéphanie Doucet (Windsor Univ.), Amy Newman & Ryan Norris (Guelph Univ.), John Anderson and Bill Carpenter (College of the Atlantic). Moreover, as the name suggests, each night was accompanied by an outstanding dessert.





## Bowdoin Scientific Station Community 2017



Back row (l to r): David Anderson, Brennan Clark, Colin Tiernan, Michael Elza, Ryan Norris, Mark Murray, Ian Thomas.  
Middle row: Matthew Keller, Lily Bailey, Zoe Wood, Amy Newman, Midge Minot, Ed Minot  
Front row: Claire Goffinet, Emma Greenberg, Evie Norris, Amélie Mennill, Max Mennill, Dan Mennill, Stéphanie Doucet



Photo by Fred Field for Bowdoin College



## Bowdoin Student Projects

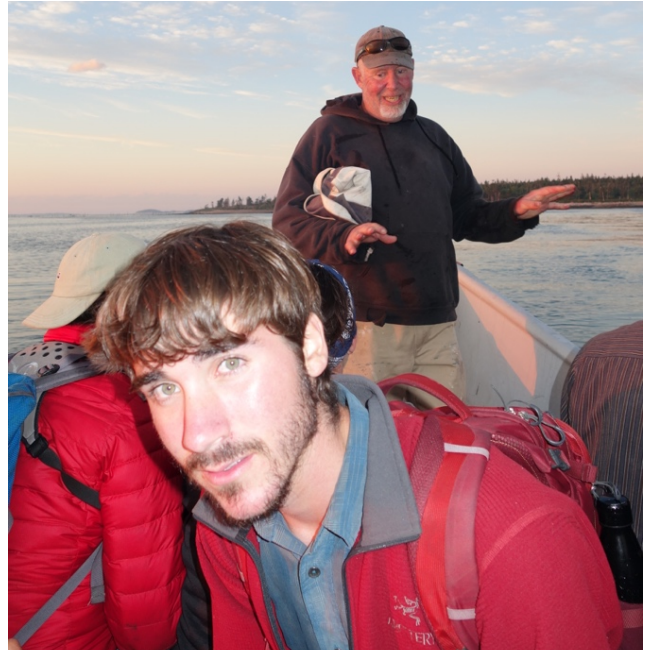
### Effects of local population density on reproductive success and feeding behavior of the Savannah sparrow

David Anderson, '19 – Bowdoin Fellow

The conservation of migratory bird species requires an understanding of the effects of population density on breeding populations. While the general concept of density dependent population regulation is foundational in ecology, little has been done to determine the manner or scale at which density-dependence operates. A twenty-seven-year study of the Savannah sparrow (*Passerculus sandwichensis*) on Kent Island, found that while density of the entire study site was negatively correlated with reproductive success via double brooding and depredation, local density (within 50m of the nest) had almost twice the effect.

While this phenomenon is clearly seen in the data, understanding why it occurs is more difficult. I worked with Ryan Norris of Guelph University to test two hypotheses. The first is straightforward: perhaps higher sparrow densities resulted in more competition for food resources and consequently lower reproductive success. To test this, we compared average feeding rates at different nests in the ten days immediately after young were fledged. If there were fewer resources available in high density areas we would expect feeding rates to be significantly lower in high density areas than in the low-density areas.

The second hypothesis is slightly more nuanced. It rests on the facts that a) Savannah sparrows are highly territorial and b) that after fledging, young sparrows wander off from the nest despite still needing to be fed by their parents. Presumably in high-density areas young would be more likely to wander into neighboring territories, which in turn would cause the parents to be harassed while feeding. This increase in energy expenditure could lead to a lower likelihood of double brooding and consequently reduced reproductive success. To test this, I recorded the number of territorial interactions experienced by the parents over five half-hour periods spread across ten days immediately after the chicks fledged. If density-dependent interactions were the cause of the decline in high density success, we would expect to see a) a positive correlation between density and number of interactions and b) fewer interactions at nests



which raised a second brood.

As expected, an analysis of our data reveals a positive linear correlation between density and the number of interactions between birds ( $R^2=0.452$ ,  $N=21$ , ANOVA test of predictors  $P=0.002$ ). However, there was no significant difference in interactions between birds that double brooded and birds that did not (unpaired t-test  $p=0.956$ ), suggesting that the increased number of interactions does not explain decreased reproductive success in high-density areas. No significant difference was detected in feeding rates between high and low-density areas either, suggesting that resource scarcity is not driving lower reproductive success in high density areas either. To further test the scarcity hypothesis, it may be valuable to study what food the parents are bringing back to the nest. For example, it may be of poorer quality in high density areas compared with low density areas. Overall this study raises more questions than it answers. Resource scarcity and social interactions, the two obvious explanations for how density negatively affects reproductive success, were not confirmed by our observations, so it stands to reason that some other regulatory force is at work. Discovering the nature of this regulation would be an interesting subject for future research.

## Soil profiles and forest regeneration on Kent Island

### Lily Bailey, '18 – Bowdoin Fellow

Island ecosystems are especially sensitive to perturbations. Two changes on Kent Island have had a major effect on the forest and its regeneration. When herbivorous snowshoe hares were introduced in the 1950's, many tree seedlings were eaten and regeneration slowed. When the hares were eradicated in 2007, regeneration resumed, but the seedling and sapling recruitment was inconsistent, with areas of high and low regeneration, and areas with unhealthy and dying forest. My goals for this summer were to examine the link between soil composition and regeneration, and to contribute to long-term monitoring of the forest.

For the long-term data set, I focused on locating tagged and numbered trees on the island, recording their GPS coordinates, measuring DBH, evaluating their overall health, and noting bark beetle holes and lichen growth. In the future, students studying the island's trees can locate the tagged trees more easily and track average growth rate, identify which trees are dying, and possibly cite lichen overgrowth and bark beetles as contributing factors in their declining health.

To compare regeneration and soil composition on the island, I first chose two main study habitats within the forest—the spruce/fir forest and birch/mountain ash forest. Within each of those habitats I identified large areas of high and low regeneration. In each of those areas, I randomly selected and set up 1m<sup>2</sup> plots and surveyed all the growth within, measuring percent cover of vegetation, and recording species, diameter at 1 cm, and height of each seedling or sapling within the plot. Seedlings under 5cm were not included in my data set. At each plot, soil was sampled at each soil horizon until the water table was reached. Depth of each horizon was measured, and pH and TDS were recorded for each sample.



Interestingly, there does seem to be a correlation between the soil composition and tree regeneration. Soils were consistently shallower in high regeneration areas, and consisted of only two primary layers before hitting the water table. The low regeneration areas had more stratified soil horizons that had greater depth. The average height, in addition to number of saplings and seedlings, was also higher in high regeneration areas, indicating that the high regeneration areas have both high recruitment and growth rates. Overall, the spruce/fir forest had more regeneration than the birch/mountain ash, which could be because the snowshoe hares disrupted and consumed coniferous trees the most. While these data are by no means conclusive, it is a good start in analyzing and understanding the patterns of change occurring in Kent Island's forest. The soil results could be especially helpful in determining ideal locations to transplant trees to initiate future regeneration.



## Poetry and photography at Kent Island

Brennan Clark, '20 – Bowdoin Fellow and Artist in Residence

I tackled two large projects on Kent island, one in writing and the other in photography.

My writing consisted mostly of poems, exploring four different genres: 1. Short verse poems on the different birds that inhabit the island mimicking the style of Kate Shilling who was a poet on the island in 1967. 2. Longer verse pastorals on the landscape and natural beauty of the island, specifically looking at the island as a natural refuge not just for animals, but for the humans that inhabit it. 3. Structured poems exploring my background of religious faith. 4. Poems exploring modern interpretations of Greek myths.

For my photography, I used 35mm black and white to mimic a historic feel of the island. This was like the film used by the founders of the island in the 1930s. I focused my lens on human interaction the island. Although the island is a wildlife refuge, many animal species benefit from human interaction. The tree swallows on the island are there only because of the artificial nest boxes. One of the largest scientific studies on the island, the Savannah sparrow project, is only possible because the fields are mowed to maintain the breeding habitat used by the sparrows. The herring gull population on the island fluctuates directly with the food supply provided by a landfill on Grand Manan. The animals on the island are how they are because of the humans on the island, and I tried my best to capture that concept in my work.

In all, I wrote not only many poems and made many pictures, but grew a new appreciation for birds, and the environment. Those living on Kent Island generate a small environmental footprint, and that helped me realize how little one needs to be happy.



## Leach's storm petrel chatter response to predator vocalizations

Claire Goffinet, '19 – Bowdoin Fellow and Cook

This summer, I worked as a researcher and cook on Kent. Both facets of my employment were overall very positive, and I have left the island with a renewed interest in cooking and a new hobby of bird watching. I originally chose to go to Kent Island to remove myself from the distractions so commonly found on campus, and hoped that isolation and quiet would encourage personal and academic reflection that can only stem from periods of boredom. While I would like to think that this overall growth of character was achieved, I was surprised to find that my time on the island was always filled and never dull. I worked on a long-term data set monitoring the colony of breeding Leach's storm petrels, cooked for twenty people, and did a personal project on the effects of predator vocalizations on ambient petrel chatter calls. Outside of those larger commitments, I spent my days learning how to paint, going on walks in the woods, and swimming in the basin at high tide. I left the summer with a greater technical understanding of ornithology and the process of becoming a researcher, but learned equally important lessons on how to ask answerable scientific questions, study living systems, and find beauty on every walk in the woods or hole in the ground.



Although working as the cook was a last-minute addition to my application, the job quickly became one of my favorite parts of the day. My experience cooking, although less academically rigorous, was equally as challenging and just as rewarding as my research. I had very limited cooking experience prior to this summer, but was able to learn basic techniques and create healthy, interesting meals for large groups using limited ingredients (we were in the Bay of Fundy after all). I learned how to organize large grocery orders and plan meals in advance to accommodate visitors to the island. I will return to Kent Island twice more in the fall of 2017, and am looking forward to cooking for both trips. Originally, I came to the island planning to work on Savannah Sparrows with the Canadian researchers on the island. However, alongside cooking, this proved to be too much of a time commitment. For a while, every day was a new conversation, a crash course in ornithology, but also forest ecology, and entomology. Eventually, I joined another Bowdoin student who was working on Leach's petrels to help collect data for the long-term project. The data set with sixty years of petrel data did not make it to the island, so I was unable to use those data for my own project. I stayed up late to listen to the calls of the petrels returning to the island at night. Their night-time arrival is thought to minimize depredation. Based on this, I eventually came up with my own project looking at the Leach's petrel's chatter response to predator vocalizations.



Leach's petrels make a very characteristic chattering call at night when returning to the island from feeding waters. I hypothesized that the birds make a choice about when they use a chatter call at night, and that choice should be related to their perception of the presence of herring gulls, a predator of Leach's petrels. I went to densely populated areas of petrels on the island, both near and far from gull colonies, and recorded the petrels' chatter response to a series of playbacks of gull calls, silence, other chatter recordings, and the sound of an unfamiliar call, similar pitch to a gull. I was unable to analyze the chatter calls individually because there is great variation between male/females and burrowing/flying petrels. Instead, I studied the change in the rate of chatter calls in response to gull calls and the various controls. The second

facet of my project compared the response rate of individual birds in burrows to recorded petrel calls both with and without an accompanying predator playback. I knew from prior experience that petrels are very likely to respond to chatter playbacks when they are in their burrow, and wanted to know if the calls of a predator directly before the petrel playback would affect their response rate. After analyzing my data, it appears that neither the night playbacks nor the burrow playbacks affected the chatter responses of the birds.



## **Habitat characteristics as determinants of burrow density of Leach's storm-petrel on Kent Island**

**Emma Greenberg, '18 – Bowdoin Fellow**

Leach's storm-petrels are long-lived, pelagic seabirds that nest on offshore islands on the Atlantic Coast. They have increasingly become recognized as an ecosystem indicator species because aspects of their lifecycle are sensitive to disruption because of climate related changes to their environment. As ocean temperatures warm they are forced to travel further and longer for their required prey, especially to feed their chicks. Their low elevation burrows are also at risk from sea level rise. Because of these vulnerabilities, Leach's storm-petrel breeding patterns are being studied closely to understand their population dynamics. On Kent Island, recent changes to the ecosystem may have long-term effects on the petrels, including the eradication of snowshoe hares and the die-off of the dominant white spruce forest. Habitat quality has been identified as an important determinant of breeding success in many seabird species. My study evaluated the environmental characteristics of areas of high burrow density and low burrow density in two habitats, forested and open hills. Understanding the importance of factors such as vegetation type and soil temperature, for example, can help understand the potential effects of environmental change on petrel nesting and reproductive success.



Fieldwork was conducted on Kent Island, an island that is primarily open grassland on the south end and forested on the north end. Areas of high and low densities of petrel burrows were identified and surveyed in both forested and open habitats using 20 plots of nine square meters each. Soil temperature and moisture were measured, substrate material was characterized, and the organic layer was assessed for depth and composition. Dominant vegetation and canopy cover were identified and percent cover calculated. Proximity to nesting gulls was measured. The physical characteristics of the sites were examined for slope and aspect. Finally, petrel burrow density was calculated.

The data are being evaluated to determine whether there are statistically significant differences in the environmental characteristics of areas of high burrow density compared to areas of low burrow density within each habitat and between the two habitats. These results may help characterize what factors are most important to habitat choice and inform further studies on the petrel population of Kent Island. Understanding the key biologic features which impact Leach's storm-petrel burrowing and reproduction can inform conservation efforts aimed at mitigating the impact of climate change on these seabird populations.



## Photography on Kent Island

### Matt Keller '20 – Bowdoin Fellow, Artist in Residence and Cook

Nature photography requires constant inspiration, and that is what I found on Kent Island this summer. I came to Kent with more than ten years of photography experience, but with essentially no knowledge of the island itself and a very loose plan for my project; I hoped to form a better understanding of Kent Island before I decided how I wanted to portray it through my photos. My overall goal was to emphasize the incredible diversity of the small island and to form some connection between my work on the island and the world outside, whether by finding personal meaning that I could carry into my own future or by inspiring those who view my photos and writing.



For some time, I simply explored the island, familiarizing myself with a new area each day, taking photos of anything that stood out to me. I took thousands of shots in the first few weeks, including hundreds of photos of the trees, birds, and landscapes, as well as flowers, ferns, fog, insects, water, stars, sunsets, and more. Editing these photos was both a joy and a struggle. As one of the island's two cooks, a good portion of my time was also spent preparing dinners. While cooking made my overall experience even more rewarding, it created an additional challenge that drew time and energy away from my primary work. I spent a lot of time wondering how my project would finally come together and struggling to give concrete answers to simple questions like "What are you doing with your photos?" As I began to feel more comfortable on Kent Island, I realized that the answers to those questions were not all that important. Attempting such an in-depth portrayal of one place does not necessarily require a specific, detailed plan. Instead, it calls for flexibility, focus, and

patience; I needed to be ready to take advantage of what the island had to offer, ready to notice an interesting shape in the clouds or the drops of dew on a leaf, to appreciate everything from a tiny flower to a bright sunrise and to turn that appreciation into a powerful image. If I could continue to find inspiration in the subjects I was shooting, I knew the photos would speak for themselves. When I look at them now, I see a full picture – a strong representation of the island as I came to know it.

Towards the end of my time on Kent Island, I started work on a short memoir relating my experience there with other experiences I have had. Switching between my thoughts on the island and memories from my past, I have been able to find many connections that help my photos and reflections become more meaningful and less isolated. To make these connections more visible, I am paralleling the memoir with photos from Kent Island, mixed among photos from California and other locations that I have photographed. So far, the results are coming out well and I am excited about the outcome.

The thought of fully investing myself in this project, being immersed in the subject of my work, and sharing my results with the Bowdoin community (and beyond) was what originally brought me to Kent Island. In all my years photographing the outdoors, I had never been given an opportunity to spend so much time with one subject, becoming close to a place, witnessing its richness and diversity, and calling it my home for nine weeks. During that time, I learned a lot about the island – its history and ecology – and myself – both as a photographer and as an individual. I am deeply grateful for my experience on Kent Island and hope that my work reflects that feeling.







Photos and poem – Matt Keller '20



## Coming to Kent

Rolling streets  
Painted city  
Gilded ocean  
Burning fog

Smeltered streets  
Sitting back  
Under the influence  
Of champagne sun

Streets of sand  
So many soles  
So many souls  
Shuffling on

Streets of steel  
Gold over water  
Precipitous visions  
Persuasive horizon

Above every picture  
Streets of silver  
To far-away islands  
With no streets at all



## Could Kent Island's south end be reforested? A transplantation experiment

### Colin Tiernan, '17 – Bowdoin Fellow

Kent Island's southern end had a forest. How long ago that forest stood alive and well is currently uncertain, but in the 1930s large clusters of barren, ghostly stumps covered substantial portions of the south end. Only a few of those stumps stand today.

Why did the forest die out? There are several reasons, but gulls, primarily herring gulls, likely played the biggest role in regeneration suppression. As Grand Manan developed, its dump grew, and became a huge and accessible food source for gulls. The dump's growth coincided with a fishing industry boom. Increased fishing created more available fish for gulls, as fishermen threw bait and offal overboard and caught more fish in weirs. These factors cumulatively led to an explosion in the gull population. All those gulls had to nest somewhere, and many of them nested on Kent Island. At their peak, as many as 30,000 pairs of gulls bred on the island each year, far more than breed on the island today. Why would the presence of gulls lead to deforestation? Here are the best hypotheses: Copious amounts of acidic guano could have killed needles and leaves, and might have obstructed trees' ability to photosynthesize. The sheer weight of gulls damaged trees. Breeding gulls plucked any matter, organic or otherwise, for their nests, including small saplings. Snowshoe hares also played a role in forest repression. To some extent, the muskrats also retard forest growth. They enjoy nibbling recently transplanted balsam firs. Acid rain and fog, and climate change, could also have deteriorated Kent's Island's forests.

I designed an experiment to test the viability of reforesting the southern end, by planting saplings in four plots at the south end. Each of the four plots contains 36 trees (12 each of birch, balsam fir, and white spruce), transplanted from the north end. I divided each plot into four treatments: Weed cloth, fencing, weed cloth



and fencing combined, and no protection. Those plots are not an attempt to start a forest, but they will provide valuable information: Could trees grow if planted on the south end? Which species would have the most success? Are the muskrats or gulls still preventing forest expansion? Are certain microhabitats within the south end more suitable for growing trees than others? What's the minimum (human) investment required to initiate forest growth? If it turns out that it is viable to reforest the southern end, then it will be important for future Kent Islanders to decide if it should be done.

Additionally, with help from Mark, I made a sweet driftwood chair.



Photo by Fred Field for Bowdoin College



## Host plant preferences of *Philaenus spumarius*, the meadow spittlebug

### Zoe Wood, '18 – Bowdoin Fellow

I had the exciting opportunity this summer to work with a system that no one had previously examined in depth on Kent Island: *Philaenus spumarius*, the meadow spittlebug. While Kent is a wonderful place to study seabirds and migrating birds, it also contains a wealth of insect and plant life that make great subjects.

Spittlebugs are small but visible crop pests that are easily recognized by the frothy spittle masses the nymph creates on the plant it feeds on. Spittlebugs are generalist xylem-sap feeders, meaning they are not host-plant specific to any one species, but rather are versatile in their feeding behavior. Nevertheless, they still have preferences for certain plants, including but not limited to nitrogen-fixing angiosperms, suggesting the role of nitrogen content as a potential factor in host plant selection. Plants with higher nitrogen content may consequently be a richer source of amino acids for the xylem-feeding insects. My project aimed to characterize the 1) diversity of the plants on Kent found to be spittlebug hosts, 2) density and performance of nymphs on different plant species, 3) and changes in density on goldenrod (*Solidago rugosa*) over the course of eight weeks with nitrogen fertilizer application.

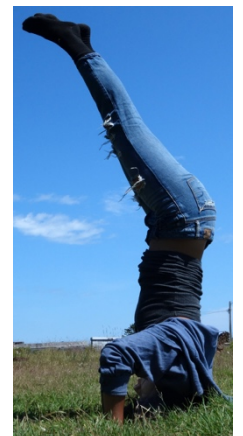


So far, I've identified 32 host plants and trees species, including several flowering plants and some conifers. I measured nymph body sizes on some of these plants as a proxy for performance, and found that on average, nymphs on goldenrod were larger than nymphs on sheep sorrel. For my density censuses, I created paired goldenrod plots (half fertilized, half unfertilized) around the island and measured plant height and number of nymphs over the course of the summer. I found that the density of nymphs in the nitrogen treated plots decreased over time at a



faster rate than the nymphs in control plots, suggesting either 1) a faster growth rate and earlier adult emergence, or 2) higher rates of depredation. As the nymphs molted into adults, I also noticed different morphs or color patterns around the island. Several studies have examined the polymorphism of the meadow spittlebug, and most have identified the three most common morphs as populi (POP), typicus (TYP), and trilineatus (TRI). In my last couple weeks on Kent, I collected and attempted to categorize the different morphs I saw in both my fertilized and unfertilized plots, but I didn't detect any difference in the frequencies of the three common morphs.

As well as studying spittlebugs, I maintained an insect collection, learned the names of plant and moth species, and, of course, how to do a headstand. The isolation of Kent Island allowed for a summer free of distractions in which I was also able to take advantage of my time to read, write, draw, and wander. I look forward to continuing to work with my data and questions about spittlebug-plant interactions in the coming academic year.



## Collaborative Research on Kent Island

### **Savannah Sparrows – University of Windsor**

Members of Dan Mennill's and Stéphanie Doucet's Laboratories from the University of Windsor were very excited to conduct research on Kent Island again this summer, and to work together with the Bowdoin undergraduate students on their research projects, and deliver guest lectures at the station.

Three students from the University of Windsor lab arrived on Kent Island on April 15: Ian Thomas, Ines Moran, and Katherine McGuire. The team focused on recording the songs of Savannah Sparrows and mapping their territories as soon as the birds arrived on the island, and continuing the long-term playback study of song learning that has been ongoing since 2013. Ines and Katherine left the island on May 28, the same day the rest of the University of Windsor team, including Dan and Stéphanie and their two children, arrived. Dan and Ian spent June recording birds, while Stéphanie used her field-portable spectrophotometer to study visual signals. Ian collaborated heavily with Ryan Norris and Amy Newman's team in finding nests and banding the sparrows. Ian returned to the island in early September, to conclude this year's playback experiment.

This was Ines' final field season studying Savannah sparrows on Kent; she defended her Master's thesis on August 28, under the co-supervision of Dan Mennill and Ryan Norris: "Acoustic signalling in Savannah sparrows, *Passerculus sandwichensis*: Diel and seasonal variation, male-male vocal interactions." Ines described patterns of seasonal and diel variation in the singing behavior of Savannah sparrows, and presented the findings of a playback experiment that reveal that Savannah sparrows use quiet song as an aggressive territorial signal.

### **Savannah Sparrows – Amy Newman, Guelph University**

In collaboration with Dr. Ryan Norris, I spent 5 weeks as a happy resident on Kent Island, arriving at the end of May and staying through June which is the height of the Savannah sparrow breeding season. I continued contributing to the long-term monitoring of the core Savannah sparrow population, captured adult Savannah sparrows to recover GPS and geolocator tags that were deployed in September 2016, and captured all returning yearlings (hatched in 2016) to collect blood samples with the goals of investigating ecophysiological links between the early life environment and adult stress physiology, behavior, and fitness. The Savannah sparrow team welcomed Dr. Bridgett Stutchbury as an esteemed guest ornithologist for a 3-day visit to the Island in mid-June.

I also enjoyed mentoring undergraduate students from Bowdoin College, and training graduate students new to the Savannah sparrow project. In my spare time, I welcomed the opportunity to explore Kent Island with my 4.5-yr-old daughter, and take photographs.

### **Savannah Sparrows – Mike Elza, Guelph University**

This summer I contributed to the long-term Savannah sparrow project. Within our 10-hectare study site, Savannah sparrows have been monitored on Kent Island since 1987. This summer, as with past years, breeding territories of each pair were mapped, all nests within the study site were found and monitored, un-banded birds were given color-bands as unique identifiers, and all birds hatched on the study site were also given bands. Additionally, we re-captured birds that were given GPS tracking devices (via a backpack-style harness) and geo-locators (light-level sensors to determine location). Data recovered from these devices will shed light on where and when this population of Savannah sparrows migrates and overwinters. For my Master's thesis, I will rely on these annually collected data, along with the GPS and geolocator data, to analyze climatic and agricultural impacts on Savannah sparrows.



## Seabird Surveys and Monitoring – Rob Ronconi and Sarah Wong, Dalhousie University and Canadian Wildlife Service

The Dalhousie University (Nova Scotia) field course in Marine Ornithology visited Kent Island for two nights in July of 2017. Now in its third year lead by instructors Rob Ronconi and Sarah Wong, the course teaches students the theory and field techniques associated with studies of seabird ecology and conservation. As part of that experience, students are brought to Kent Island where they can discover, first-hand, the day-to-day life of breeding seabirds in their colonies. This experience also includes student projects which implement standardized field techniques aimed at collecting data that will contribute to long-term monitoring of local seabird populations. This year's projects on Kent included 1) census of black guillemot nests and habitats, 2) testing of call-playbacks as a tool for Leach's storm-petrel nest monitoring, 3) surveys of common eider abundance in brood-rearing habitat, and 4) at-sea surveys of seabirds during vessel transits to and from the island.

Rob Ronconi also works for the Canadian Wildlife Service in Dartmouth, Nova Scotia, where he is leading projects mapping bird abundance and distribution for the purpose of oil spill response planning. During their visit to Kent, Rob and students deployed tags on black guillemots which will monitor their year-round movements in the Bay of Fundy and beyond. The tags will be recovered from birds in 2018.



The 2017 Dalhousie University Marine Ornithology field course led by Rob Ronconi and Sarah Wong

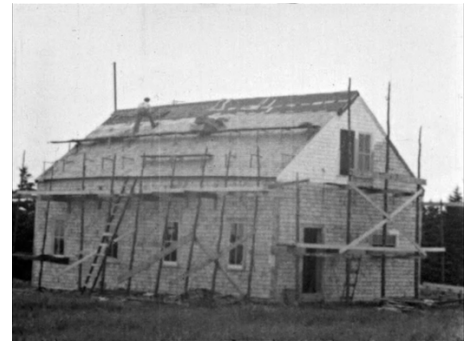
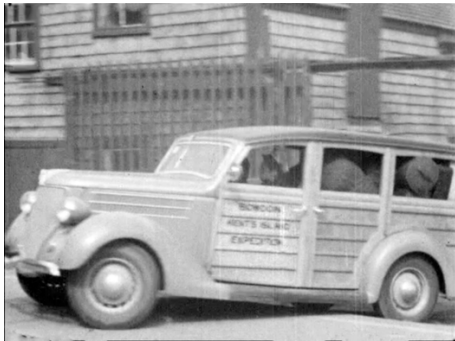


## Historic Kent Island Films

In 2015, Ed Minot was looking at boxes in the attic of his family's home in Brunswick. There he found three *circa* 1936 Kent Island 16mm films. These mostly black and white films document the early days of the Bowdoin Scientific Station. Caroline Moseley, Bowdoin College Special Collections, oversaw the archiving of these films and their subsequent transfer to MP4 digital format. The films may be downloaded for viewing at

<https://library.bowdoin.edu/arch/mss/aogg.shtml#ref615>

The following six images are frames from those films. 1. Ford V8 station wagon donated by the Ford Motor Company. 2. Tom Gross '39 operating the BSS radio, call sign VE1IN. 3. Maintenance on the Dorm under the direction of Lester Tate of Ingall's Head, Grand Manan. 4. Ernest Joy and Thornton W. Burgess catching and banding herring gull chicks on the south hill. 5. Alan Brand from Cornell came to record the calls of Leach's petrels. 6. Bill Gross (Bowdoin '37) with cine camera on Machias Seal Island.



## Weather Station Update

Jim Cunningham has established an automated weather station at Kent Island. Anyone interested in checking on the Kent Island weather may go to the following URL:

<https://www.wunderground.com/personal-weather-station/dashboard?ID=INEWBRUN16>

This summer, Jim added two webcams so it is possible to see both current and past pictures from the site of the weather station. Each camera has its own web address:

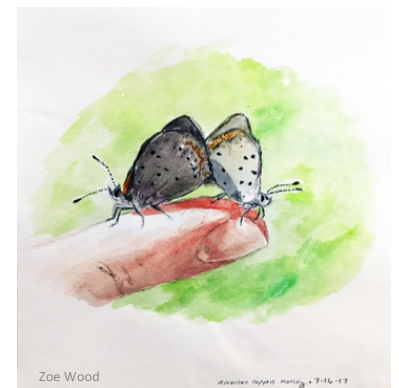
<https://www.wunderground.com/webcams/fogseeker/1/show.html>

<https://www.wunderground.com/webcams/fogseeker/2/show.html>



## Kent Island Art

One of the great pleasures of a summer at the Bowdoin Scientific Station is the discovery that science, natural history and art blend seamlessly on the island. This is due in part to the seeming paradox that the confines of a 50-hectare island act to liberate the senses through experiencing many facets of the same constrained landscape. There were two Artists in Residence in 2017, yet everyone on the island developed an artist's perspective. A show at the Smith Union that opened on 17 October celebrated this by presenting works from five of the Bowdoin Fellows.





## Kent Island News

Kent Islanders had a lunchtime reunion at the 2017 North American ornithology meeting (photo below). Andrea Kudrez Townsend ('98) was elected to the AOS Council and Mike Butler ('02) won the prestigious Young Investigator Award.



Dan Mennill, Stéphanie Doucet (plus Amélie and Max), Mike Butler ('02), Andrea Townsend ('98), Sami Nichols ('09), Brad Woodworth, Nathan Elliott ('09), Lisa Elliott, Nat Wheelwright, Ines Moran, Katherine McGuire, Bryant Dossman ('11), Greg Mitchell, Justin Schuetz ('93).

Nat Wheelwright was director of the BSS for 17 years from 1987 until 2004. He retires from Bowdoin College spring semester 2018. On April 19, 2018 there will be a formal gathering at Bowdoin to celebrate his 32 years at Bowdoin and ongoing activity as an Emeritus Professor.

Nat recently started a series of 90-second videos on natural history available at the Maine Audubon website.  
<https://www.maineaudubon.org/news/nature-moments-with-nat-wheelwright/>

These videos are done in conjunction with his recent book with Bernd Heinrich (more below):

Wheelwright, N.T., and B. Heinrich. 2017. *The Naturalist's Notebook: An Observation Guide and 5-Year Calendar-Journal for Tracking Changes in the Natural World around You*. Storey Publishing, North Adams, Mass.

Dan Mennill made a time-lapse video of a day on Kent Island: <http://bit.do/KentIsland>

Bowdoin News has an item about Kent Island: <http://bit.do/KentNews2017>

Amy Newman's photograph "History" won first prize in a contest at The University of Guelph in August. <https://www.uoguelph.ca/research/photo-contest/history-amy-newman>

Over the summer, the station assisted the Canadian Wildlife Service with three projects, collecting herring gull and Leach's petrel eggs for toxicology studies and eider feathers for a population genetic analysis.



## Publications since the 2016 BSS report

Newman, AEM, H Hess, BK Woodworth & DR Norris. 2017. Time as a tyrant: the minute, hour and day make a difference for corticosterone concentrations in wild nestlings. *General and Comparative Endocrinology* 250:80-84. DOI:10.1016/j.ygcen.2017.05.022

Taylor, P. D., TL Crewe, SA Mackenzie, D Lepage, Y Aubry, Z Crysler, G Finney, CM Francis, CG Guglielmo, DJ Hamilton, RL Holberton, PH Loring, GW Mitchell, D Norris, J Paquet, RTA Ronconi, J Smetzer, PA Smith, LJ Welch & BK Woodworth. 2017. The Motus Wildlife Tracking System: a collaborative research network to enhance the understanding of wildlife movement. *Avian Conservation and Ecology* 12(1):8. DOI:10.5751/ACE-00953-120108

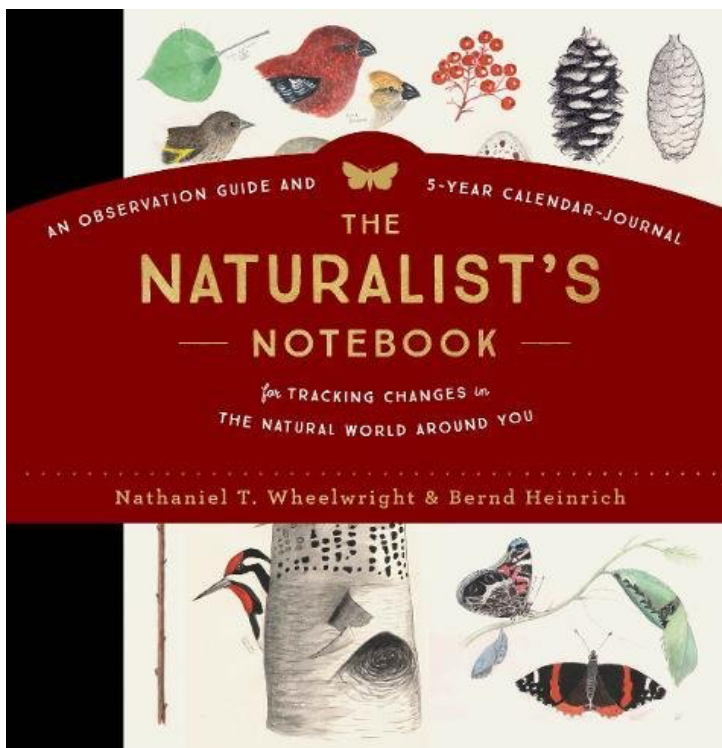
Wheelwright, NT, & RA Mauck. 2018. In Memoriam: Charles Ellsworth Huntington, 1919–2017. *Auk* (*in press*).

Wheelwright, NT, & C Teplitsky. 2017. Divorce in an island bird population: causes, consequences, and lack of inheritance. *American Naturalist* 190: 557-569. DOI:10.1086/693387

Woodworth, BK, NT Wheelwright, AEM Newman & DR Norris. 2017. Local density regulates songbird reproductive success through effects on double-brooding and nest predation. *Ecology* 98:2039-2048. DOI: 10.1002/ecy.1911

Woodworth, BK, NT Wheelwright, AE Newman, M Schaub & DR Norris. 2017. Winter temperatures limit population growth rate of a migratory songbird. *Nature Communications* 8:14812. DOI:10.1038/ncomms14812

New Book by Kent Island Director Emeritus Nat Wheelwright and Bernd Heinrich



Nat has published a new book in collaboration with famed natural historian and nature writer Bernd Heinrich. This beautifully illustrated notebook will guide you through how to keep a nature journal and includes a 5-year calendar-journal for you to start your own notes on the natural world around you. A perfect gift for nature lovers and Kent Islanders of any age. 100% of the proceeds go to non-profit conservation and environmental education organizations.

“A marvelous guide to curiosity and wonder, full of brilliant and inspiring advice from two of our generation’s most accomplished naturalists.” – David George Haskell author of *The Forest Unseen* and *The Songs of Trees*



Research and Student Fellowships are Generously Supported by Alumni and Friends of Kent Island Donations

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Huntington-Wheelwright Field Station Endowment  
Kent Island Fund  
Minot Fund for Kent Island  
Heizaburo Saito Fund  
Thomas and Roberta Skaling Kent Island Fund  
Andrew and Patricia ('76) Towle Fund for Kent Island

### **Kent Island on Social Media**

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Bowdoin Scientific Station at Kent Island

Please tag us in your Kent Island posts! #bsskentisland

