



WHERE THE WILD



Half boot camp, half playground,
the Island Ecology Program
turns students into scientists

BY LAURA BARLAMENT

One afternoon early in June, a small group of Sewanee students, and a few of their parents, are gathered in the small sandy parking lot at Halfmoon Landing, located at a sharp bend in one of the meandering coastal waterways south of Savannah, Georgia. Bulky duffle bags, backpacks, and guitar cases lie at their feet, which crunch on dry live oak leaves and pine straw. Docked nearby are two boats, one bearing the University of the South logo. The humid air smells of the sea.

This is the last day these students will stand on the mainland for

foundation dedicated to conservation and research, for an integrated study of geology, hydrology, plant communities, marine and invertebrate zoology, and wildlife ecology.

In the process, the Island Ecology Program also integrates the childlike fun and adventure of summer camp with the intensity and rigor of boot camp for field scientists. Together, a few professors and students study this environment where constant change makes their quest for understanding like a race with no end in sight, the island itself always a mile ahead of the professors, with the students

THINGS LEARN

the next 36 days. For that time period, they will be absorbed into a different world. Located just around a bend or two of the North Newport River as it slinks its way through the salt marsh, that world contains no Wal-Mart or McDonald's, no traffic lights, nor even any paved roads (though there is wireless Internet).

It's a world of smooth gray-brown beaches, where the shifting sands have half buried the bleaching remains of forests, and loggerhead sea turtles leave their nesting tracks; of green-gold marshes growing in black muck that clings to boots like wet concrete; of freshwater ponds where slim white egrets sleep in the moonlight, surrounded by moss-draped live oaks; of sandy roads through brackish wetlands where alligators sun themselves undisturbed for hours.

That is the world of St. Catherine's Island. For 20 years now, Professor Timothy Keith-Lucas has brought 10 students and a team of professors to this little-known barrier island, owned by a

close at their heels. For most of the 200 students who have participated over the years, this wild island has hosted the most incisive learning experience of their Sewanee career.

"There aren't many places where you would find students excited about staying up all night to count bird abundance at a pond or track a raccoon through a maritime forest, but that's how it was on St. Catherine's," says Eric Keen, C'08, one of this year's participants. "It was just this positive atmosphere where we were all passionate about what we learned. Each day was unpredictable, wonderful, and better than the day before."

LIKE THE SEWANEE DOMAIN ITSELF, St. Catherine's has many features that make it an unparalleled place for ecological study. It encompasses about 12,000 acres of firm land (plus another 10,000 acres of marsh), untouched by development and isolated from the world's hubbub; its human population is limited to a

Opposite page: Students paired up to complete four independent research projects during the five-week Island Ecology Program. Inset: Laurence Hayes, C'07; Rachael Snow, C'08; Eric Keen, C'08; and Will Brown, C'07, observe a ghost crab that Laura Candler, C'09, found on the beach.



Above: Students used a vibracore to take geological samples up to 20 feet deep. Right: Tim Keith-Lucas, Island Ecology Program director, watches as Sally Neas, C'08, puts some muscle into the work. Opposite page: Laurence Hayes, C'07; Allison Laney, C'07; and Eric Keen, C'08, study a transect of saltwater marsh. Students have gathered data on this transect for the last 10 years.



handful of highly knowledgeable staff, plus a few veterinarians and other zoo workers who make the trip to the island daily, and the scientists who visit periodically to do research. Its human history is also rich and deep, from prehistoric Native American inhabitants to 16th-century Catholic missionaries to Colonial figures such as Button Gwinnett (one of Georgia's signers of the Declaration of Independence) to pre- and post-Civil War African American communities to Edward J. Noble, who made a fortune on Life Savers candies and bought the island as a private retreat in the early 1940s.

Sewanee's history with the island started in 1985, a few years after the St. Catherine's Foundation had become a separate entity from the Edward J. Noble Foundation. Keith-Lucas — a professor of psychology who specializes in animal behavior, especially in ring-tailed lemurs — was invited by the New York Zoological Society to help relocate a population of lemurs to the island, where the zoo had an off-site breeding facility.

"I thought, 'This is a wonderful place to teach ecology,'" Keith-Lucas recalls. "You can draw a line around it. It's geologically active. You can see the effects of various interventions, like farming, forest fires, and draining of wetlands. Yet it's undeveloped."

Back in Sewanee, he talked with a few colleagues from different disciplines — George Ramseur from forestry, Bran Potter from geology, and Ron Toll from biology — about his idea of a summer program in island ecology. They laid out the basic plan and curriculum that is in use to this day. Convincing the St. Catherine's Foundation to agree to such a program was a little more difficult, as their previous experiences with other colleges had not been entirely positive. But, with financial and institutional backing from science alumni and Vice Chancellor Bob Ayres, Sewanee managed to convince the foundation that the University would be a boon to the island.

Since then, Sewanee's Island Ecology

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Program has become integral to the ebb and flow of life and work at St. Catherine's. "It was the first truly cooperative program that came to the island," says Royce Hayes, longtime island superintendent. Its success has bred further success, he notes, becoming the model for other programs the island now hosts, such as an environmental school for science teachers and a wildlife veterinary program.

Above all, the island leaves a permanent mark on the students, who also leave a positive legacy on the island. Many Sewanee students have returned to St. Catherine's as interns and have gone on to environmental careers. Hayes notes that at a recent scientific conference devoted to the study of the rare gopher tortoise, which lives on the island, seven of the 45 people in attendance were St. Catherine's alums, and three of those were Sewanee St. Catherine's alums. No matter what they go on to do in life, these alums carry with them an unusual appreciation for the environment as an entire system, where each part is related to every other. "Because of who they are and the caliber of student they are," Hayes says, "they are very important to our future."

BEFORE THE STUDENTS pile into the boat for the 10-minute ride out to the island, Keith-Lucas (a.k.a. TKL) hands out a map of the coastal waterways and explains the route they'll take. During a

preparatory seminar held during the spring semester, they had learned about point bars — earth deposits in the bends of the waterways as the tides ebb and flow. Now they are experiencing them and learning to apply that knowledge. The students are here not to be tourists led around by the experts. They are here to observe, to learn, and to understand how all the pieces of this complex ecological puzzle fit together. They are here to make the island their own and to make original contributions to the ever-evolving understanding of the island.

"You've only got 36 days here," Keith-Lucas says to the group once they've reached the island, deposited their bags in their cabins, and are seated in a circle on the stubbly caterpillar grass behind the camp headquarters, a combination of kitchen, dining area, and lab. "The goal is to see how much you can get out of it."

After outlining the program's rules and regulations, he turns them loose with these instructions: Pair up with another student whom you don't know well; take your bike, compass, GPS unit, map, radio, field notebook, pencil, and water; find two specific locations on the island, where Keith-Lucas has left index cards affixed to trees or poles;

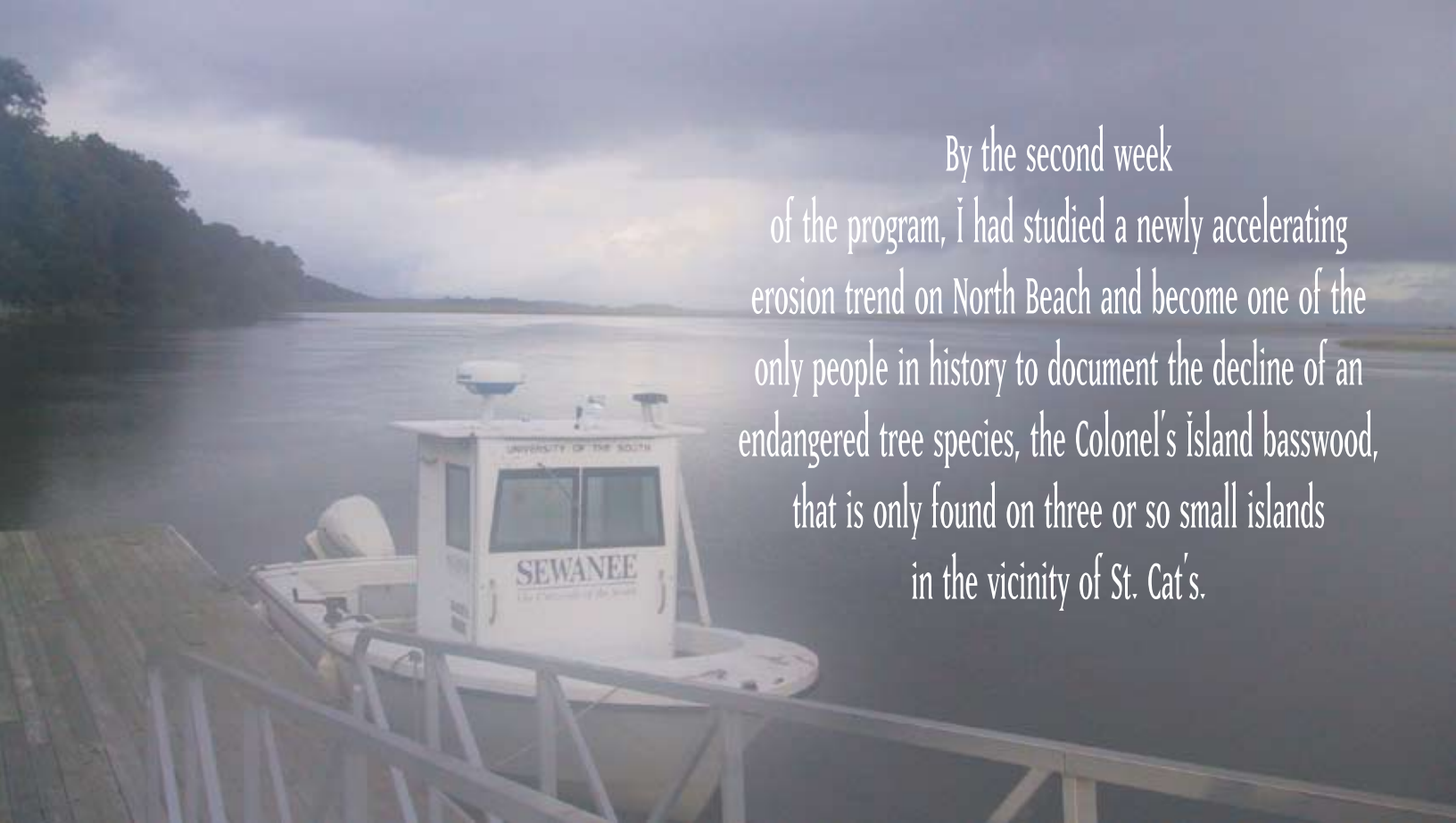
and write down your observations.

"Your primary goal this afternoon," he adds, "is not to get lost and to get back in time for dinner." Along the way, they might also get their first inklings of what pieces of the island ecology puzzle they would like to work on.

I set off with environmental studies major Rachael Snow, C'08, and psychology major Allison Laney, C'07. They have named their bikes: Lola and Stanley. Through careful scrutiny of the map and with the guidance of small numbered metal markers tacked to trees at intersections, we find both our locations without too much trouble — the Savannah Road spillway, a gummy green canal down a sandy, live-oak-lined lane; and Picnic Bluff, on high ground bordering the beach on the northern end of the island.

But, as Keith-Lucas had warned us, bike riding and sandy roads make a hazardous combination. "You'll learn to ride down the middle of the road where the grass is, or on the shoulder," he said. "Still, when we're driving by later, we'll see skid marks and a face print in the sand." While none of us actually face-planted on this trip, two hours of sliding and getting stuck in the





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sand left me sweaty and dirty and tired. The students, however, return glowing with reports of where they got lost and saw wild hogs in the underbrush and lemurs in the trees.

Still, they're ready for the substantial dinner prepared by the IEP chef, Lisa Keith-Lucas (Tim's wife and a science teacher at St. Andrew's-Sewanee School), whose efforts in the kitchen many alumni remember with great appreciation. One of this year's first-time IEP faculty members, Tom Howick—who not only helps coordinate Sewanee's outreach programs, but who also holds a Ph.D. in science education and has taught island ecology on every barrier island in the state of Georgia—notes that the good food and air-conditioned sleeping quarters do a lot to help the students and faculty to keep up an intense work pace, the exact outlines of which the students learn right after dinner.

The group reassembles in the lab next door. On the walls hang maps, aerial photographs, and skulls of dolphin, alligator, feral pig, deer, and whale. Microscopes, laptops, and printers sit on workbenches. A

bookshelf holds a small scientific reference library, and filing cabinets hold 20 years' worth of student studies of the island, as well as research going even farther back. There's a herbarium, and all sorts of field equipment in the cabinets. This lab is a field researcher's dream.

As he has for the last 20 years, geology professor Bran Potter kicks off the program. This evening, he outlines the plan for the next eight days. For three days, he will cover the geology and hydrology of the island from south to north and east to west, and deep into the earth (with the help of a machine called a vibrocore that takes samples up to 20 feet in depth). After these three days of group instruction, the students will start developing their own research agendas. "The aim of the project is to ask a single, coherent question that can be answered in three to four days of field work," Potter says. "You want something that's significant but doable." The students will create a methodology for answering their question and gather the data in the field. Then they will analyze their findings and deliver an oral report a week from

today. Their written report will be due the next afternoon. On the ninth day, they rest. And on day 10, the cycle starts anew, this time focused on botany.

"Any questions?" says TKL. "Sounds great!" says Sally Neas, C'08, a curly-headed natural resources major with a pretty much perpetual grin. "It is," replies the professor, with a knowing smile.

THE ISLAND ECOLOGY PROGRAM includes four eight-day sections, each taught by a different professor. Beginning with the geological processes of the island with Potter, it proceeds to a study of the island's plant life, led by Jon Evans, associate professor of biology, who took over from Ramseur, one of the original four faculty, a dozen years ago. Next comes a study of marine and invertebrate zoology, jointly led this year by Kirk Zigler, assistant professor of biology, and Tom Howick; and it ends with a section on wildlife ecology with Keith-Lucas.

Each section culminates in a project, which the students complete in pairs, collaborating with a different person each

time. Over the last 20 years, Island Ecology Program students have accumulated a large archive of research touching on every feature of the island—from the erosion and accretion of dunes, to the transformation of freshwater ponds that are breached by the sea, to changes in forest composition, to soil invertebrates in pine stands, to indigo bunting foraging behavior.

Superintendent Hayes says that these reports often turn up new data about the island, besides simply being a treasure trove of information tracking the island's evolution over the last 20 years. And the quality, he says, is outstanding. "These reports are only done in a week, but some are publishable."

Alumni like Steverson Moffat, C'88, who attended the second year of the Island Ecology Program, can describe the studies they did in detail, even years later. "I learned very good field research skills—the importance of careful data collection and note-taking skills in the field, which served me well during my master's degree in forest ecology," says Moffat, a law and policy researcher for the Forest Service's Southern Research Station in New Orleans. He holds a Ph.D. in forest policy from North Carolina State University as well as a master's from Clemson.

Several of these early IEP alumni have become leaders in conservation organizations. As assistant director for training and capacity-building for the Wildlife Conservation Society, Meade Love Penn, C'89, runs a grant program for field-based conservation projects. Reviewing more than 100 project proposals a year from all around the world, she says, "I can look at all of them and recognize things I learned from St. Catherine's."

Christine Rucker Small, C'90, who did an internship on the island as well as attending the IEP, also credits the St. Catherine's experience with setting her on her career path. She is overseeing the implementation of a comprehensive wildlife conservation plan for the state of Florida, a plan she helped create. "[The Island Ecology Program] solidified in

my mind the value of a complete working system," she says. "Also the exposure to people working on conservation issues from around the U.S. solidified a career path for me. It influenced both what I do and how I do it."

But the program is just as important to the non-science majors who attend it every year (the program has always been open to

students from all majors) and who go into any number of different careers. "It took going to a small island to see the entire world differently," says Michelle Thompson Hall, C'91, who was a history major and is now associate dean of students at Agnes Scott College. She subsequently took a science course every semester at Sewanee, and books about science or the environment



Professor Bran Potter explains how to read the three vibracore samples that the students took near an archaeological site that is being excavated by scientists from the American Museum of Natural History in New York. These samples are helping to date this site.

make up much of her current reading.

This year's students included history major Will Brown, C'07, who was taking his first science course at Sewanee. For him, doing real-world research made the experience one of his best at Sewanee. "I got to jump straight in and do work that matters, following up on the work of both my predecessors in the IEP and some of the older more formal work that has been done over the years on St. Catherine's," he says. "This wasn't measuring gravitational acceleration

been documenting since 2004. Also this fall, Eric Keen (an ecology and biodiversity major) and Laura Candler, C'09, (a rising sophomore who plans to major in English or French) are working with Zigler to polish a study they did of the marsh periwinkle snail, in which they revisited a study first done 30 years ago on the island, finding significant new results. And all the students participated in taking a vibracore sample at an archaeological site under study by David Hurst Thomas, H'95, of the American

vehicle fondly known as the Popemobile — a 20-year-old Chevy van salvaged and converted by Keith-Lucas into an open-air safari vehicle by removing its body and installing a long two-sided bench instead. Some art major of years past painted flames licking up the front end. It's one of several vehicles, boats, and other pieces of equipment that Sewanee has brought to the island, and which are used and maintained year-round by island staff and visitors.

As we whip through the forest on the Popemobile at, say, 15 miles per hour, low-hanging branches smacking us in the head and palmetto fronds tearing at our knees, the students make comments along the lines of, "This is freakin' sweet!" and "I wanna swing on those vines!" Along the way, Potter points out landmarks — roads that branch off, a manmade pond created to attract wildlife, a gap in the forest where beetles and tornadoes felled a stand of pine — and the differences between the topography of the Pleistocene and Holocene eras. We pay a brief visit to Cracker Tom Hammock, a wetland area, where the tide is low and an alligator and a snake are sunning themselves on the mud, before continuing back through the forest. After another branch swipes the whole row of passengers in the head, Will Brown comments, "Please reserve the blood-curdling screams for situations that are actually life-threatening."

"You know what this is?" exclaims Sally Neas, her eyes and mouth wide with wonder as she surveys the forest. "Where the Wild Things Are! 'Let the wild rumpus start!'"

POTTER PARKS THE POPEMOBILE just off the beach, and we all jump off and grab our bikes, which Cindy Potter — Bran's wife and annual island visitor — drove down in the pickup truck. The lesson starts simply. "Look around," says Potter. "What strikes you about this beach?" The students gaze at the brownish-gray sand gently sloping toward the sea, where shrimpers are at work. "What strikes me is its beauty," Potter says. "The low angle, how wide it is." A few steps away, he calls their attention to swatches



Tree frogs rest on a water oak.

for the millionth time in some physics lab. By the second week of the program, I had studied a newly accelerating erosion trend on North Beach and become one of the only people in history to document the decline of an endangered tree species, the Colonel's Island basswood, that is only found on three or so small islands in the vicinity of St. Cat's."

Brown is not exaggerating about the importance and relevance of this work. This fall, Jon Evans plans to submit for publication a study on the dramatic decline of red bays, an understory tree on the island, which he and IEP students have

Museum of Natural History in New York. The sample provided exciting new evidence about the age of that site, and Thomas planned to give all the students credit for their role in the discovery.

BY 7:56 A.M. OF THE FIRST full day on the island, every student is at the headquarters with his or her equipment and ready to go. "Make sure you have a map in a readily accessible place," says Potter. "That's part of the pleasure of week one. Getting your bearings and annotating your map."

To travel down to the south beach, the students will be taking their first ride on a

of dark, dense material lying on the sand. It's peat, the last remnants of a marsh that used to cover this surface, a vivid reminder of the dynamic interaction of sea and land through time. "So the beach is where marsh once was," Potter remarks. "See what the possibilities are?"

"Let's just take a walk up the beach and see what we find," he continues. We wander over to the scarp — i.e., the edge or bluff — which marks the landward limit of the beach. It's well over 6 feet high, and grasses grow on top, and trees whose branches are bent almost parallel to the ground, as if in a perpetual gale. At Potter's direction, we look closely at the scarp and notice a stripe of dark-colored material embedded in the sand. "What is it?" Potter asks. The students examine the material. "Charcoal?" someone suggests. "Burned wood, yeah. So, interesting. What looked like a simple dune is a little more complex. Step back. ... You got a sand dune, then bunch of charcoal, then more sand on top. What does this indicate? ... There was a wildfire, then more sand accreted on top."

"We're into our topic of time," Potter says. "If I had to choose one theme for my section, it would be enlarging your view and perception and appreciation of time. There's a clarity and understanding that comes from placing things in time."

But the geological timeframe is much different in this dynamic, sandy, windy environment than it is in the other environments where Potter teaches, on the Cumberland Plateau, or out West. "It's amazing what happens here in 24 hours, during a single storm," Potter says. "I'm out of my element here. There's very few solid rocks."

As we sketch the scarp in our field notebooks, a man drives up in a four-wheeler. Deeply tanned, with a gray beard like an Amish farmer, Gale Bishop happens to be a geologist as well as a sea turtle expert. He's on the island to monitor sea turtle nesting. Just on the other side of the path where we entered the beach, he tells us, is a nest made last night. He'll be back in a few minutes; first he has to rebury the clutch of 79 eggs

he just dug up farther down the beach. I'm not sure what he means, but we wander over to the nesting site to find out.

A 300-pound animal that ventures out of the ocean only a few times a year, in the black of night, leaves no unsubtle signs of its presence on the beach. As if a small bulldozer had driven out of the surf, the track starts at the high tide line and continues almost to the top of the beach. There, the regularly patterned track disappears in a wider, circular patch of disturbed sand, from which it reemerges to make a precise U-turn and march, parallel to the original path, back down to the sea.

In the messy place, Bishop explains, is where the mama turtle carefully dug her nesting hole, about 12 inches deep and 8 inches wide, depositing her load of eggs — 113 on average. After carefully tamping down the sand on top of them, she uses her strong flippers to throw sand around the nest area to disguise its exact location.

On average, loggerhead sea turtles lay 3.86 nests per year, says Bishop. Yet, out of every 1,000 eggs laid, only one turtle will reach reproductive age. In this particular spot, however, not one of these eggs has a chance of hatching without humans' help — if they weren't eaten by raccoons, they'd be flooded by a high tide. By moving them to a higher and more protected location, we can guarantee that 70–80 percent of them will at least emerge from their shells to begin life.

Now, Bishop says, who wants to take the first turn at the shovel?

Layer by layer, the students take turns gently removing the sand, looking for the "bull's eye" — the swirled mixture of packed black and white sand that indicates the nest's exact location. It takes at least five minutes of careful digging to reach the eggs, a collection of sandy ping-pong balls, slightly gooey, which dent (but do not break) with the slightest pressure. We all take turns getting on our knees, reaching our arms into the hole up to our elbows, and lifting the eggs out into a 5-gallon bucket.

Bishop takes one egg for DNA testing. Only the shell is needed for that purpose,

he says; the contents will be sacrificed in the name of science. "Who wants to try a turtle egg?" Laura Candler's hand shoots up while everyone else stands around, looking doubtful. We gather around close as he breaks the egg with a knife and dumps the contents into her hands. She lifts them to her face, and after only a moment's hesitation, takes a bite.

"How does it taste?" I ask, watching her face. She looks a little like she might gag, but she swallows it down. "It's not bad ..." she says. "It's very fishy." Neas tries a bit as well, her nose wrinkling. She says it tastes like "gooey oysters. Really fishy and salty."

Bishop puts a shirt over the eggs in the bucket, and he and Cindy Potter take off down the beach to bury them in a safe spot. It's only quarter to 11, and we're off down the beach again.

AFTER A MONTH'S WORTH of days and nights like that — of seeing, touching, smelling, hearing, even tasting, and all the while learning — students say their perspective on the world changes.

"My time on St. Catherine's taught me how to quantify my old 'romantic' ecological sentiments, which were based more on a love for green places and unspoiled nature than on anything concrete," says Will Brown, the historian and science neophyte. "Now I have a solid foundation for understanding how the natural world around me works and how we, as humans and participants in the processes of ecology, can change that world for good or bad."

This knowledge makes nature's wonders even more wondrous, says Eric Keen. The beach at sunrise, for example. "At the end of the program, not only did we see beauty and wonder in it, as always, but we were also able to see it as an ecological system, as a process, as dynamic. We were able to understand why we were seeing what we were seeing, and who in the ecosystem was involved in making it so. ... We were able to see a deeper beauty in it all."

Long live the "wild rumpus" on wild, beautiful, free St. Catherine's Island! ■