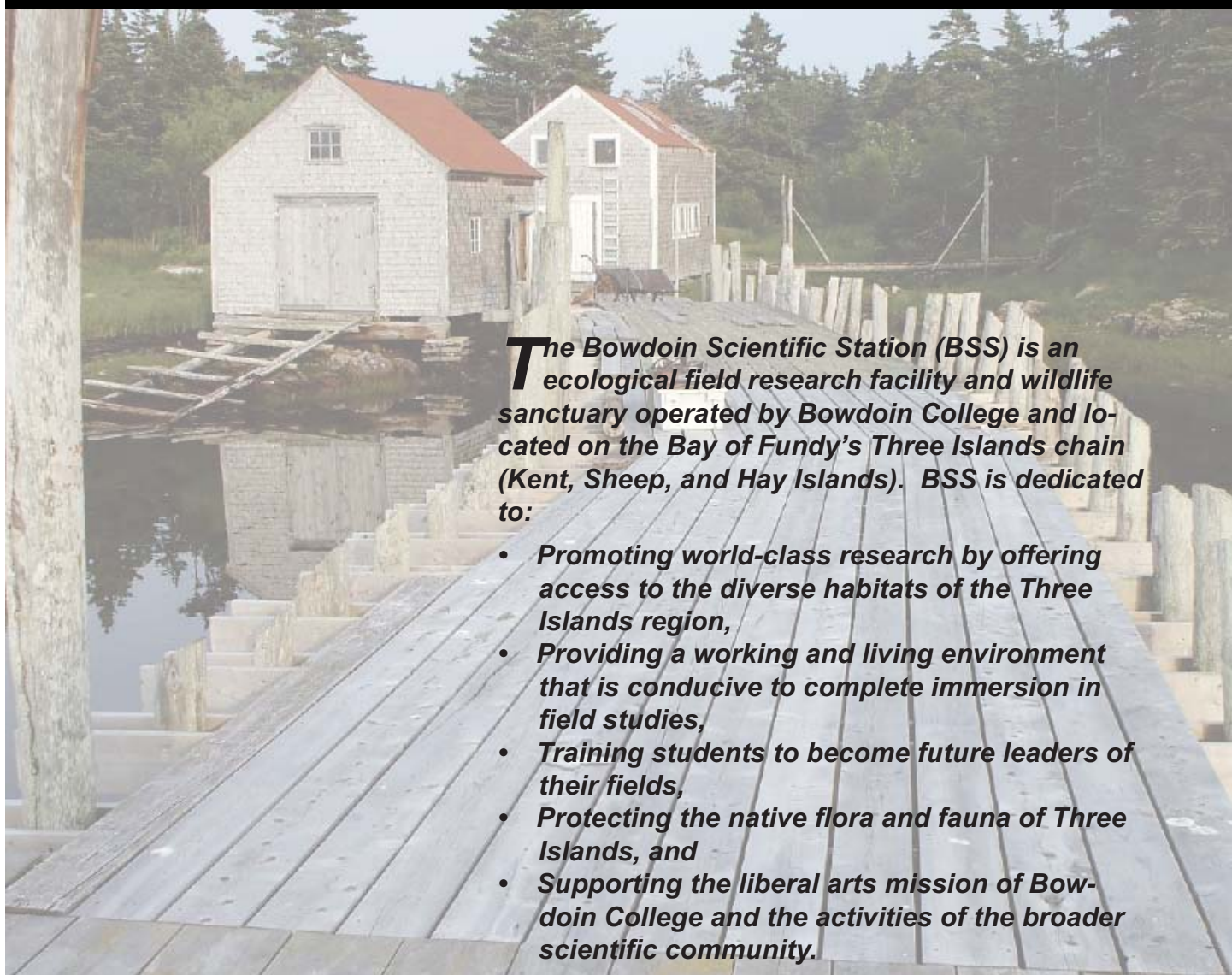


Bowdoin Scientific Station

2008 Annual Report



The Bowdoin Scientific Station (BSS) is an ecological field research facility and wildlife sanctuary operated by Bowdoin College and located on the Bay of Fundy's Three Islands chain (Kent, Sheep, and Hay Islands). BSS is dedicated to:

- ***Promoting world-class research by offering access to the diverse habitats of the Three Islands region,***
- ***Providing a working and living environment that is conducive to complete immersion in field studies,***
- ***Training students to become future leaders of their fields,***
- ***Protecting the native flora and fauna of Three Islands, and***
- ***Supporting the liberal arts mission of Bowdoin College and the activities of the broader scientific community.***

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From the Director



Taking over the reins of a research station with such a rich history is a daunting task. But the outpouring of support from Kent Islanders, and everyone at Bowdoin, has been incredible. I am truly fortunate to be working with such dedicated and talented people. This annual report gives me an opportunity to introduce myself to the entire Kent Island family, to reflect on BSS's accomplishments, and to articulate my ideas for its future.

BSS is where many students get their first taste of scientific field work. Over 400 undergraduates have conducted significant summer research projects at BSS and hundreds more have studied at BSS during class field trips. This experience has a profound and lasting effect. An extraordinary number of BSS alums go on to careers in science and environmental management: 50 BSS

undergrads have gone on to graduate degree programs in ecology and related fields since 1987.

But one of the most impressive things about BSS is the quantity and quality of research that it produces. The Organization of Biological Field Stations has 311 member stations. Most of these other stations are operated by large research universities and have budgets that are astronomically greater than that of BSS, and many are envious of BSS's publication record. Publications are the currency of science. Not only does BSS publish a lot of research, but the quality of these publications is exceptional. The number of papers published in top-tier scientific journals is remarkable. That this level of productivity has been achieved primarily by a small assemblage of faculty and students from a liberal arts college is astonishing. You would be hard-pressed to find a field research facility that has a better ratio of the number of peer-reviewed papers published versus dollars spent. BSS is truly one of the best research investments in North America. It is my job to make this point clear to research funding agencies, foundations, and private donors.

As the first full-time director of BSS, I have the opportunity and obligation to dedicate more effort toward developing and sustaining academic programs, maintaining infrastructure, and securing funding than was possible for my predecessors, who had full-time teaching appointments. All of my activities in these areas will be guided by the Station's mission. My highest priorities are to:

- Maintain BSS's high scientific productivity
- Maintain and strengthen all of BSS's existing long-term research projects
- Establish new research programs in marine ecology
- Facilitate new research collaborations (among faculty from Bowdoin and elsewhere)
- Strengthen the student artist-in-residence program
- Expand the range of academic disciplines using the Station (including humanities and social sciences)
- Increase use of the Station for research and education during August-October
- Maintain the Station's infrastructure so that all of the above work can be pursued vigorously and efficiently
- Protect the natural habitats and native species of Three Islands
- Maintain the sense of community and simple lifestyle at the Station
- Keep the history of BSS alive
- Raise the funds necessary to promote all of the activities listed above

In the following pages, you will see that BSS was a well-used facility in 2008. This past year the Station was home to 11 major research projects and several other small projects. Most of the research projects were conducted by students. Their work was original and impressive, and, most important, advanced the scientific community's understanding of island habitats. Each major project is described below by its principal investigator.

In the past year BSS research resulted in more than a half-dozen papers published in scientific journals and several more manuscripts are undergoing peer review as I write this report. In addition, there were three honors theses,

and several lectures and conference presentations made in 2008.

BSS is a resource for the entire scientific community. We had several faculty and students from other institutions conducting research on Kent Island last summer. Clearly, the impact of BSS reaches beyond the Bowdoin community. But the benefits flow in both directions, as these visiting faculty expose Bowdoin students to a wider range of scientific expertise.

Of course, science isn't all that we do at the Station. Kent Island hosted two student artists from Bowdoin this past year, Nate Johnson '09 and Mary Helen Miller '09, who used the beautiful and sometimes severe setting of the island as the subject of their work. In addition, a multidisciplinary group of faculty held a retreat at BSS in July; ten first-year students ventured to Kent Island for a pre-orientation outing in August; and three Bowdoin classes took field trips to the Station during the fall semester.

Needless to say, 2008 was a busy year at the Station, and the work conducted there has influenced the campus community, as well as the greater scientific and artistic communities, in many ways. This year is shaping up to be even busier. We are initiating new research projects on Common Eiders, marine mammals, and marine community ecology, and preparing for some much needed major infrastructure maintenance projects.

BSS is a gem of a resource and is part of what makes Bowdoin a vital and unique educational institution. It thrives because of the dedication and support of its students, faculty, staff, and alums. As director, I promise to tirelessly pursue BSS's mission. Economic conditions will present many challenges in the coming years, but I know that I will enjoy continued support and guidance of the Kent Island community.

Keep In Touch,

Damon Gannon, Director
dgannon@bowdoin.edu
(207) 798-4267



BSS Personnel, 2008



Undergraduate Students

- Nathan Elliott (Bowdoin '09)
- Priscilla Erickson (Kenyon College '09)
- Lisa Harn (Kenyon College '09)
- Nate Johnson (Bowdoin '09)
- Mary Helen Miller (Bowdoin '09)
- Katherine (Sami) Nichols (Bowdoin '09)
- Meredith Steck (Bowdoin '09)
- Allison Weide (Bowdoin '08)

Graduate Student

- Greg Mitchell (Ph.D. student, U. Guelph)

Bowdoin Faculty

- Damon Gannon (BSS, Biology)
- Meggan Gould (Visual Arts)
- Chuck Huntington (Biology-Emeritus)
- Cristle Collins Judd (Dean of Academic Affairs)
- Matthew Klinge (History, Env Studies)
- Bruce Kohorn (Biology)
- John Lichter (Biology, Env Studies)
- Barry Logan (Biology, Biochemistry)
- Bob Mauck (BSS, Kenyon College Biology)
- Dharni Vasudevan (Chemistry, Env Studies)
- Nat Wheelwright (Biology)
- Genie Wheelwright (Romance Languages)

Visiting Faculty

- Don Dearborn, Bucknell University
- Janet Gannon, Mote Marine Laboratory
- Heather Koopman, UNC Wilmington
- Ryan Norris, University of Guelph
- Rob Ronconi, Dalhousie University
- Andrew Westgate, UNC Wilmington
- Heather Williams, Williams College

Research Assistants

- Sterling Brough (Mitchell)
- Hannah Harwood (Mauck, Dearborn)
- Katie Mauck (Mauck)
- Ross Mauck (Mauck)
- Lauren Rae (Mitchell)
- Allison Weide (fall) (Mauck, Dearborn)

Station Staff

- Dre Gager, Chef & mentor
- Damon Gannon, Incoming director
- Joan Ingalls, Logistical support
- Russell Ingalls, Year-round caretaker
- Bob Mauck, Outgoing director
- Susie Mauck, Logistical support
- Mark Murray, Summer caretaker
- Seth Murray, Visiting engineer
- Julie Santorella, Administrative support

Guests

- Bill Beazley
- Meg Boyle (BSS '03)
- Erin Dukeshire (BSS '03)
- Miles Logan
- Todd McLeish
- Rob & Anita Miller
- Jan & Liz Pierson (BSS alums)
- Jim Cunningham
- Peter Cunningham
- Jean Stewart
- Hank Washburn
- Eric Winne
- ~70 people for Bob Cunningham's Memorial Service
- Bowdoin First-Year Student Pre-Orientation
- Three Bowdoin Class Field Trips



In Memoriam



Robert M. Cunningham (by Bob Mauck)

Bob Cunningham's eight decade love affair with Kent Island came to an earthly end April 15, 2008 at the age of 89 when he died at his home in Lincoln, Massachusetts. Bob first set foot on Kent Island as a high school student in 1937 after hearing Bill Gross describe Bowdoin's new summer field station in the Bay of Fundy. That summer marked the start of his long-term study of Kent Island weather. It is a study that has enriched the lives of every Kent Islander who ever took the daily weather records and, perhaps for the first time, was forced to look up at the sky twice a day and think about it.

Trained as a cloud physicist, Bob spent his career studying the weather. Through the years, Bob always found his way back to Kent Island. His Kent Island data found their way into the scientific literature, such as his 1941 paper demonstrating a link between the wind from the industrial northeast and the acidity of the fog. Bob and his family -- wife Claire, sons Peter, Bill, and Jim -- made a second home on Grand Manan near his lifelong friends, Lester and Myhron Tate. Given half a chance, Bob would hop the next boat bound for Kent Island, wind and tide be damned. We were always glad to see him. The joy Bob took in the weather was good for all to see. It fascinated him in a way that can't really be explained, and does not need to be. He was most at home with that great joy when he was on Kent Island. There was no place on earth he would rather look up at the sky. Those of us fortunate enough to have shared it with him count ourselves the better for it.

A memorial service was held on Kent Island on July 28th, attended by over 70 people. This may have been the largest number of people on Kent Island since the Station was founded, which indicates the widespread fondness and admiration for Bob as well as the close ties that exist between BSS and the Grand Manan community.



William A. O. Gross (by Nat Wheelwright)

Bill Gross (Bowdoin '37), the last surviving member of the four "Kent Island pioneers," died on Sept. 24, 2008 at the age of 93. When he was 19 years old, having just completed his freshman year at Bowdoin, Bill spent the summer of 1934 camping on Kent Island, which at the time was owned by J. Sterling Rockefeller. Inspired by his boyhood visit to the Smithsonian Tropical Research Institute on Barro Colorado Island, Panama with his father, Bowdoin Ornithology Professor Alfred Gross, Bill saw the possibilities for Bowdoin to have its own research station, and that summer he persuaded Rockefeller to donate the island to the College. Although he ultimately went on to a career in advertising, Bill left his mark in science by publishing a paper on the biology of Leach's Storm-Petrels, which is still widely cited. A lifelong and passionate supporter of Kent Island, Bill and his family established endowment funds for the operation of the field station and for student research, and donated the lead gift that made possible the purchase of Hay and Sheep Islands in 2004. Bill's vision and enduring loyalty to Bowdoin College have touched the lives of thousands of Kent Islanders, and he will be sorely missed. A memorial service on Kent Island is tentatively planned for July 2009.

Allan Moses (by Damon Gannon)

On July 19, Bob Mauck and Damon Gannon represented BSS at a ceremony on Grand Manan to unveil a new monument marking the grave of Allan Moses. Moses, a Grand Manan native and accomplished naturalist, played a key role in the chain of events that eventually culminated in the creation of the Bowdoin Scientific Station. During an ornithological expedition to central Africa in 1930, he convinced J. Sterling Rockefeller to purchase Kent Island in order to protect the Bay of Fundy's last remaining breeding colony of common eiders. At the time, there were thought to be fewer than 10 nesting pairs on the island. That act stemmed the tide of the eider's precipitous decline. Along with Ralph Griffin, Moses became Kent Island's first warden.

Allan Moses died in 1953, but his grave site was not marked by a head stone. Grand Mananers Wayne Sears, Fisher Greene, and Ava Sturgeon led a fundraising effort to purchase a gravestone befitting of such an important historical figure. Under Bob Mauck's leadership, BSS was a major contributor to this cause. Approximately 50 of Allan's friends, family members, and admirers attended the ceremony.

2008 Research Projects



Parental Investment by Herring Gulls and Leach's Storm-Petrels Donald Dearborn, Ph.D., Assoc. Professor of Biology, Bucknell University

I spent the summer working on two projects, both related to strategies of parental investment. In Leach's storm-petrels, I explored the importance of temporal coordination of parental food deliveries. Using an experimental scheme of natural feedings by storm-petrel parents and supplemental feedings by researchers, I tested whether temporally clumped food deliveries caused slower growth and development than evenly spaced food deliveries. In herring gulls, I tested whether mothers provision their first- and last-laid eggs with different levels of immune factors. Because last-hatched chicks are usually at a competitive disadvantage, moms might adopt one of two strategies: (1) provision extra immune factors to last-laid eggs, to offset the competitive disadvantage of hatching last, or (2) put fewer immune factors in last-laid eggs, so that any period of severe environmental stress might quickly kill the weakest offspring without a debilitating period of intra-brood competition. Future lab-work will use this summer's samples to measure immune function in these herring gull nestmates.



Habitat Survey of Kent Island Nathan Elliott, Bowdoin '09

I conducted a thorough habitat survey of Kent Island under the supervision of Damon Gannon and with much analytical assistance from Janet Gannon and taxonomic assistance from Nat Wheelwright. Our purpose was four-fold: first, to create a complete and accurate description of the flora and habitat types of Kent Island; second, to provide a database that will be useful to future researchers interested in biogeography; third, to document changes in the island's flora over time, especially with the recent eradication of snowshoe hares; and fourth, to serve as a tool for making management decisions about reforestation, invasive species, and bark beetles.

My survey design consisted of dividing the entire island into a grid consisting of approximately 10,000 10×10 m cells. Grid cells to be surveyed were selected randomly. I hiked to each selected cell and located its position with a GPS (glob-

al positioning system), where I recorded canopy density and height, understory height, soil type and moisture, and the dominant species in each layer. I identified and counted all tree species; classified them as mature trees, saplings, or seedlings; and identified any obvious signs of bark beetle infestation (see *Three Islands Ecology* on p. 10). Finally, I determined the percent ground coverage for about 50 species of understory plants.

I ended up collecting data on 853 grid cells on Kent Island. I will be using GIS (geographic information systems) to compile my data, analyze spatial trends in species distributions, and make visually effective summary maps for my honors thesis.

*See Nathan's map depicting tree canopy height throughout Kent Island on p. 15.

Don't put all your eggs in one basket: Growth, oxidative stress, and fledgling survival in Savannah sparrow chicks raised in experimentally manipulated broods Priscilla Erickson, Kenyon College '09

All organisms must devote a portion of their energy intake to self maintenance in order to survive for future reproduction. However, during the first few days of life, growth is also quite important, so a trade off exists between investment in tissue maintenance and growth. Maintenance takes a variety of forms. I am particularly interested in the management of oxidative damage to tissues. Organisms have a variety of mechanisms to resist and repair this damage to promote survival, but they are costly and reduce energy for other purposes. Savannah sparrows on Kent Island are excellent models for studying these relationships because the same individuals can be monitored for several years from birth until death.

My study utilized two main techniques to manipulate environment and resource allocation: brood size manipulation and lysozyme supplementation. Brood size manipulation (adding or removing chicks) altered food availability for growing chicks. Chicks in enlarged broods compete more with each other for food, so they must either work harder to receive the same amount of food or receive less food. In contrast, chicks in reduced broods either receive more food or work less for the same amount of food. When food availability changes, the amount of energy invested in self maintenance processes will likely change. For the second part, I supplemented chicks with lysozyme, an enzyme that helps build the immune system. When chicks receive this immune boost, they may be able to invest more energy in maintenance.

I spent most of my time in the field looking for nests and handling chicks. After hatching, the chicks were weighed every two days until they were seven days old, when we banded and measured the chicks and collected small blood samples. I will be analyzing the blood samples for a variety of indicators of oxidative damage to DNA and lipids, as well as repair mechanisms for my honors thesis at Kenyon Col-

lege. By combining these physiological and morphological data, I will better understand what priorities determine allocation of fixed energy budgets during development.

Parent-Offspring Energetic Conflicts in Leach's Storm-Petrels Lisa Harn, Kenyon College ('09)

I studied parent-offspring conflict during the incubation period in a long-lived species of seabird, Leach's storm-petrels. Leach's storm-petrels lay their eggs in forest burrows, far from the open ocean where they forage for food. This imposes an energetic constraint on the parent birds, and therefore a trade-off exists between how much energy the adults invest in caring for offspring and self-maintenance. Parent-offspring conflict theory predicts that a long-lived species like Leach's storm-petrel will tend to invest more energy in self-maintenance rather than reproductive effort: a single year's reproductive output (just a single chick) is a lower priority than maintaining the potential for future reproduction (one chick every year or so for a life span that can exceed 30 years).

To explore this trade-off, I induced a temporary increase in the cost of flight for parents by trimming their wings by 1.5 cm. I am also interested in how males and females differ in their energy allocation strategies. This species uses biparental care, so the males are participating in incubation and chick-rearing. As it turns out, the males are very devoted fathers—whereas the female must invest heavily in the production of an energetically expensive egg, the males have more energy available to expend on parental care. In order to look at this sex-specific energy allocation during incubation, I used four treatment groups: both parents had their wings trimmed, only the male had its wings trimmed, only the female had her wings trimmed, or neither parent had their wings trimmed.

My summer, therefore, involved spending most of every day in “the Shire” up to my elbows (and sometimes my shoulders) in petrel burrows. Fortunately, the Shire is one of the most peaceful landscapes I've ever seen—a mixed forest of spruce, balsam fir, mountain ash, birches and a dense understory of ferns. For the first couple of weeks, I made the rounds to 150 burrows, grubbing to find the precise lay dates of eggs until I had found 61 eggs. The length of the incubation served as an indirect indicator of the level of parental investment—less time on the egg results in a longer incubation period.

Eight days after the egg was laid, I returned to each burrow to capture the adults (usually with the assistance of at least one volunteer) so that I could trim their wings (or not), draw blood samples that I will be using later this fall to determine if the birds are males or females, and remove tail feathers so that I could examine their level of investment in self-maintenance versus prental care by determining exact feather growth rates. I also used a combination of temperature loggers and Passive Integrated Transponders (PIT) tags in a subset of my study burrows to document the comings and goings of the adults. PIT tag antennas placed around the mouths of the burrows recorded unique identifying codes when a bird banded with a tag passed through. The temperature loggers indicated the time periods when

eggs were being incubated. I will be analyzing these data for my honors thesis.



Tracking Movements of Savannah Sparrows and Leach's Storm-Petrels with Electronic Tags Greg Mitchell, Ph.D. Student, University of Guelph*

My advisor, Dr. Ryan Norris, and I were among this year's group of Sparrow Wranglers. Beginning in June, we helped search for Savannah sparrow nests and captured unmarked individuals within the study site. In mid-August, I began outfitting both adult and juvenile Savannah sparrows with miniature radio transmitters. Using two towers that I constructed, each equipped with multiple antennae and an automated radio telemetry receiver, as well as handheld receivers and antennae, I was able to track the movements of instrumented birds. This allowed me to study their habitat use patterns on Kent Island prior to migration, and the direction of departure at the commencement of migration. Habitat use patterns prior to migration are of interest, because we know virtually nothing about the ecology of young songbirds during this time. We were also interested in the direction of migration because the shortest (energetically least costly) route is likely to be the riskiest route since it takes the birds across open ocean where there is no opportunity to rest and there is a chance of being blown off course by storms. So a trade-off exists, and birds with different levels of experience or fitness might differ with regard to the migration routes that they choose. This pilot research was a great success; I was able to track the habitat use of 54 individuals on the island and the departure directions of four who had commenced their fall migrations.

When not following birds with radio transmitters, I was busy recapturing Savannah sparrows to assess whether breeding season events or tagging had any bearing on individual body condition prior to migration. Lastly, I outfitted 20 storm-petrels with light-sensing geolocators in the hope of attaining a better understanding of their migration routes and migratory behaviors. Leach's storm-petrels that breed on Kent Island are thought to travel to the coastal waters of West Africa, but their exact distribution during the northern hemisphere winter is poorly known. These studies were pi-

lot projects to determine whether the techniques would work. Ryan and I look forward to following up this effort next year.



*Greg Mitchell completed one of the longest field seasons in Kent Island's recent history, spending 124 days on the island from mid-June to late October.

Surf and Turf: Habitat Choices of an Island Sparrow Population Kathryn (Sami) Nichols, Bowdoin '09

I investigated the Savannah sparrow diet under the supervision of Bob Mauck and Nat Wheelwright. I was interested in what parents fed their nestlings, where parents foraged to provide this food, and whether the parents' foraging decisions affected growth rates of the nestlings. Parents can either forage on terrestrial prey within their territories or they can feed along the shore on intertidal prey. Food is abundant in the intertidal zone, but there may be costs to exploiting it, for example: leaving the territory unguarded, risk of extrapair copulations, and metabolic costs associated with consuming prey with a high salt content. Carbon isotope ratios are expected to differ between intertidal food sources and terrestrial ones due to different sources of primary productivity. I collected feather samples from nestlings at age 7 days to analyze their stable isotope ratios to test which portions of diet come from terrestrial sources and which come from intertidal sources. I also collected vegetation and potential prey items from across the island to demonstrate the extent of variation in stable isotope ratios between the two habitats. Analysis of the stable isotopes is being conducted in Ryan Norris's lab at the University of Guelph.

Since stable isotope ratios will only be able to discriminate between terrestrial habitats and intertidal habitats (and not identify the species of prey), I also observed parents feeding nestlings throughout the summer. For every trip to the nest that I saw, I recorded time of visit, parent ID, prey item description, prey item size, direction of approach to nest, and habitat in which the parent foraged. Preliminary analysis suggests that some parents may have used a variety of foraging locations (determined by direction of approach) while other parents repeatedly approached the nest from the same general direction, and were presumably foraging in just a few locations. These differences in apparent foraging location will be compared to the isotope data for the same individuals.

To test whether nestling growth is correlated with parental

foraging choices, nestlings were weighed on post-hatching days 2, 4, 6 and 7 and tarsus length was measured on day 7. My Kent Island field studies will be the basis of my honors thesis.



An inordinate fondness for beetles, bread, and Balderdash Meredith Steck, Bowdoin '09

Within two hours of arriving on Kent Island (a week late, jet-lagged, and still thinking *en français* from my semester in France), I found myself on a habitat walk down the L-transect path with Nat and Damon. As we passed the wet moss and sparse understory at the fringe of the balsam fir forest, I asked Nat whether beetles lived in these wetlands.

"Don't know," he shrugged merrily, "That's what you'll tell us." I tried unsuccessfully to suppress a panic attack.

From my reading, I was aware that beetles were often a key component of biodiversity studies and that they had previously been used to study large scale island biogeography. Additionally, I knew a bit about identifying and pinning from an insect natural history project I had completed in Nat's class. I narrowed my summer plans down to four main goals: 1) improve BSS's Coleoptera reference collection 2) sample all beetle communities on Kent, Hay and Sheep Islands to investigate island biogeography of the small archipelago, 3) bake something so tasty that almost everybody voluntarily goes for seconds, and 4) work on recognizing and employing sarcasm.

Preliminary trapping surveys revealed striking differences among forest habitats in the densities and diversities of beetles. Fascinated, I had an almost uncontrollable urge to set traps in every habitat and found the insects (lots of them) in places I wasn't expecting. I thus divided the islands into 12 habitats (5 forests, 4 fields, 1 wetland, 1 dying forest and 1 littoral zone) and used 5 beetle capture techniques (pitfall trapping, tree beating, brush/understory sweeping, malaise trapping and light trapping) to sample each habitat. Additionally, I sampled the densities and diversities of beetle communities from similar habitats on the Three Islands: littoral wrack, wetland, dry field, and one habitat found on only Kent and Hay (mixed dying forest).

Coordinating the various sampling efforts in all of the habitats was challenging but by July, I had streamlined the process and was able to put more effort into identifying and pinning beetles. Pinning insects is the best way to learn about them. By concentrating on meticulous details, you see

things that escape your notice during casual observation. It is a refreshingly artistic release after tramping through forests, fields and spider webs.

The highest ground beetle density on Kent Island was in forests, although there was much variation among forest types. I caught over 1,000 beetles during a pitfall period of 6 days in white spruce compared with only about 500 caught in mountain ash and 200 in white spruce. However, the diversity of beetle species (measured in number of species per pitfall trapping event) appeared to be lower in the forest than in the fields. Much more analysis lies ahead. I am collaborating with Chris Majka from the Nova Scotia Museum to identify the beetles. I plan to place my results in an island biogeography framework to make inferences on the patterns of colonization by beetle species in *Three Islands*.

So I achieved my first 2 goals of the summer. As for my 3rd and 4th goals...I made a cranberry pumpkin bread that got a "Y-U-M-!" in Dre's notebook. And playing Balderdash with Marko and Don provided some good examples of sarcasm. But the best part of the summer came in late July when I was walking down the L-transect past the spot where I had asked Nat about which beetles could be found in the wetland. I suddenly realized that I knew exactly who I would find in that habitat. One might come across some click beetles on the whorled-wood aster and lichen. A night walk would yield at least four different species of carabids: two from the genus *Pterostichus*, *Calathus opaculus* and *Carabus granulatus hibernicus*. There might even be a scarab feeding on the muskrat dung. The most gratifying part of this knowledge is that I did not read it in a book and it is not something that someone else taught me. I learned it directly from observing the natural world. I still don't know whether Nat feigned ignorance or whether he really didn't know what kind of beetles lived in the wetlands...but I'll be excited to tell him about my findings just the same.

*Editor's note: Nat confesses that his ignorance was genuine and is grateful for all that Meredith has taught him about Kent Island's beetles.

Long-term Study of Forest Health on Kent Island Allison Weide, Bowdoin '08

To understand the pattern of forest regeneration following the eradication of introduced snowshoe hares, I counted and measured seedlings in many different habitats around the island. Seedling abundance varies widely according to forest type on the island. For example, there was an average of 70 seedlings per 1.5 X 1.5-m plot in the balsam fir forest, while the white birch forest plots contained an average of just 5 seedlings. Habitat type, dominant canopy, and dominant understory all seem to play a role in seedling growth; for example, the lowest densities were found in thick patches of wood ferns.

Part of this summer was spent considering ways to speed forest recovery in areas that are now too far from mature

trees (seed source) or that have developed a thick turf that diminishes seedling survival. I transplanted trees from the edge of north field to an open area on the east side of Petrel Path where the forest has died within the past two decades and planted three more along the trail to the southern end where the skeletal remains of a forest that has been dead for many decades can still be seen. Hopefully these transplants will eventually be a seed source in locations where it is currently difficult for seedlings to get established. Unfortunately, some of the transplants on Petrel Path were killed – but not eaten – by muskrats. I also planted 300 red spruce seeds in a 10x10 meter plot that was burned last summer to see whether burning is an effective way of removing groundcover vegetation and reducing the thickness of the underlying turf to promote seedling germination and growth. However, out of 300 seeds planted, only 20 germinated.

In addition to working with seedlings, I also spent time expanding a tree tagging project that was started last summer. I used the 10x10m cell raster grid of Kent Island created by Janet Gannon for Nathan Elliott's project to randomly select grid cells in forested areas. For each tree within the grid

"The most gratifying part of this knowledge is that I did not read it in a book and it is not something that someone else taught me. I learned it directly from observing the natural world."

-Meredith Steck, Bowdoin '09

cell, I recorded its DBH (diameter at breast height), general health, the presence of bark beetles and lichen, and then I gave it a permanent identification tag. In all, I tagged almost 200 trees. I also visited trees that were tagged last summer to document their growth and any changes in health status.

The tree tagging project will be helpful in understanding the state of the forests over time, since tree status can be updated every year.



Singing Behavior of Male Savannah Sparrows Heather Williams, Ph.D., Professor of Biology at Williams College (Bowdoin '77)

Songbirds are a valuable model for human speech and language because of the many parallels between song learning and speech acquisition (imitation from adults, guided by innate predisposition; learning occurs during a critical period; the sensorimotor neural pathways have striking similarities) and their common use as a communication system. Although it is well understood that young songbirds imitate the songs of others in order to learn the songs they will sing

Research, cont.

as adults, from whom and when the young birds learn their songs is not as clear. Because young birds do not sing a recognizable song until they are at least six months old, their preferences for a song model are difficult to track over time. In this study, I am 1) tracking the song development and adult songs of as many adult Savannah sparrows at the Kent Island study site as possible over multiple years, 2) investigating the song preferences of adults by playing song samples back to them in the field and observing their responses, and 3) determining the responses to songs by juveniles - birds that have not yet learned their songs - by examining their movements, calls, and changes in breathing rate to playbacks of several different songs from their natal area. Upon their return to breed the following spring, I will re-examine the preferences of surviving birds by recording the songs they sing (for males) or the songs of their mates (for females) - and, wherever possible, their responses to songs that were sung by their neighbors either during their juvenile year or their first breeding year. Taken together, these results should allow me to assemble an overall picture of how the vocal environment influences song learning in a wild population.

By spending three weeks during the early spring on Kent Island, I was able to record both first-year birds and experienced adults immediately after their arrival on the study site. Both older adult males and first-year males arrive well before the females, and during the first few days after their arrival both age classes sing songs that are not fully crystallized. Although their syllable structure is often initially unstable, adults' songs assume the form sung in previous years within a week. Some first-year males's songs have instability similar to that of the older males that resolves soon after arrival, but others have highly variable songs that often include more than one song type and may also have highly unusual syllable order as well as unstable syllables. The

uncrystallized songs of the young males changed to recognizable, normal Kent Island song within 2-3 weeks, before the return of the females. These preliminary results suggest that female preferences do not play much if any role in the genesis of male song in Savannah sparrows.



2008 Artists in Residence

Nate Johnson, Bowdoin '09

This summer, I did Art. A large portion of my artistic endeavors took the form of oil paintings of landscapes. While most of them simply sought to capture scenes that I found visually interesting or attractive, the two of the Warden's House sought to capture a phenomenon, the changing weather that is such a large part of Kent Island. I spent a lot of time roaming the island and simply looking at the surroundings. There were unfortunately a lot of views that I wanted to paint, but many of them required sun and/or a certain tide, which did not always cooperate. I also did some photography with black and white film that I will develop back at Bowdoin, a few sketches, and a couple watercolors. During the later part of June, I got somewhat sick of looking at and painting gray with a few trees in the foreground, so I did a lot of random drawings that had little to do with Kent Island. Thus while not all of my art was directly inspired by Kent, having

the time and space, and especially the seclusion, necessary to focus on my art was an amazing opportunity.

I also spent a good chunk of time doing things besides art, such as helping Marko reclaim wood from the beaches and helping with tree swallow research. So mostly my summer was spent Arting, "Sciencing," and messing around in boats. What more could one desire?

Mary Helen Miller, Bowdoin '09*

As an artist-in-residence on Kent Island, I spent the summer creating art, monitoring the tree swallow nests, and helping other people on the island with various projects. On a typical day, I spent two or three hours in the morning and the same amount of time in the afternoon working on an art project. I used primarily oil paints, and my focus was painting landscapes on site. During the first week, I worked on a small painting of the north field in the morning, with a swal-



Art, cont.

low box in the foreground and a spruce tree highlighted by the sunlight in the background. I was drawn to the north field because it was the calmest spot on the island during those sunny but windy mornings. During the afternoons of that sunny first week, I worked on a larger painting of the warden's house. For this piece, I set my easel up on the path in front of the dorm, and almost everyone who passed by would stop for a quick chat and glimpse at my work. Because painting is a solitary endeavor, it was more fun for me to work in locations where I could enjoy the company of passersby. In the beginning of the summer, I was more self-conscious about people looking over my shoulder while I worked, but I got over this insecurity very quickly.

As the summer progressed, the infamous Kent Island fog rolled in, and I was initially pushed indoors to work. After completing a still life of a green bottle and a knotted rope in the lower lab, I began to feel restless working inside. I ventured outdoors and painted a scene of the Susannah Kent tied to the wharf at low tide. This is one of my favorite pieces of the summer. It shows a familiar scene at the wharf that is not idealized by brilliant sunlight or a high tide. After working on this piece, I realized that overcast and foggy days were better for painting outside than sunny ones. The light stayed more constant on these days, and it mattered less what time of day I started the painting. On a sunny day, the changing light forced me to put down my paintbrush after a couple of hours, but on overcast days, I could work for longer stretches if I wished.

A few of the other students on the island modeled for my paintings and drawings throughout the summer. Lisa was eager to let me paint her while she sat on a lawn chair entering data on a laptop. I began two paintings of this scene and finished one of them. Nathan let me sketch him one evening while he was reading in the Dingleberry, and Nate, the other artist, agreed several times to model for me if I did the same for him. One time, instead of taking turns sitting and drawing, Nate drew me painting him up at the north end. Now, I have a painting of him with his drawing pad, and he has a drawing of me sitting at my easel.



*Mary Helen's work from Kent Island was exhibited at Bowdoin's Visual Arts Center during November 2008.

Three Islands Ecology

Snowshoe Hares & Tree Seedlings:

The single most common question asked by former Kent Islanders is: "Are they really gone??" Yes, they appear to be gone (knock on wood!). And seedlings are flourishing; recruitment is far higher now than it has been in the past several decades. Unfortunately, there is a new potential threat to Kent Island's forest: bark beetles. An infestation of bark beetles appears to be killing mature white spruce trees. As of last fall, the infestation was concentrated mainly around the North Field. At this point it is not clear whether the infestation affects healthy trees or just older, weakened trees. Thus the severity of this threat is unknown. Fortunately, we were well-poised to investigate this problem. Meredith Steck identified the beetle as a member of the genus *Den-*

droctonus (Latin for "tree killer"). Nathan Elliott and Allison Weide documented the extent of damage to the trees. The tree tagging program of John Lichter and his students (Allison Weide, Anna Bender, and Kendra Neff) will be crucial for assessing this threat. Stay tuned.

Leach's Storm-Petrels:

The storm-petrel flag, signifying the first chick of the season to be hatched, flew for the first time on July 10.

Savannah Sparrows:

This year's sparrow wranglers, Priscilla Erickson, Sami Nichols, Greg Mitchell, Ryan Norris, Bob Mauck, and Nat Wheelwright worked collectively to find nests and band as



Ecology, Cont.

many individuals as possible. The crew called in reinforcements for “Fledgie Fest.” Jan and Liz Pierson, Genie Wheelwright, Susie Mauck, and several of the Bowdoin Faculty attending the workshop. By the end of the summer, they had banded almost all birds in the core study sites (South Field, North Field, and West Beach) and found 80 nests.



Common terns:

Common terns returned to Sheep Island this summer. Historically, Sheep Island was home to a large tern colony but they disappeared over the past decade, despite efforts a few years ago to lure them back to the island. Numbers of nesting terns throughout the northern Gulf of Maine and Bay of Fundy have been plummeting in recent years. In fact, when we went to Machias-Seal Island this summer, there wasn't a single nesting pair to be found. The reason

for the decline is largely unknown, but at Machias-Seal it appears to be decreasing availability of high-energy food (juvenile herring) and increasing predation by gulls. Sheep Island was an exception this year to the broader trend. We tried to avoid disturbing the colony, so we did not get an exact count of the number of pairs. But clearly, there were more terns on Sheep Island than there have been in several years. The question now is whether they reproduced successfully. Terns are sensitive to disturbance at their nesting sites, which underscores the importance of protecting Sheep, Hay, and Kent Islands in their entirety. Hopefully Sheep Island's tern colony reproduced successfully and will continue to grow next year.

Tree swallows:

In addition to Mary Helen's artistic endeavors this summer, she also monitored the tree swallow nest boxes on the Island. Unfortunately, only 5 nest boxes on the entire island had active nests, yielding a total of 26 nestlings. Five nests is a drastic decline in the swallow population here, as there were more than 100 nests on the island 20 years ago. Reasons for the decline are unclear, but it appears to be a trend throughout the region.

Kent Island Cuisine

There is one critical element that can make or break a field season, and it has nothing to do with sampling equipment, experimental design, or even weather conditions. The single most important factor affecting the success of a field research project is food. Having good food is essential. Every field project runs into some sort of road block. After all, if the work was easy, it would be done in a lab. How the investigators respond to that challenge is critical. If you have to re-write a software program, re-design an entire experiment, re-do two weeks of data collection, or find a piece of equipment that was lost in the woods or dropped over the side of the boat, you don't want to be doing it on an empty stomach. So much of the success of a field season depends on morale, and nothing boosts morale like good, hot food... and lots of it.

By any measure, the 2008 field season was spectacularly successful, thanks in large part to Dre Gager, our kitchen magician. She kept everyone well fed, including the obligate carnivores, vegetarians, and lactose intolerant people. And we're not just talking good food; we're talking GREAT food. Food that you would pay a lot of money for at a fancy restaurant. Things like chicken marbella, roast pork, roasted chick peas & zucchini pancakes, calzones, crab chowder, and curry stew. She even made dessert every day! And she did it all for less than \$10 per person per day.

But Dre's talents aren't limited to the kitchen. She is also a scientist with years of field experience and she recently published an important paper on host-parasite co-evolution

of avian malaria (Gager et al. 2008. *Molecular Ecology* 17:2552–2561). So when she wasn't in the kitchen, she was out mist netting or helping someone with their project. Put simply, she is a multitasking person and a great mentor for students. We will certainly miss her next year, but we all wish her the best of luck in her new nursing career!





Rescuing the Shop:

Mark Murray performed several infrastructure projects at BSS this summer. Most of the projects were routine: replacing cedar shingles on the Rat Shack, rebuilding the front porch on the Caretaker's Cottage (with lumber recycled from the pier), re-shingling the roof on Fog Heaven and part of the Dorm, and replacing half of the windows in the Lower Lab (he built all the window casings himself and re-used the glass panes from the old windows, saving thousand of dollars in material costs). But by far, the largest project of the summer was rescuing the Shop.

The Shop is an important building; it houses all of our tools and hardware, provides space to build and fix equipment, and allows us to store machinery indoors over the winter. But 75 years of North Atlantic weather had rotted its foundation footings, and the prevailing easterly storm winds had caused the entire building to lean toward the west. There were more than a few skeptics when Mark announced in May that he planned to jack the building up off the ground using nothing more than large levers and human muscle power. After lifting the entire structure (over a period of several days and with the help of all hands on the island) and replacing the footings and several floor joists, Mark slowly straightened the building with a come-along and braced it off from the inside.

The building is once again solid and straight as an arrow. The large beams used to form the new footings and to make the levers were salvaged from the beach. Mark cut them into the proper shape using a chainsaw. You don't often see someone cut 20-foot logs into clean, square pieces of lumber without using a saw mill. The cost of materials for the entire project was probably about \$20 for plywood and fasteners. Marko's skill and hard work saved the Station tens of thousands of dollars by giving a new lease on life to a building that most other people would have demolished and rebuilt from scratch. That's the Kent Island ethic. He finished off the project by re-shingling the entire roof (with help from his son, Seth).

Weather Station:

In addition to being our guardian angel on the other end of the VHF radio waves, keeping us well-provisioned, and

taking us lobstering, whale watching, and to Machias Seal Island, Russell Ingalls also spearheaded an upgrade of our automated weather station. He designed and installed a new mast on which to mount all of the weather instruments, which will provide more accurate data. See the current weather conditions on Kent Island at <http://www.bowdoin.edu/kent-island/kent-island-weather/index.shtml>.

End-Of-Season Work Party:

At the end of October, after all the research projects had ended and the last class field trip had come and gone, Mark led a group of volunteers who donated their skills and a week of their time to winterize and perform maintenance on the Station: Bill Beazley, Eric Winne, and Seth Murray. We are all grateful for the hard work and generosity of these fine folks. Without this work we wouldn't be able to do our research at the Station.

Dorm Stabilization:

The Dorm is over 100 years old and was originally built to be a sheep barn. Similar to the Shop, the Dorm's foundation footings have rotted. But the dorm is a much larger structure than the Shop, so it is going to be a much larger, more complex task to fix it. The Dorm also needs a new roof, new windows, waterproofing of the cedar shingle siding, and a new porch. Of the 13 buildings on the island, the Dorm is the most important. It houses the largest number of people, contains all of our kitchen facilities and the Station's largest solar power generation system, and is the heart of the Kent Island community. There are many other needs at the Station, but the Dorm is at the top of the "to do" list. Funding is being sought for this project.



(Human) Life on Kent Island



On Kent Island, daily rhythms tend to follow the rising and setting of the sun. With 17 hours of daylight in June, work days tend to begin early and end very late. For faculty and students alike, it is tempting to work the entire time that the sun is up. But such a feverish work pace quickly leads to burnout and is counterproductive in the long-run. Having some down-time is essential. Thus, recreational and social activities are crucial elements of the *Kent Island Experience*. We work hard and we play hard. Here is a sampling of the 2008's extracurricular activities:

Canada Day:

Much fun was had at the Canada Day celebration in Seal Cove. Starting with the lobster pot hauling competition, 81-year old Junior Ingalls (Russell's father) teamed up with his granddaughter, Wendy Ingalls. Junior manned the oars and Wendy hauled the pots. They might not have won, but they certainly out-classed the competition. In an unusual move, Chris Ingalls (Russell's son and a lobster fisherman by profession) teamed up with BSS's Nate Johnson for the pot hauling competition. To make it even more unusual, they used a canoe rather than the traditional dory. Unfortunately, the canoe had enough speed but didn't maneuver well. Give them credit for creativity.

BSS had a strong showing in the Greasy Pole competition, with eight contestants (Greg, Don, Mary Helen, Nathan, Nate, Ross, Meredith, and Allison). Don Dearborn and Nate Johnson successfully reached the flag. This was the second year in a row in which Don was victorious. He made it look so easy; I don't think he even got wet. Will there be a Dearborn "Threepeat" in 2009?

4th of July:

BSS celebrated 4th of July with the traditional beach cleanup of Kent Island. Six teams of people scoured the perimeter of the island, caching the trash in strategic locations along the shore for pickup by a crew in the skiff. Awards were given for several categories of trash: Don and Dre won for Most Patriotic Trash; Nate and Greg won in two categories, Most Creepy and Most Useful; Mary Helen, Allison & Damon won for the trash item that Traveled Furthest. In total, more than a ton of trash was collected from the shores of Kent Island—a lot considering the island's remote location and that this cleanup occurs annually.

Whale Watch:

A spectacular day on the *Island Bound*; clear and calm (although Hurricane Bertha sent us some swell from its location hundreds of miles to our southeast). We saw hundreds of harbor porpoises, 3 finback whales, 8 or 9 humpback whales, and several minke whales, along with loads of puffins, phalaropes, razorbills, greater & sooty shearwaters, Wilson's storm-petrels, and northern fulmars. All this plus Russell's famous barbecued bacon. It doesn't get any better.



Machias Seal Island Trip:

The annual pilgrimage of Kent Islanders to Machias Seal Island took place on July 5th. Machias Seal has an interesting history, as it lies within a strip of ocean to which both the U.S. and Canada lay claim. The conflict is over fishing rights, but the island is home to one of the largest breeding colonies of alcids in the Gulf of Maine: 3,000 breeding pairs of puffins, 600 pairs of razorbills, and 100 pairs of common murre. And it's one of the few places where people can watch these birds from close range without disturbing them. On the way home, Russell took us through the Murre Ledges and past Gannet Rock where there were dozens of gray seals hauled out in the afternoon sun.

Kent Island Olympics:

Two teams competed in the First Annual Kent Island Olympics. Opening ceremonies were held on the wharf and featured an adaption of the traditional Olympic theme music

Life on Kent Island

performed by Nathan (tuba), Meredith (flute), and Sami (violin). Six whacky events were contested:

- Basin Bonanza (an obstacle course relay race through the muckiest part of the basin at low tide)
- Football target throw
- Caber toss (contestants wearing plaid kilts, of course)
- Pipe Dream (a time trial race to roll a ball through an 80' section of PVC pipe)
- Survival suit relay
- Navigation & orienteering

Team Moustache emerged the victors, but nobody was really keeping track of the score.

Music:

Live music could be heard on Kent Island during most evenings. A variety of instruments were on hand, as were talented folks to play them: banjo (Don), ukulele (Nate), mandolin (Nate & Marko), guitar (Bob, Katie, Marko), tuba (Nathan), flute (Meredith), violin (Sami), fiddle (Hank Washburn), and harmonium (Seth).

Lawn Games:

There were plenty of the usual games: soccer, wiffleball, touch football, and the like. "Tank" and "spud" were this year's preferred games...games usually associated with recess at an elementary school. One evening there were five well-respected faculty members playing spud on the lawn with a bunch of undergrads...running around and laughing

uncontrollably. This is something you might not see on campus, which is a shame. Curmudgeons might question whether this childlike activity is productive. How does it contribute to research or education? Well, from that moment on, the students felt completely at ease with these faculty members. After all, you can't be too intimidated by someone you just nailed with a playground ball. And this is important. Interactions between students and faculty outside of the classroom are an essential part of a college education.

Obviously, students will require guidance on their class work and their research. But their needs go far beyond the immediate tasks at hand. Students are preparing for their futures, so they understandably have a lot of questions. Should I go to grad school? Should I get a masters degree or Ph.D.? What kind of jobs are available in this field? These are important questions that professors can help students answer.

Unfortunately, few college students feel comfortable seeking advice from their professors on these big issues. But by breaking down social barriers through informal interactions, such as those that occur daily around BSS's dinner table or on its playing field, the likelihood that students will take advantage of their professors' experience is increased. And this new-found feeling of ease experienced by BSS students doesn't end when the *Island Bound* returns them to civilization; it persists back on campus. This is one of the intangible benefits of a residential field studies program. You can't quantify it but it's real. All thanks to a silly schoolyard game.

Faculty Retreat

In late July, a faculty retreat was held on Kent Island to discuss potential research initiatives, academic programs, and infrastructure needs at BSS. Faculty representing the departments of Biology, Chemistry, Environmental Studies, History, and Visual Arts participated in the retreat. In addition, Dean of Academic Affairs, Cristle Collins Judd, and three visiting faculty who work from the Grand Manan Whale and Seabird Research Station (two from the University of North Carolina at Wilmington and one from Dalhousie University) also took part. The retreat was largely a brain-storming exercise and a chance for faculty who had not visited BSS previously to see the types of opportunities that are available on Kent Island. Many good ideas were generated on how to strengthen existing long-term research programs, establish new research programs, increase use of the Station for research and teaching during the off-season (August-October), enrich the experiences of our student artists, maintain the Station's infrastructure, and procure funding to make it all possible.

Two new collaborative research projects that were hatched during the meeting will commence this coming summer (one on storm-petrel foraging, lipid metabolism & toxicology and the other on common eider nesting ecology) and there are plans to increase the support of our artist-in-residence program by increasing participation by faculty from the Visual Arts Department.



News from Kent Islanders



Bowdoin College awarded the Anne T. and Robert Bass Professorship of Natural Sciences chair to **Nat Wheelwright**, in recognition of his excellence in research and teaching. View his appointment lecture, Good Gun Tales and the 73-Year History of the Bowdoin Scientific Station on Kent Island, at the BSS web site: <http://www.bowdoin.edu/kent-island/history/wheelwright-slideshow/index.shtml>. Not one to rest on his laurels, Nat was then awarded an OPUS (Opportunities for Promoting Understanding through Synthesis) grant by the National Science Foundation for his 18-year study of Savannah sparrows on Kent Island. This is a very prestigious and competitive grant awarded to scientists who have maintained an unusually high level of productivity throughout their careers. The OPUS grant will allow Nat to investigate heritability of morphology, behavior, and life history traits in Savannah Sparrows based on his 18-year study on Kent Island and it will support student research on Savannah Sparrows.

Chuck Huntington celebrated his 89th birthday in December. He was on Kent Island in June to continue his Leach's storm-petrel work. It is believed that Chuck's study is the longest-running study of any animal population in the world by a single scientist.

Janet and Damon Gannon hosted the First Annual BSS Practice Thanksgiving dinner. It was a fun evening in which many of the 2008 BSS faculty, students, staff, and friends shared a traditional, home cooked Thanksgiving meal and had a chance to get reacquainted with friends. Even Kenyon College students **Lisa Harn** and **Priscilla Erickson** flew in from Ohio for the festivities.

At the 2009 conference of the Society for Integrative and Comparative Biology (SICB) in Boston in early January, **Priscilla Erickson**, **Lisa Harn**, and **Sami Nichols** presented the results of the research they conducted at BSS in 2008. Former Kent Islander, **Shaina Stewart** (BSS '07), also made a presentation at the conference.

Bier Kraichak (BSS '07, Bowdoin '08) began working on his Ph.D. in the Department of Integrative Biology at the University of California Berkeley.

Claire Varian (BSS '99) defended her dissertation at Washington State University and started a teaching job at the University of Puget Sound (where Peter Hodum, another BSS alum, is also on the faculty).

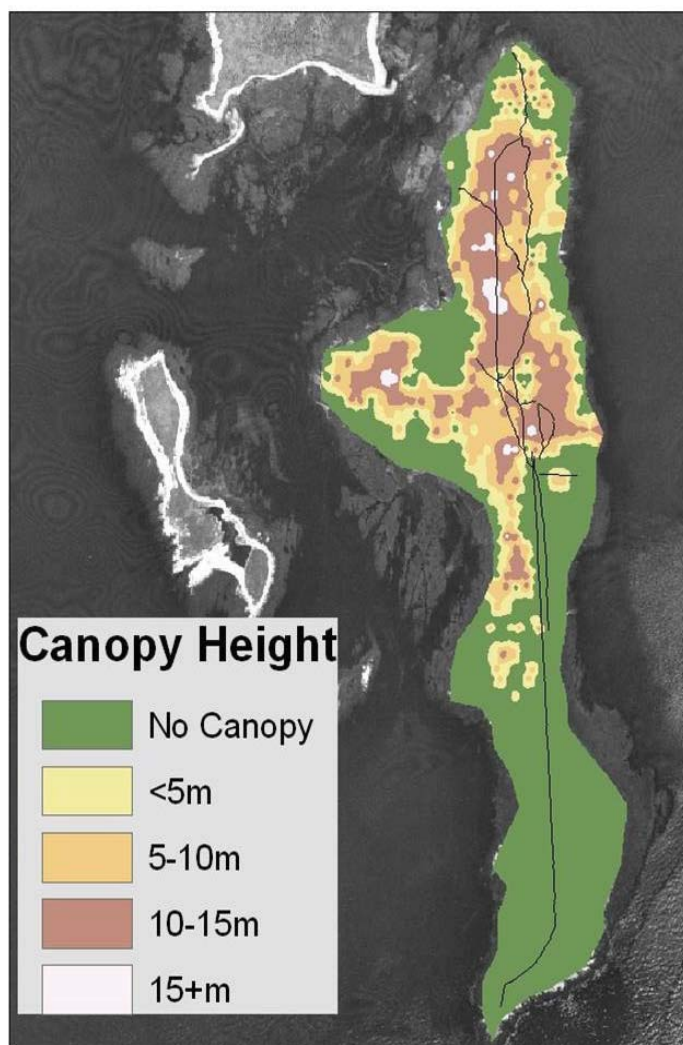
Mark Haussmann, who conducted his Ph.D. and postdoctoral fellowship research at BSS, joined the faculty of Bucknell University.

Jed Burtt (Bowdoin '70), Professor of Zoology at Ohio Wesleyan University, has been elected president of the American Ornithologists' Union, North America's oldest and largest professional society devoted to the scientific study of birds.

Todd McLeish, a nature writer who visited BSS in June, has written a book that includes a chapter on the Leach's storm-petrels (and researchers) of Kent Island. The book is titled *Basking with Humpbacks: Tracking Threatened Marine Life in New England Waters*, and will be published by University Press of New England later this year (visit www.toddmcleish.com for updates on the book's release).

This just in...**Don Dearborn** and **Dre Gager** are engaged to be married. There couldn't be a better match. Congratulations, doctors!

If you have Kent Island news to share, contact Damon Gannon (dgannon@bowdoin.edu).



Nathan Elliott produced this contour map of tree canopy height on Kent Island using ArcGIS geographic information system software and tree height data that he collected in the field.

2008 Academic Accomplishments



Peer-Reviewed Papers Published (* indicates undergraduate students)

Bogomolni, A.L., R.J. Gast, J.C. Ellis, M. Dennett, K.R. Pugliares, B.J. Lentell, and M.J. Moore. 2008. Victims or vectors: a survey of marine vertebrate zoonoses from coastal waters of the Northwest Atlantic. *Diseases of Aquatic Organisms* 81:13-38.

Hausmann, M.F., and R.A. Mauck. 2008. Telomeres and longevity: testing an evolutionary hypothesis. *Molecular Biology and Evolution* 25: 220-228.

Hausmann, M.F., and R.A. Mauck. 2008. New strategies for telomere-based age estimation. *Molecular Ecology Notes* 8: 264-274.

Wheelwright, N.T., and J.D. Rising. 2008. Savannah Sparrow (*Passerculus sandwichensis*). *Birds of North America Online* (A. Poole, Ed.). Ithaca: Cornell Laboratory of Ornithology. 90 p. (BSS Contribution No. 193)

Wheelwright, N.T., M.B. Swett, I.I. Levin, D.E. Kroodsma, C.R. Freeman-Gallant, and H. Williams. 2008. The influence of different tutor types on song learning in a natural bird population. *Animal Behaviour* 75: 1479-1493. (BSS Contribution No. 192) (highlighted in an article on bird song learning in *Science News*, Nov. 8, 2008, pp. 22-26)

Peer-Reviewed Papers In Press

Butler, M.W., J. Garvin, N.T. Wheelwright, and C.R. Freeman-Gallant. In Press. Ambient temperature, but not paternity, is associated with immune response in Savannah Sparrows. *Auk*.

Gannon, D.P., E.J. Berens, S.A. Camilleri, J.G. Gannon, M.K. Brueggen, A.A. Barleycorn, V.I. Palubok, G.J. Kirkpatrick, and R.S. Wells. In Press. Effects of *Karenia brevis* Harmful Algal Blooms on Nearshore Fish Communities in Southwest Florida. *Marine Ecology Progress Series*.

Kraichak*, E., R.G. Pope, and N.T. Wheelwright. In Press. Habitat associations of macrolichens on a boreal island in the Bay of Fundy, New Brunswick, Canada. *The Bryologist*. (BSS Contribution No. 194)

Manuscripts Submitted for Review

McCabe, E.B., D.P. Gannon, N.B. Barros, and R.S. Wells. Prey selection by resident bottlenose dolphins (*Tursiops truncatus*) in Sarasota Bay, Florida. (submitted to *Marine Biology*).

Cohen, A., R.A. Mauck, N.T. Wheelwright, C.E. Huntington, and K. McGraw. In review. Complexity in relationships between antioxidants and demographic parameters in two distantly related bird species. (submitted to *Oikos*). (BSS Con-

tribution No. 202)

Gannon, D.P. and J.G. Gannon. In review. Using passive acoustics to investigate temporal and spatial trends in densities of a soniferous fish: comparison to trawl survey data. (Submitted to *Fishery Bulletin*).

Gannon, J.G., R.S. Wells, J.B. Allen, D.P. Gannon, E.J. Berens, and S. Hofmann. In review. Effects of harmful algal blooms on bottlenose dolphins (*Tursiops truncatus*): changes in distribution and behavior. (submitted to *Marine Ecology Progress Series*).

Theses

Kraichak*, E. 2008. Community structure of macrolichens on a boreal island in the Bay of Fundy. Undergraduate Honors Thesis, Bowdoin College, Dept. of Biology.

Neff*, K. 2008. Constraints on tree recruitment on Kent Island, New Brunswick, following snowshoe hare eradication. Undergraduate Honors Thesis, Bowdoin College, Dept. of Biology.

Brinda*, S. 2008. Telomeres, survival, and individual quality in a wild population of Savannah sparrows (*Passerculus sandwichensis*). Undergraduate Honors Thesis, Kenyon College, Dept. of Biology.

Technical Reports Submitted

Dearborn, D. 2008. The importance of coordinated parental care in seabirds. Preliminary grant report submitted to the Eppley Foundation. May 2008.

Gannon, D.P., D. Fauquier, E. Berens, J. Gannon, and R. Wells. 2008. Ecological effects of harmful algal blooms on the wildlife communities associated with submerged aquatic vegetation. Annual Technical Report to Florida Fish & Wildlife Conservation Commission, State Wildlife Grants Program, Tallahassee, FL. Project No. SWG05_028. July 15, 2008.

Publications for a General Audience

Wheelwright, N.T. 2008. First, there was an albatross. *Bowdoin Magazine*, Winter 2008: 26-33.

Conference Presentations

Brinda*, S., A. Bender*, R.A. Mauck and M.F. Hausmann. 2008. Heritability of telomere length in a wild population of Savannah sparrows (*Passerculus sandwichensis*). Society of Integrative and Comparative Biology. San Antonio.

Carlton* E.D., S.N. Stewart*, M.F. Hausmann and R.A. Mauck. 2008. Flashy feet: color based assortative mating in the black guillemot (*Cephus grylle*). Society of Integrative and Comparative Biology. San Antonio.

Accomplishments, Cont.

Gannon, D.P., E. Berens, J.G. Gannon, S. Camilleri, J. Allen, and R.S. Wells. Effects of *Karenia brevis* Harmful Algal Blooms on Bottlenose Dolphins and Their Prey. Florida Marine Mammal Health Conference, University of Florida, St. Augustine, FL.

Wheelwright, N.T. Savannah sparrows: simple song, not so simple song-learning. Oral presentation, 12th biennial congress of the International Society for Behavioral Ecology, Ithaca, NY.

Invited Lectures

Hausmann, M.F. 2008. Telomeres, aging, and lifespan: all's well that ends well. Bucknell University.

Mauck, R.A. 2008. Population to Cell: are all storm-petrels created equal? Oberlin College.

Wheelwright, N.T. 2008. Good Gun Tales and the 73-Year History of the Bowdoin Scientific Station on Kent Island. Anne T. and Robert Bass Professorship of Natural Sciences appointment lecture. Bowdoin College (<http://www.bowdoin.edu/kent-island/history/wheelwright-slideshow/index.shtm>).

Art Displays

Mary Helen Miller's paintings and sketches from Kent Island were exhibited at the Visual Arts Center on Bowdoin's campus during the month of November.

Grants Awarded for Research and Teaching at BSS

Dearborn, D. "The importance of coordinated parental care in seabirds." Funded by the Eppley Foundation for Research. (\$14,470 to Bucknell University)

Gannon, D.P. "Bowdoin Scientific Station Summer Working Group." Bowdoin College Office of Academic Affairs (\$5,673)

Gannon, D.P. "Bio 154 Field Trip to the Bowdoin Scientific Station on Kent Island." Bowdoin College Course Enhancement Fund. (\$600)

Gould, M. "VArt 281 Field Trip to the Bowdoin Scientific Station on Kent Island." Bowdoin College Course Enhancement Fund. (\$600)

Hausmann, M.F. and R.A. Mauck. "RUI: Telomere Dynamics and Individual Quality." National Science Foundation, Research in Undergraduate Institutions Program. (\$535,227 to Kenyon College)

Wheelwright, N.T. "OPUS: RUI: Long-term Studies of an Island Bird Population: Vertebrate Ecology Across Generations." National Science Foundation (funded jointly by NSF's Opportunities for Promoting Understanding through Synthesis (OPUS) and Research in Undergraduate Institutions (RUI) programs). (\$134,000 to Bowdoin College)



Government Commissions

Gannon: Pelagic Longline Take Reduction Team (convened by NOAA/National Marine Fisheries Service)

Gannon: Atlantic Trawl Gear Take Reduction Team (convened by NOAA/National Marine Fisheries Service)

Graduate Committees

Gannon: thesis committee member for Hillary Lane, M.S. Student at the University of North Carolina Wilmington (thesis title: "Ontogenetic, seasonal, and annual variation in lipid content and composition of Atlantic herring (*Clupea harengus*) from the Bay of Fundy, Canada.")

Gannon: thesis committee member for Sabrina Bowen, M.S. student at Savannah State University (thesis topic: foraging ecology of bottlenose dolphins)



Supporters



We wish to thank the generous donors whose support allows the Bowdoin Scientific Station to thrive:

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Mrs. Agnes H. Potter
Dr. Thomas P. Skaling '62
Dr. Ivan M. Spear

Ms. Lela Stanley '04
Dr. C. Jeffrey Tannebring '73
Ms. Carol C. Taylor
Mr. Joseph B. Travers
Dr. Geoffrey C. Trussell '90
Ms. Ramsay Gifford Trussell '89
Mr. Mort Walker
Mrs. Joan M. Warburg
Rikako Watai
Mr. David Z. Webster '57
Mr. Ed L. Williams
Dr. Heather Williams '77
Mr. Donald M. Zuckert '56
Peter F. Cannell Fund for Kent Island
Fidelity Charitable Gift Fund
Professor A.O. Gross Fund for Kent Island
Huntington-Wheelwright Field Station
Endowment
Kent Island Fund
Minot Fund for Kent Island
Heizaburo Saito Fund
Roy Spear Memorial Fund
Textron Defense Systems

"I had a great time this summer and enjoyed working on my project. But even more than that, I really enjoyed the community environment of Kent Island. I met a lot of great people up here and would like to thank Bowdoin for operating such a unique and valuable program. Very few places offer the opportunity for undergraduates to do genuine independent research, and none do so in such a cool place as Kent Island! I highly recommend this program to anyone interested in ecological research who isn't afraid to do without some modern (but easily forgettable) conveniences. The atmosphere is well worth sacrificing indoor plumbing for!"

-Nathan Elliott (Bowdoin '09, BSS Summer '08)



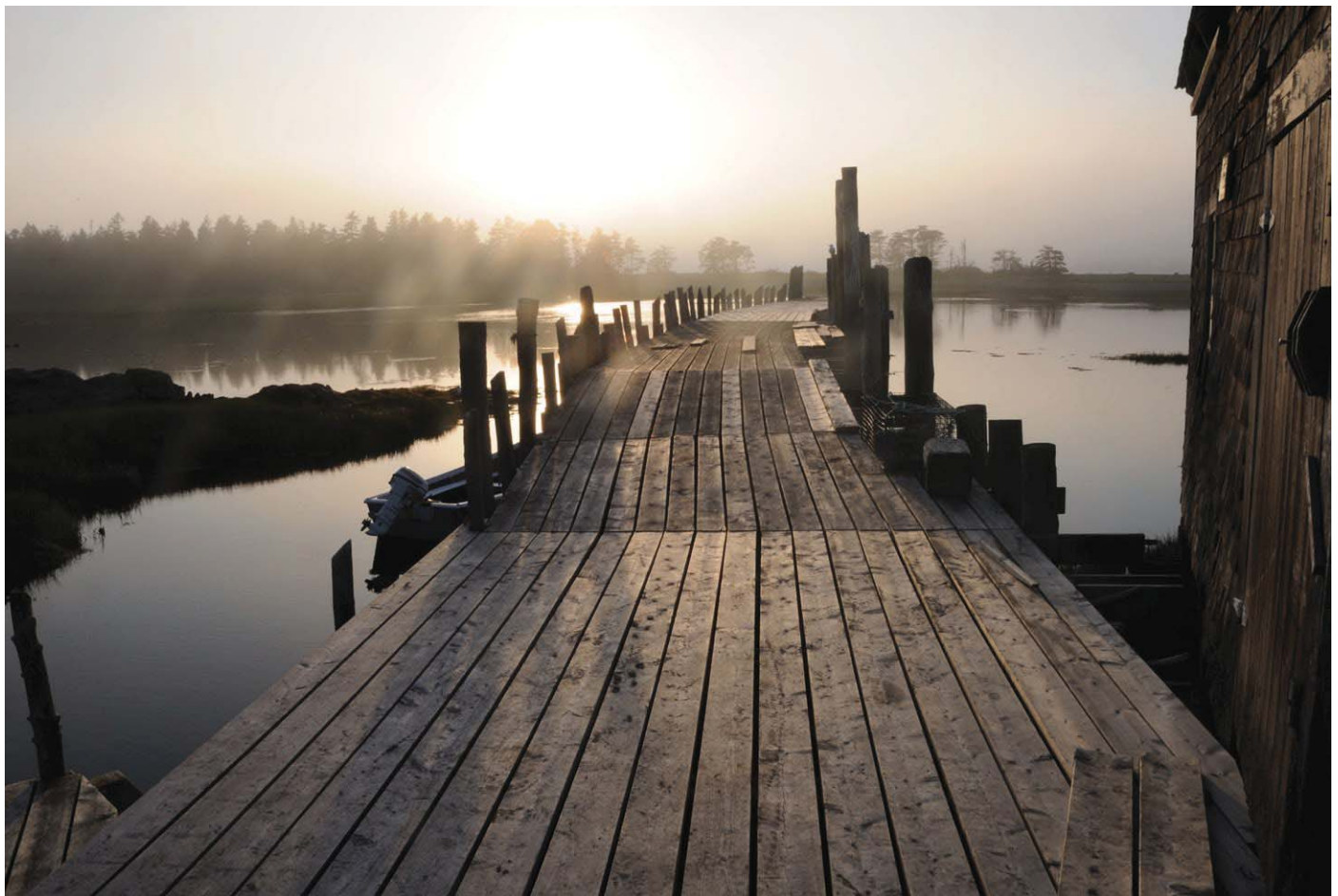
Wish List



BSS is in need of the following equipment and materials:

- 12-volt chest freezer (for biological sample storage)
- Fish sampling nets (10' otter trawl, beach seine, fyke net, and trammel net)
- New safety and navigation equipment for boats (handheld VHF radios, handheld GPS units, spare anchors, depth sounder, EPIRB, survival suits)
- Replacement outboard engine for *Ernest Joy* (70-90 horsepower)
- Digital electrical multimeter
- Multi-stage "smart" battery charger
- Photovoltaic solar panels
- High capacity 6-volt deep-cycle batteries
- Sine wave inverter for dorm/lab
- "Link 10" power consumption monitors (3)
- Wood stoves, chimney pipes, and hearths for dorm & Hodgson House
- Construction materials for dorm restoration project (lumber, fasteners, windows, doors, cedar shingles, roof shingles)
- Outdoor propane cooker
- Mattress pads/couch cushions (Closed-cell foam designed for boats)

Contact Damon Gannon (dgannon@bowdoin.edu) if you can help procure any of these items.



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Brunswick, ME 04011

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BSS is a member of the Organization of Biological Field Stations.