BOWDOIN COLLEGE

BOWDOIN SCIENTIFIC STATION BRUNSWICK, MAINE 04011

1989 Annual Report

Since the Last Annual Report

The National Science Foundation has once again distinguished the Bowdoin Scientific Station with the award of a grant, this time a matching grant of $15,500 for the construction of a new research laboratory. The old laboratory, located by the wharf at the edge of the basin, will be renovated to allow research in marine biology. Additional research space in the center of the island has long been a high priority. For several years most of us have worked shoulder-to-shoulder in a corner of the shop/garage, next to the old darkroom. The new research laboratory will be similar to the shop/garage in dimensions and architectural style. Attached to the NE corner of the dorm by a covered walkway, the building will be oriented in a NE-SW direction to minimize its visual impact. There will be six work stations, a long lab bench on the opposite wall for equipment such as electronic balances and computers, a wood stove, and sink. The lab will have electricity provided by the photovoltaic system installed in 1988 as a result of an earlier NSF grant. To facilitate winter research, the building will have thermopane windows and will be fully insulated. Mark Murray ('75), supervisor of the project, expects the building to be completed by the time the Common Eiders begin nesting next spring, assuming matching funds can be found.

The Governing Boards of Bowdoin College, at their meeting of May 26, 1989, voted that Chuck Huntington should carry the title of "Director Emeritus of the Bowdoin Scientific Station" as an expression of gratitude for the leadership he has provided over the years and for his continued concern and involvement in Kent Island.

It was a pleasure to receive numerous cards following last year's annual report. Together they fill in some of the gaps in Kent Island's oral history. Particularly interesting were the Kent Island "geneologies" that could be stitched together from a variety of notes. For example, ornithologist Helmut Mueller (University of North Carolina) sent his student Pam Young to the island, where she met and married Jed Burtt ('70, now at Ohio Wesleyan and Editor of the Journal of Field Ornithology). Professor Mueller also encouraged ecologists Haven Wiley (University of North Carolina) and John Emlen (University of Wisconsin) to spend summers at the station, and Dr. Emlen's student Tom Grubb (now at Ohio State University and still an active researcher at Kent Island; see below) later conducted his PhD dissertation research on the island. Roger Evans, also one of Dr. Emlen's students, has sent three of his University of Manitoba graduate students, Brian Knudson, Percy Hébert, and Sandra Lee, to Kent Island. Also at the University of Wisconsin is PhD candidate Catherine Owen ('83), who noted that she "launched my career as an ecologist on Kent Island." Duke University ecologist Henry Wilbur, who studied storm-petrels at Kent Island during the summers of '65 and '66, later sent students Dave Maddox (Maryland Natural Heritage Program) and Reid Harris (James Madison University) to the station.

Several Kent Island alumni/ae wrote to ask when it would be convenient to visit the station. Visitors are always welcome, of course, especially if they bring mail, current newspapers, and chocolate bars for the natives. Beds and space at the dining room table tend to be scarce during June and July, when research is most active. For overnight visitors, a better time to arrive would be May, August, or September. Visitors should try to coordinate their trips well in advance with Chuck, me, or caretaker Bob Tate (506-662-3670, Grand Harbour, New Brunswick EOG 1XO). Bob charges $50 Canadian for transportation to Kent Island in his new boat, the "Miss Karla," unless trips are coordinated with Bob's scheduled trips (to Kent Island on Monday, returning to Ingalls Head on Friday). If there are enough people interested, perhaps we should organize an alumni/ae reunion for several days in August 1990.

The Summer of 1989

The sound of hammers punctuated the incessant chorus of Herring Gulls during most of the summer. Mark Murray, Jan Pierson ('74), and Bob Tate converted the upstairs of the dorm to luxury living quarters, erecting seven-foot walls to enclose five semi-private bedrooms. There are still as many beds upstairs in the dorm as before construction (six), although not as many as during Bob Cunningham's early days, when the dorm held 20. The Club Dingleberry, no longer used as a bedroom, serves as computer room, meeting place for our weekly seminars, and social center. Mark also built a dozen lockers and installed glass storm doors on the dorm's first floor to provide light and passive solar heat. Liz Pierson reorganized the dining area. The biggest project turned out to be reshingling the north-facing roof of the dorm, a week-long effort which required the help of everyone on the island. Peter Hodum ('88) instructed us in rock-climbing techniques and fashioned safety harnesses. Once we ripped up the tired existing shingles, we uncovered and replaced what must have been the original roof boards, more than a century old. Except for the thunderstorm that rushed in just after we'd opened the roof, the project went smoothly. Next summer we'll tackle the south-facing dorm roof.

The system of trails in the north and central fields is well-established and heavily-used. About 25 acres (10 hectares) are divided into 50-meter square quadrats. In the spruce-fir forest on the north end of the island an area half that size is similarly gridded. This summer we made a loop trail by connecting the northern transect with the Eagle's Nest Trail (which ends at the northernmost point of Kent Island), and cut a new path, tentatively called the Fireweed Trail, which goes directly east from the junction of Petrel Path and Eagle's Nest Trail to the cobble beach on the island's eastern shore.

Research Projects in 1989

The major research projects at the Bowdoin Scientific Station in 1989 focused on Leach's Storm-Petrels, Savannah Sparrows, and Tree Swallows.

• Leach's Storm-Petrels -- Chuck Huntington and field assistant Laurie Averill ('89) continued Chuck's long-term study of storm-petrel demography and reproductive success. "Prince Phillip," a 33-year-old male storm-petrel, reappeared to break the longevity record again for the species. Chuck annually monitors several hundred storm-petrel burrows at his three study sites, Crockett Point, Hodgson House, and Petrel Path, and bands all breeding birds and their young.

Another long-term project on storm-petrels is being conducted by Robert Ricklefs (University of Pennsylvania) with the assistance this summer of Teresa Stevenson ('92) and Betsy Banks ('90). Bob and his wife, Kathy, spent a week in late July experimenting with a high-tech version of Chuck's method of placing a lattice of twigs in front of burrow entrances to monitor visits to the nest. Using battery-operated metal detectors that sound off when a specially marked bird enters a burrow, plus optical sensors with light beams that are interrupted by passing birds, Bob hopes to record adult visits and determine which parent has fed a particular chick without having to disturb

birds by handling them. The storm-petrels didn't seem to mind negotiating their electronic vestibule, but the electronics themselves suffered in Kent Island's wet weather. Daily weighings of chicks have provided information on age-related variation in parental feeding behavior and the influence of weather patterns.

Tom Grubb (Ohio State University) returned to Kent Island, where he had carried out his well-known dissertation research on olfaction in storm-petrels in the late 1960s. This summer, with the help of Terye and Betsy, he asked a question that many ecologists are currently paying a lot of attention to, namely: Do animals become more successful at breeding as they grow older and gain more experience? What distinguishes Tom's approach is his application of a technique called ptilochronology which he recently pioneered. The technique relies on the observation that birds' feathers show parallel markings or growth bars denoting 24-hour periods of growth (just as trees show annual growth rings). His study involves plucking a single tail feather and examining the induced or replacement feather for its rate of growth. The study is currently underway, but Tom predicts that the superior foraging skills of older birds will be reflected in faster feather replacement. If so, his research may shed light on the mechanism behind deferred reproductive maturity in seabirds and the positive correlation between age and reproductive success in many species.

• Savannah Sparrows -- The Savannah Sparrow field season began when I brought a group of ornithology students to Kent Island during the first week in May. Many male sparrows had already set up territories in the bleak brown fields, and females soon joined them. We mist-netted and color-banded more than 80 adults. After three years of banding nearly 1,500 sparrows, we now have a large, known-age population to work with. That enabled me and my field assistants Geoff Trussell ('90) and J. P. Devine ('91) to perform an experiment on age-related reproductive performance. Previously we had discovered that older female sparrows fledged more young on average over the course of the season, which might explain why dominant males appeared to favor mating with older females. We were able to demonstrate this summer that older females respond to simulated nest predation by gulls and ravens by relaying eggs more quickly than their juniors. Moreover, older females laid more eggs and lost less weight in the process. Birds were able to replace their clutch within a few days after their first nest was destroyed. Surprisingly, these replacement clutches were larger and the eggs themselves were bigger than in the first clutch, presumably because their insect prey was more abundant at the time they replaced their clutches. Another experiment demonstrated, reassuringly, that our method of marking nests (placing engineers' stake flags 3 meters south of the nest itself) does not make the nest more vulnerable to predators than unmarked nests. Next summer we plan to investigate whether females mated to polygynous males have higher metabolic costs than monogamously mated females, and to document the development of foraging skills and anti-predator vigilance in newly independent fledgling sparrows.

• Tree Swallows -- Caragh Fitzgerald ('90) took charge of the Tree Swallow project this summer. She banded 557 swallows and determined which birds were breeding in which box, and with whom. Eighty-nine of the 119 boxes (75%) had eggs, eggs in 70 of those nests (78%) hatched, and 66 nests (74%) fledged at least one young. Caragh continued two studies, the first a collaborative project coordinated by David Hussell (Ontario Ministry of Natural Resources) that required sampling flying insects daily and relating food abundance to swallow clutch size. As Joanna Leary ('88) discovered last year, there are two major peaks in abundance of small insects, the first in early June and the second in late July (presumably the offspring of the first emergence of flies). The second project was a continuation of Joanna's experimental study of the relationship between the number of chicks that a pair must feed and the chicks' and parents' weights and survival. Nestlings in experimentally enlarged clutches tend to be relatively small, and their parents have to make additional foraging trips, but the parents of enlarged and diminished clutches were equally likely to survive until the next year.

• Bird Populations -- Jan Pierson laid the groundwork for what we hope will become a long-term systematic monitoring of forest songbird populations. The sampling protocol will be to map the locations of singing male birds on at least four days in mid-June in a census area that covers about 11 hectares, or a little more than a third of the area of forested habitat on the island. Jan estimated that in 1989 the island held 42 breeding pairs of American Redstarts, 27 pairs of Northern Parulas, 21 pairs of Black-throated Green Warblers, and 19 pairs of Blackpolls. We will compare our results with concurrent censuses conducted by researchers from Darmouth and Tulane at Hubbard Brook, New Hampshire, with a particular interest in population trends of neotropical migrants potentially threatened by deforestation in Central and South America.

Several ornithological oddities appeared this summer. A Summer Tanager spent a week in June at the edge of the north field, and a Yellow-crowned Night-Heron lived beneath the wharf in early July. Between 1966 and 1988, 48,075 birds representing 127 species have been banded at the Bowdoin Scientific Station (see Table 1). Forty-one species were recorded from the outhouse alone this summer. Merlins nested on the island and raided the Tree Swallow colony daily.

• Climate -- Bob Cunningham's long-term study of Kent Island's climate, and his more recent investigation of fog acidity and weather trajectories, were delayed while Bob recovered from an operation in May. Bob wasted little time when he and Claire did return. To celebrate (belatedly) the 50th anniversary of the Radio Shack, which he and Lester Tate built in 1937, Bob constructed a fog-collecting center to house digital pH meters and computerized data loggers which provide instantaneous measurements of fog acidity.

• General Natural History -- Susie Mason ('90) used her spare time from cooking to survey the marine intertidal zone. She pressed and keyed out at least 30 species of marine algae, and collected numerous invertebrates which are currently being identified to provide a reference collection of marine life at Kent Island. With the Department of Biology's recent hiring of a marine biologist, Amy Johnson, and the prospective conversion of the basin lab to a marine research facility, the stage is set for exploring marine biology around Kent Island.

Arlen Johnson ('91) worked to update the flora of Kent Island and to prepare herbarium specimens of all vascular plant species found on the island. More than 270 vascular plant species have been described at Kent Island, including a half dozen species found on the island for the first time this summer. Ironically, one of the new trails on the north end of the island traverses a large grove of yellow birch, a species unrecorded in two earlier publications on Kent Island's flora. Several dozen mushroom species have been sent to a mycologist for identification.

Kent Island Life

On July 4 we held the second annual beach cleanup. Last year on the west beach alone we gathered eight huge garbage bags full of washed-up plastic items. As a result the beaches were cleaner this year, although we managed to send Bob's boat back to Grand Manan loaded with trash. This year's prize for The Most Useful Item, first given to Peter Hodum, who beach-combed a complete outfit including a stylish sweater, overalls, and shoes that didn't match but did fit, was retroactively awarded to Chuck. The single oar he discovered allowed us to paddle the dinghy out to the skiff moored in the Three Islands harbor after our only other set of oars had floated out to sea.

The 35-hp Evinrude that powered the whaler died one morning two-thirds of the way to Grand Manan. Some fishermen towed us in, fortunately, and we replaced the old motor with a new 50-hp motor with a backup 4-hp motor. With a favorable tide and flat water, the trip to Ingalls Head in the whaler takes just 15 minutes, a far cry from the overnight sail from Lubec.

We were pleased to host, rather unexpectedly, visitors from the Royal Canadian Mounted Police and the Canadian Wildlife Service. Once the rising tide liberated their boat, which had been grounded for some time at the entrance of the basin, they came

ashore to check our scientific permits. Except for a plastic bag in the freezer containing several nestling Tree Swallows that had been found dead in their nest box, they deemed everything in order. Other visitors included bird tours from Field Guides, Inc. and Victor Emanuel Nature Tours, and a group of students from St. John's-Kilmarnock School in Elora, Ontario. Several of this summer's Kent Island veterans led 10 Bowdoin freshmen on an orientation trip in late August. Mark Murray provided everyone with a shovel and, with the help of the students, Rebecca Stanley, Seth Murray, and Peter Cunningham, managed to get the foundation for the new lab in place.

Susie Mason was much appreciated as our cook this summer. She quickly learned that every recipe should be doubled if not tripled, and her portions were famously generous and delicious. For entertainment, we had Malibu volleyball games and soccer shootouts, played Boggle and Genie Wheelwright's "hiding game," and assembled a madrigal group, which performed the debut of Arlen's arrangement of "Our Country 'Tis of Thee" on July 4. "Walkmen" have colonized Kent Island, too, alas, and provided private entertainment for some. Speaking of entertainment, while cleaning the darkroom I came upon some negatives of what looks like a group of scantily-clad youths, taken around the mid-1960s, judging from their haircuts. I would have thought that the Bay of Fundy would have been too chilly to be dressed like that. Anyway, if the pictures belong to you and you would like them discreetly returned or destroyed, please let me know.

On September 12 I will give a slide presentation entitled, "From Eiders to Ideas: The Bowdoin Scientific Station, 1935-1989." The general public is welcome to attend.

Proposal for Fellowship for Canadian Graduate Student

Two noticeable absences this summer at Kent Island were graduate students and biologists from Canada. Graduate students provide intellectual outbreeding, tremendous energy, and a role model for Bowdoin students exposed to field biology for the first time and wondering how one bridges the gap between being an undergraduate and becoming a professional biologist. Canadians introduce cultural diversity to Kent Island and serve as a source of information about Canadian traditions. They also bring a certain legitimacy to a U.S.-owned and -operated field station located in Canadian territory and help us maintain good relations with our neighbors on Grand Manan Island.

I have a proposal that would remedy both shortcomings and greatly strengthen the learning and research experience at Kent Island. I would like to recommend the establishment of an endowment fund that would support one Canadian graduate student each summer at the Bowdoin Scientific Station. A modest stipend ($1000-2000) and a small grant for research equipment ($500) would attract excellent candidates. Bowdoin could waive station fees and cover the costs of an undergraduate field assistant. The fellowship could be advertised by letter to Canadian ornithologists and ecologists, and listed in the newsletters of the Ornithological Societies of North America and other professional organizations. Members of the Bowdoin Scientific Station Site Advisory Committee could review applications and make selections each year. I believe the benefits to Bowdoin College, Bowdoin undergraduates, and the Bowdoin Scientific Station would be enormous.

If you are interested in supporting a Canadian graduate student fellowship or the construction of the new research laboratory, or if you have suggestions about foundations that might fund either project, I would appreciate hearing from you. I am about to leave for a sabbatical year abroad (hence the early date of this Annual Report), but I can be reached through the Biology Department at Bowdoin.

Additions to the List of Publications from the Bowdoin Scientific Station

Lank, D.B. 1989. Why fly by night? Inferences from tidally-induced migratory departures of sandpipers. J. Field Ornithology 60: 154-161.

Nathaniel T. Wheelwright
Director, Bowdoin Scientific Station
September 1989

Table 1. List of bird species banded at the Bowdoin Scientific Station, 1966-1988 (compiled by Beth Jones Whalon '89).

Species	No.Banded
Greater Shearwater	532
Sooty Shearwater	64
Wilson's Storm-Petrel	217
Leach's Storm-Petrel	22,312
Brant	1
Common Eider	436
Sharp-shinned Hawk	9
Semipalmated Plover	15
Lesser Yellowlegs	1
Solitary Sandpiper	1
Spotted Sandpiper	23
Ruddy Turnstone	1
Semipalmated Sandpiper	650
Western Sandpiper	1
Least Sandpiper	79
White-rumped Sandpiper	1
Purple Sandpiper	1
Short-billed Dowitcher	1
Common Snipe	1
Herring Gull	1925
Great Black-backed Gull	69
Black Guillemot	545
Black-billed Cuckoo	14
Yellow-billed Cuckoo	7
Common Nighthawk	1
Chimney Swift	1
Yellow-bellied Sapsucker	3
Downy Woodpecker	34
Northern Flicker	66
Olive-sided Flycatcher	3
Eastern Wood-Pewee	23
Yellow-bellied Flycatcher	168
Acadian Flycatcher	1
Traill's Flycatcher	326
Alder Flycatcher	8
Least Flycatcher	132
Eastern Phoebe	1
Great Crested Flycatcher	4
Eastern Kingbird	2
Tree Swallow	4907
Rough-winged Swallow	1
Cliff Swallow	6
Barn Swallow	1646
Blue Jay	10
American Crow	7
Black-capped Chickadee	63
Boreal Chickadee	93
Red-breasted Nuthatch	126
White-breasted Nuthatch	1
Brown Creeper	32
Winter Wren	21
Golden-crowned Kinglet	116
Ruby-crowned Kinglet	76
Veery	20
Gray-cheeked Thrush	6
Swainson's Thrush	152
Hermit Thrush	25
American Robin	24
Gray Catbird	81
Brown Thrasher	5
Cedar Waxwing	61
European Starling	19
Yellow-throated Vireo	3
White-eyed Vireo	1
Solitary Vireo	33
Warbling Vireo	1
Philadelphia Vireo	20
Red-eyed Vireo	355
Tennessee Warbler	244
Nashville Warbler	86
Northern Parula Warbler	116
Yellow Warbler	373
Chestnut-sided Warbler	15
Magnolia Warbler	318
Cape May Warbler	1593
Black-throated Blue Warbler	28
Black-throated Green Warbler	138
Blackburnian Warbler	71
Pine Warbler	4
Prairie Warbler	8
Bay-breasted Warbler	834
Blackpoll Warbler	545
Black-and-White Warbler	178
American Redstart	572
Ovenbird	65
Northern Waterthrush	323
Mourning Warbler	28
Common Yellowthroat	264
Wilson's Warbler	39
Canada Warbler	103
Yellow-breasted Chat	10
Yellow-rumped Warbler	1389
Palm Warbler	27
Yellow-throated Warbler	1
Kentucky Warbler	1
Connecticut Warbler	2
Blue-winged Warbler	2
Cerulean Warbler	1
Rose-breasted Grosbeak	47
Blue Grosbeak	1
Indigo Bunting	2
Chipping Sparrow	68
Field Sparrow	1
Savannah Sparrow	3505
Fox Sparrow	2
Song Sparrow	561
Lincoln's Sparrow	30
Swamp Sparrow	14
White-throated Sparrow	221
White-crowned Sparrow	8
Dark-eyed Junco	132
Lark Sparrow	5
Seaside Sparrow	1
Bobolink	1
Red-winged Blackbird	9
Eastern Meadowlark	1
Rusty Blackbird	2
Common Grackle	1
Brown-headed Cowbird	50
Northern Oriole	35
Pine Grosbeak	38
White-winged Crossbill	3
Pine Siskin	12
American Goldfinch	40
Evening Grosbeak	1

TOTAL: 127 species/48,075 individuals