

2002 Annual Report

Since the Last Annual Report

Kent Island alumni took home the honors in the 2001 awards of the American Ornithologists' Union. Raymond Paynter ('47; Harvard University), Director of the Bowdoin Scientific Station for several summers in the postwar years, was selected for the Elliott Coues Award. Steve Rothstein (University of California-Santa Barbara), who as an undergraduate spent the summer of 1964 on Kent Island, received the William Brewster Memorial Award. Both awards recognize distinguished career achievements in the field of ornithology.

Kent Islanders were also prominent at the North American Ornithological Conference in New Orleans last September. Seven former students, now professors or doctoral students, presented papers on their research (Peter Hodum '88, Chris Filardi '89, Justin Schuetz '94, Christina Maranto '97, Jason Johnston '97, Sarah Bartos '98 [Bates], Rachel Seabury '01). At that same conference, one of the Best Student Paper awards went to Mark Haussmann (Iowa State University) for his path-breaking PhD dissertation research on aging in birds—particularly Leach's Storm-Petrels on Kent Island (see below).

At the invitation of the World Register of Field Centres, the Bowdoin Scientific Station became a partner in the Terrestrial Ecosystems Monitoring Sites (TEMS) database, which is sponsored by the United Nations Environmental Program, World Meteorological Organization, and other international organizations. TEMS is an international directory of sites that carry out long-term environmental monitoring and research.

Last spring Kent Island lost a loyal supporter when Peter Cannell ('76) died of brain cancer. While working on his PhD in evolutionary biology, Peter relieved Chuck as Director of the Bowdoin Scientific Station for two years in the late 1970s before turning to a career as editor and later Director of the Smithsonian Institution Press. It was Peter who established Kent Island's first herbarium and insect reference collection. Memorial contributions given in

Peter's name by his many friends have greatly strengthened the endowment funds (Minot, Gross, Huntington-Wheelwright, Kent Island) that make possible the operation of the Bowdoin Scientific Station.

Summer of 2002

Russell Ingalls's duties as Caretaker keep him busy year-round, but starting in May and running throughout the summer, they are especially demanding. To illustrate, last spring Russell arranged the purchase of a fire-engine red Kubota tractor to replace the 1964 Cub Cadet (which, believe it or not, is still limping along). That left the problem of how to get the new tractor onto Kent Island. After floating it into the Basin on his lobster boat, *Island Bound*, he began to offload it. Things began to go wrong when one of the tractor's tires slipped off the ramp and became mired in a mudhole. Before the rising tide could swamp the tractor, Russell's son Chris jumped off the boat, tied a bowline to the tractor, ran the line around the nearest spruce on shore, and raced back to secure the other end to the boat. Slamming the *Island Bound* into reverse, Russell was able to yank the tractor safely ashore just in time.

We made good use of the tractor and its bucket loader to haul rocks, propane tanks, firewood, even Bob Cunningham when the walk between the wharf and *Fog Heaven* was too fatiguing. The tractor was the perfect tool for excavating the collapsed wire fencing from the old Silver Fox cages Stirling Rockefeller had built near what is now the double outhouse. The major group construction project last summer was rebuilding a 14-foot section of the wharf. We also painted the lab and the Warden's House. Russell had two students helping as "handy-persons," Elliott Wright ('04) and Amber Reed ('02). Amber also took charge of our garden, growing lettuce, radishes, and basil.

The trip between Seal Cove and Kent Island now takes us by a string of salmon pens which line the shores of Wood and Outer Wood Islands up to the White Horse. Fortunately, Three Islands has been officially declared an

exclusion site for salmon aquaculture, which has spared us from the noise, pollution, constant boat traffic, and disruption of long-term experiments.

Research in 2002

• Leach's Storm-Petrels

Chuck Huntington has been studying Leach's Storm-Petrels on Kent Island for almost a half century now. Assisted by Susan Culliney ('04), he concentrated on monitoring nest burrows and banding adults and nestlings on Petrel Path, where at the moment the oldest living known-age bird is "only" 30 years old.

Chuck's records provided the key data point for Mark Haussmann's study of aging, in collaboration with Dave Winkler (Cornell University), Katie O'Reilly (University of Portland), and Carol Vleck (University of Iowa; see "List of Publications from the Bowdoin Scientific Station," below). In most animals, the ends of the chromosomes (telomeres) shorten as cells age. Leach's Storm-Petrels present a startling contrast to the general pattern: their chromosomes remain constant or even grow with age! Among bird species, the maximum age to which individuals are known to live is negatively correlated with the rate of telomere shortening. Mark's study has important implications for understanding how animals (including humans) might combat the aging process through the expression of telomere-repairing enzymes while avoiding the tumor-promoting tendencies of those enzymes.

• Savannah Sparrows

Through the efforts of Corey Freeman-Gallant ('91), we received a major three-year grant from the National Science Foundation to investigate the evolution of avian mating systems, using Savannah Sparrows as our model species. The grant supported four field assistants last summer: Vittoria Marzot (Skidmore '03), Katie Meiklejohn (Skidmore '03), Mike Butler ('02), and Bob Zaino ('03). Corey (now a professor at Skidmore College), Vittoria, Katie and Bob began the field season on May 21. By the time Chuck, the rest of the students and I arrived a week later, they had banded and taken blood samples from 85 adults. Our project got a boost from Kevin Oh ('01) and Bob Mauck (currently in his first year as an Assistant Professor at

Kenyon College). Kevin, an expert nest-finder, spent a week in early June helping us expand the sparrow study area to the West Beach and southward to N34. Bob M., who served as Co-Director the two previous summers, programmed several powerful new features into the relational databases he designed to manage our data on sparrows, storm-petrels and Tree Swallows. With Corey, Kevin, and our four field assistants on the lookout, it was pretty tough some mornings to find that "pre-breakfast nest." By the end of the summer, we had located 115 nests and banded 138 adults and 264 nestlings on our study site. Nest predation rates were unusually low this year (10% vs. the more typical 30%) but nestling mortality was higher than usual. For the first time since I can remember, juvenile Savannah Sparrows failed to aggregate into large flocks in late July; our massive fledgling mist-netting operations ("fledgie fests") were mostly a bust, with a maximum of 20 birds captured per morning.

Among the questions Corey and I are asking is whether female birds prefer social mates who are genetically dissimilar with regard to their immune system (specifically, the major histocompatibility complex, or MHC). If for whatever reason females end up pairing with males that are too similar at the MHC, we hypothesize that they will be more likely to seek other males to sire their offspring, in order to give their offspring a more diverse disease-fighting immune system. Vittoria, Katie, Bob Z., Mike and I spent a week in August in Corey's Skidmore lab. After extracting and amplifying DNA from the sparrow blood samples, we are applying molecular techniques to identify the true parents of each nestling, describe its MHC genotype, and determine its sex. The most surprising finding so far is that extrapair fertilizations are even more rampant than we'd expected: about 50% of nestlings turn out not to be the offspring of the male socially mated to their mother.

• Tree Swallows

Phil Goodman ('02) took charge of the Tree Swallow project. Repainting nest boxes, repairing posts, and replacing gull guards after a Bay of Fundy winter is a major enterprise. Phil also banded all breeding adults and 84 fledglings. Ever since the Kent Island Tree Swallow population had a complete breeding

failure in 1994, it has never fully recovered. Before the population crash, most or all of the 109 nest boxes were occupied. Since then, the population has fluctuated only slightly, between 25 and 33 pairs.

University of Michigan graduate student Matt Dietz ('90) spent a week evaluating Kent Island as a possible site for his dissertation research. His interest is in the role of social interactions in habitat selection in birds. Taking advantage of 16 years of data, Matt analyzed nest box use by Tree Swallows but found no obvious spatial patterns. There also appeared to be no relationship between the number of years a given box was used and the average number of fledglings it produced. Why Tree Swallows chose particular nest boxes remains an open question.

• Bird Populations

Throughout most of the 20th century, the dominant (and typically only) chickadee species on Kent Island was the Boreal Chickadee. Several years ago, Boreal Chickadees disappeared and were replaced by Black-capped Chickadees. Their local extinction may reflect interspecific competition, global warming, or a combination of the two. Other hints of climate change include the presence of American Oystercatchers on Kent Island for a second summer in a row; oystercatchers' breeding range does not normally extend north of southern New England.

At least four pairs of Black-crowned Night-Herons nested in the firs just outside the Basin. Merlins and Bald Eagles hunted the islands daily.

Grand Manan ornithologist Brian Dalzell spent much of the summer in a newly built camp on Sheep Island. Working under the auspices of the Fundy Bird Observatory and New Brunswick Wildlife Trust, he initiated a two-year project to help reestablish Common Terns on Sheep Island. The notion is to attract breeding birds by placing tern decoys along the beach, and to use noise-makers to discourage Herring Gulls from nesting among the terns (gulls and night-herons are major predators of tern eggs and chicks). The first tern was seen on May 10 and the first nest was found on June 3. All of the early tern nests failed, but 18 replacement nests and/or nests of late arrivals produced about 40 fledglings. Two Least Terns landed on Sheep

Island's east beach on June 21, temporarily raising hopes that this endangered species might nest there.

The Canadian Wildlife Service continued its long-term study of Herring Gulls on Kent Island, a project started by Glen Fox in the mid-1970s. Laird Shutt, Kim Williams, Craig Hebert, and Debbie Ashley spent several days capturing, measuring and taking blood samples from adult gulls whose nests had earlier been located and marked by Elliott. Using a newly designed electronic "embryo viability detector," the researchers also quantified rates of mortality in two-week-old eggs. The aim of the study is to use Kent Island as a control site to monitor environmental contaminants, especially estrogen-mimicking organic compounds, for comparison with heavily polluted sites elsewhere in Canada.

A recent seabird census shows that the island's gull colony is larger than previously thought—about 6000 pairs—and by far the biggest colony in the Grand Manan Archipelago (see "List of Publications from the Bowdoin Scientific Station," below). Interestingly, the Grand Manan tradition of collecting gulls' eggs may be dying out. There were no eggers on Kent Island in early June.

At the end of July we held a "big day" bird count. Well, to be truthful, it was actually a "big two hours," late on a hot afternoon, which was all the time people could spare with their research projects winding up. But it was fun dividing into two teams, sprinting around the island, and competing for the longest bird list (35 species).

• Small mammals

It's always been easy to illustrate how abundant Snowshoe Hares are on Kent Island. You randomly toss a pencil over your shoulder. Then, stoop down to fetch it and look for the nearest hare dropping. Usually you'll find one within a few centimeters, no matter where you are on the island. Every couple of years we try to do something to reduce the number of these introduced herbivores. Our most recent attempt was the 1998 "softwood release program," which was a collaborative effort of Tom Skaling ('62) and several Brunswick hunters. But as demonstrated by the research of Trevor Peterson ('02), Akane Uesugi ('01) and Bowdoin Biology Professor John Lichter (see "List of Publications from the Bowdoin Scientific Station," below), the hares keep springing back and mowing down

nearly every spruce and fir seedling on the island, just as they have been doing ever since they were first loosed on neighboring Hay Island in 1956. In desperation, I turned to Ed Minot ('70) for advice. He recounted my futile efforts to remove the hares to Dr. Clare Veltman, Director of the Vertebrate Pest Control Program in the New Zealand Department of Conservation. Her email response was curt: "He's not trying very hard." Ed goaded me further: "Shooting has to be done with a sense of religious fervor that makes a jihad look like a Sunday school picnic."

Now, where I come from, them's fightin' words. Russell and his three children, who led the first charge, were amazed to see as many as eight hares under a given fallen tree, and even a few perched in the lower branches. After several winter expeditions, they and a few Grand Manan friends had dispatched close to 200 hares. Cade Libby, Provincial Furbearer Biologist with the New Brunswick Department of Natural Resources and Energy, accompanied by several colleagues, culled another 59. Frazier Shephard supposedly got the very last one in early April, but just in case we hired professional hunter Peter Richardson from Little Bartibog, NB to bring his beagles down. He shot 10 more, all males. Amber kept the pressure on all summer long with relentless trapping and snare-setting, which netted 24 males, females, and—not a good sign—a few young. In total, about 300 hares, or almost 3 per hectare, have been removed from Kent and Hay Islands in one year. A month ago a group of Grand Manan hunters saw not a hare, although Amber and Kevin discovered (and ate) one just last week. If we ever finally do succeed in eliminating Snowshoe Hares from Three Islands, the archipelago's forest, which provides breeding habitat for storm-petrels and many other bird species, will be safe-guarded at last.

On one of his trips, Russell added a new species to the island's mammal list. Apparently, River Otters have been taking up winter residence in the woods above the alder swale.

• Plant and Insect Ecology

Once the Tree Swallows had fledged and the Herring Gull sampling was completed, Phil and Elliott were eager to take on another research project. For some years we have been studying the reproductive ecology of an orchid called One-leaf Rein Orchis which on Kent Island is pollinated by geometrid moths and mosquitoes.

Both groups of insects are chiefly nocturnal, so it was a surprise to find, based on dawn and dusk censuses, that the paired pollinia (specialized pollen packets) are as likely to be removed from the diminutive creamy green flowers during the day as during the night. Either the moths and mosquitoes are more active than believed during the day, or some other species from the island's depauperate insect fauna, such as syrphid flies, may contribute to pollination. Flower visitors did not show "handedness": pollinia on the right and left sides of the flowers were removed at equal rates.

Susan was also looking for a side project besides art, cooking, and storm-petrels, so she laid the groundwork for a long-term study of the effect of browsing by Snowshoe Hares on White Spruce. If all goes according to plan, we will be able to return to the locations she mapped and measure the trees' responses to the removal of a key vertebrate herbivore.

Trinity College is developing a new field station, so they sent Professors Scott Smedley and Joan Richardson to the Bowdoin Scientific Station to look it over as a possible model. While they were on the island, Scott, a chemical ecologist and entomologist, solved a Kent Island mystery. For several years we've noticed butterflies, wasps, and calophorid flies aggregating at weeping bark wounds in the Speckled Alders. We've always assumed that the wounds were caused by carpenter ants (which are often found in the trunks), but the story turns out to be more complicated. Scott discovered that the larvae of an introduced weevil, the Poplar and Willow Borer (*Cryptorhynchus lapathi*), tunnel beneath the bark. He hypothesizes that yeast and bacteria ferment the sap saturating the beetles' frass, attracting masses of nematodes which prey on the microbes and producing the apple-like aroma that lures in insects seeking a carbohydrate- and nitrogen-rich food source.

There was a massive outbreak of June beetles in 2001-2002, which fattened up the gulls but ravaged the roots of the grass among the buildings. Winter storms did the rest, overturning about 80% of the sod, which made the summer's ultimate frisbee games a bit treacherous. Butterflies were very scarce in 2002, perhaps because of the cool spring. It was impossible to find Red Admiral eggs on the nettles, Painted Ladies were rare, and even the normally ubiquitous American Coppers were uncommon.

• Meteorology

The weather on Kent Island was not particularly unusual in 2002. Except for the late spring—there was a frost on June 6—the warming trend that has been especially evident during the last 20 years continued. June and July saw a record number of thunderstorms (seven). At age 83, Bob Cunningham still keeps a close eye on the island's temperature, solar radiation, wind speed and direction, and precipitation, using the Campbell datalogger meteorological system in *Fog Heaven*, Bob's laboratory and sleeping quarters south of the Warden's House.

Like many of us, Bob is concerned about the conditions under which Afghani prisoners are being held at Guantanamo Base in Cuba. But with regard to the adequacy of their cramped quarters, he couldn't help but observe that "*Fog Heaven* is just 6' by 6' by 6', with a bed and a lab, and I find it almost the finest place I've ever lived in!"

• Artists-in-Residence

Last summer we were lucky to have not one but two artists-in-residence. Susan worked with oils, watercolors, pencil, and pen and ink to produce magical Fundy landscapes and unfamiliar perspectives on familiar Kent Island structures. Amber blended her three positions—artist, handy-person, and cook—to construct a beautiful stone oven for baking bread by the campfire north of the Dorm. Teaming up, Susan and Amber crafted a series of mosaic animals and seascapes made from beach pebbles of diverse tones of red and grey. They also taught group art lessons, served as models for pencil studies and charcoal drawing (using our toes?), and displayed our work in an elegant art installation in the Lower Lab. On opening night our drawings were hung with flatteringly inflated prices. Cheese, crackers, and high-brow commentary were provided.

In honor of Mike's unconfirmed sighting of a highly unusual White Pelican flying over the island earlier in the summer, Amber and Susan snuck into the Dorm after midnight one night and painted a pelican among the seabird murals by the dining room table. Roger Tory Peterson would have been proud.

• Life on Kent Island

We had not one but three cooks last summer! Susan, Amber and Elliott took turns preparing dinner in teams of two, which provided company, assistance, and extra culinary brainpower, as well as regular breaks from the chore. Each meal was splendid: hearty soups, calzones, homemade ravioli, curried eggplant in vindaloo sauce. We hardly ate fish all summer—the local groundfishery has hit bottom—but Russell brought us so many lobsters one night that, after stuffing ourselves, we debated and finally agreed, much to Russell's mystification, to liberate the biggest one, a 6-pound monster named "Gramps." Dinner conversations could be counted on being, well, lively. It was Phil, our history major, who speculated that dining after a long day of field work releases a special enzyme that produces effects akin to Tourette's Syndrome.

The traditional end-of-the-season song was entitled "We've traveled this island all over" (sung to the tune of the Irish Ballad "Rosin the Bow"). We cleaned all the beaches on July 4 but were foiled in carrying out another tradition, our annual attempt to cross to Sheep Island dry-footed. Either the spring tides were not extreme enough or winter storms had dug the channel between Kent and Sheep Islands too deep. The growing gravel bar just off the wharf in the Basin and the severely eroded east and west beaches implicate the role of winter storms.

Peter Cunningham helped his father set up his meteorological lab in the spring. Other visitors included DeWitt John, Director of Bowdoin's Environmental Studies Program, Jane John, Anne Niles ('77), and Joan Benoit Samuelson ('79). Adrienne Freeman-Gallant spent several weeks with Grace (plus Evan, still in utero; he made his formal appearance on Dec. 17). Emily and Alex Wheelwright, who until the last few years had spent virtually every summer of their lives on Kent Island, enjoyed brief reunions. So did Susie, Katie and Ross Mauck, and Mark, Seth and Nina Murray, who spent a week in early August. While they were there, former Caretaker Mark added two glass doors to the Hodgson House. During his two trips, Bob Mauck used a high-end differential GPS (Global Positioning System) device to begin to establish a permanent grid of Chuck's storm-petrel study area. The goal is to map all known storm-petrel burrows using GIS (Geographic Information System) software, create and update maps as new

burrows are found, and make it easy for students and visiting researchers to monitor burrows and continue Chuck's long-term demographic study indefinitely.

Severe fall storms thwarted two attempts to bring my Ecology class out to Kent Island. At least there was some vicarious pleasure in having Amber and Kevin close out the season with their New Year's trip, "arriving in a southern gale and leaving on a Nor'easter."

Addenda to the List of Publications from the Bowdoin Scientific Station

More than 155 scientific articles have been published in professional journals based on research on Kent Island. Papers with an author who was an undergraduate at the Bowdoin Scientific Station are indicated by asterisks. Numbers in parentheses represent Contribution Numbers from the Bowdoin Scientific Station. The complete list of publications can be found on the Kent Island web page (www.academic.bowdoin.edu/kent_island/public.shtml).

*Freeman-Gallant, C.R., E.M. Johnson, F. Saponara, and M. Stanger. 2002. Variation at the major histocompatibility complex in Savannah sparrows. *Molecular Ecology* 11: 1125-1130.

Hausmann, M.F., D.W. Winkler, K.M. O'Reilly, C.E. Huntington, and C.M. Vleck. 2002. Can an old bird be taught new tricks? Telomere length increases with age in a long-lived bird. Proceedings of the North American Ornithological Conference, New Orleans.

Ronconi, R., and S.N.P. Wong. 2002. Seabird colonies of the Grand Manan Archipelago: 2001 census results and guidelines for surveys and future monitoring. *Grand*

Manan Whale and Seabird Research Station Bulletin No. 4.

Morrow, E.H., G. Arnqvist, and T.E. Pitcher. 2002. The evolution of infertility: does hatching rate in birds coevolve with female polyandry? *Journal of Evolutionary Biology* 15: 702-709.

*Wheelwright, N.T., and R. Seabury. 2003. Fifty-fifty offspring sex ratios in Savannah Sparrows. *Auk*. In press.

*Wheelwright, N.T., K.A. Tice, and C.R. Freeman-Gallant. 2003. Post-fledging parental care in Savannah Sparrows: sex, size and survival. *Animal Behaviour*. In press.

Wheelwright, N.T., and J.J. Templeton. 2003. Development of foraging skills and the transition to independence in juvenile Savannah Sparrows. *Condor*. In press.

Blackmer, A.L., J. T. Ackerman, and G.A. Nevitt. Effects of investigator disturbance on reproductive success in a long-lived seabird, Leach's Storm-Petrel. *Biological Conservation*. In review.

*Peterson, T.S., A. Uesugi, and J. Lichter. Tree recruitment limitation by introduced snowshoe hare on Kent Island, New Brunswick. *Canadian Journal of Forest Research*. In review.

*Freeman-Gallant, C.R., and N.T. Wheelwright. Social pairing and female mating fidelity predicted by MHC similarity in a songbird. *Proceedings of the Royal Academy of Sciences*. In review.

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January 8, 2003
