



Teaching With Big Burrows on St. Catherines Island

By Dr. Anthony (Tony) Martin

If you say the words “spring break” and “college students” in the same sentence, it may invoke lurid images of wild and crazy times on the beaches of Florida. For my students and me, spring break 2013 was certainly wild and crazy, but in a different sort of way. Yes, we spent some of that break on beaches of the Georgia barrier islands. But for much of that time, we looked at the many animals in those beaches and their traces: tracks, trails, burrows, and more. It was not a vacation, but a class field trip for a course I teach in the Department of Environmental Studies at Emory University, simply called Barrier Islands.

By far the most memorable part of our trip was the three days on St. Catherines Island, when we tromped through its fields and forests in search of gopher-tortoise burrows and alligator dens. With the help of Michael Page, a colleague of mine at Emory University who specializes in the use of GIS (geographic information systems), we used two research projects on St. Catherines as opportunities for the students to learn research methods in the field. These projects deal with two of St. Catherines’ most charismatic animals, gopher tortoises (*Gopherus polyphemus*) and alligators (*Alligator mississippiensis*).

Why these two species? What they have in common is that both make big burrows. As a paleontologist and ichnologist – the latter is someone who studies modern and fossil traces – this is pay dirt for me (pun intended). Gopher tortoises can dig tunnels more than 14 meters (45 feet) long, and alligators excavate dens that can be at least the length of a full-grown adult alligator and more than a meter (3.3 ft) wide. My hope is that our study of these big burrows on St. Catherines will help paleontologists to identify similar burrows in the fossil record. This, in turn, should also aid our understanding of how burrowing reptiles might have evolved in the first place.



The main tasks we assigned to our students were to use GPS (global-positioning system) devices to record burrow locations, as well as describe and measure burrow dimensions. On our first day on St. Catherines, we divided students into teams of three and got them acquainted with these basic field methods as they mapped and described the gopher-tortoise burrows. Over the next two days, Michael and I showed them some of the alligator dens we had mapped in 2012, which was quickly followed by our prospecting for more dens. Happily enough, we found many previously unmapped dens, with our students shared in this joy of discovery. Some of the dens were in former wetlands and now abandoned in the middle of the forests. Even so, we were very careful when approaching these dens, some of which were occupied by adult alligators, despite being well away from ponds!

Both projects are being done cooperatively with Robert Kelly Vance of Georgia Southern University, Sheldon Skaggs of CUNY-Brooklyn Community College, and Veronica Greco of St. Catherines. I’ve reported preliminary results of the studies in two professional meetings, and we’re writing two research papers that we hope to submit to scientific journals later this year. All of the Emory students will be named in the acknowledgements of these papers for helping with the research, and we are very grateful to the St. Catherines Island Foundation for supporting our visit. It was a spring break in which we all became a bit more educated!



Eaglebrook School at St. Catherines Island By Chris Lowe



Eaglebrook School returned to St. Catherines Island in March for its annual island ecology program. The trip was anxiously awaited by all of the students who attended. One young man had been waiting three years to come on the trip; his older brother had been part of our 2010 excursion, and the little one was so impressed by his brother's experience that he signed-up as soon as he was old enough. The trip was everything he had hoped it would be and more. Big brother is now taking higher level science classes at Deerfield Academy, and I am sure little brother will be following in his footsteps. This scenario is complemented by yet another little brother this year who is hoping that Eaglebrook will be able to offer a similar experience next spring. His brother has entered into a marine science program in Florida. It is very rewarding to hear that students from our program have continued their interest in the sciences at secondary school as well as college. It is a great pleasure to be able to work with young students who are so inspired by this unique experience along the Georgia coast.

This year's trip began on a frigid evening in Boston, but all flights and travel went smoothly. We landed in Jacksonville, rather than our usual Savannah connection. We all

were excited by the prospect of a warm week in the South, however we were not greeted by the typical balmy weather of years past. Rather, it was one of the coldest trips we have taken. The wind blew steadily off the mainland for much of the week we were there. This made even our afternoons chilly, but since most of our study areas were on the ocean beaches and in the salt marshes we were spared the brunt of the wind. The boys were all excited to see the beaches, and were also impressed with how different St. Catherines

"beaches" were to the ones they were accustomed to visiting. They were not familiar with the skeletons of dead trees littering the beaches, but neither were they familiar with the incredible solitude of an afternoon on South Beach, or with the fact that sand dollars and whelks could still be found on a beach! They quickly found that each of these creatures offered a mini-lesson in and of itself. The geomorphology studies were of particular interest to the boys. We used our previous data to point out the rate of erosion at Party Bluff. Trees that had been safely away from the scarp five years ago were now perched perilously close to the edge. We studied distribution of the denser sand, formation of the island core, the buried soil horizons, and marsh muds. We also performed a simple study of ground water salinity near the salt pans at the north end of Seaside Marsh. These bare areas in the marsh have proven to be of great curiosity to students in the past. The fiddler crabs and the raccoon highways are immediately obvious in this high marsh area, but when asked to sit and observe, it becomes quite obvious that the natural vegetation has a dramatically "pruned" appearance. The boys used a refractometer to determine ground water salinity along an East-West transect. The area is marked by barren expanses of sandy marsh mud which is then fringed by stressed glasswort that then transitions into some saltwort. Closer to the tidal water of the marsh is the beginning of the *Spartina*. The groundwater under the barren areas registered salinity levels greater than 100 parts per thousand. The concentration dropped precipitously as we took readings under the glasswort, and then even more so in the zone tolerated by the saltwort. The *spartina* is limited to areas with salinity readings much closer to that of average seawater. This activity is easily set up, and performed by the students. Data can be mapped out and even isohalines can be plotted. It was an excellent segue into a number of other discussions including how the refractometer works as well as salt water encroachment and fresh water lensing. The boys also got a kick out of seeing how liquefaction works. The concepts were far more easy to grasp in the field rather than the classroom where we have to use beakers and pre-prepared saline solutions.



We made numerous excursions around the island in order to teach the boys how to identify the various plant and animal species, and to look at how they fit in the ecology of the island. Over the years we have collected a number of animal profiles which are included in student packets to be used as a core curriculum. In a time when computer



games dominate our children's lives, it is nice to "unplug" kids and get them outside to fully experience nature. Students are not allowed to bring their computers, and our classroom is the entire island. It is amazing how quickly these young men can fall into a non-tech. routine. The class work and computer use we save for our return to New England. On St. Catherines, we are usually busy in the field from dawn until dusk. Even dinner can be an educational experience with the dissection of Quahogs (*Mercenaria mercenaria*) or Blue Crabs (*Callinectes sapidus*). We have handouts for these lessons as well.

The faculty that go on the trip are all old enough to remember a time before computers. Our department prides itself on a hands-on approach to science, and our philosophy maintains that the outdoors is still the best classroom. Walking along a deserted beach with a small group of enthusiastic students, and teaching them how to "see" nature in all its complexities is perhaps the most rewarding experience in my teaching career.