

R/V Savannah Rivers to Reefs Blog Post

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Watersheds, Waterways, and the Ocean Connection

On June 24th, through a stroke of good fortune, I participated in an educational cruise aboard the R/V *Savannah* with the Gray's Reef NMS Foundation and the Skidaway Institute of Oceanography. Our intended mission for the cruise was to take estuarine water quality measurements, grab sediment samples, trawl for benthic fauna in Wassaw Sound, and head to Gray's Reef National Marine Sanctuary. Once we were at Gray's Reef, we would deploy an ROV mounted with a camera to explore the reef. We accomplished much of the intended mission.

On the morning of the cruise, we met our cruise mates along with Gray's Reef National Marine Sanctuary Foundation leaders Cathy Sakas and Jody Patterson, and the sanctuary's communications coordinator, Michelle Riley. We discussed the schedule for the trip. The wind had shifted to the northeast the night before and would be increasing as the day went on. This would create unpleasant sea conditions. Cathy and Jody let us know early on that discretion was going to be the better part of valor for the day. Cruising to Gray's Reef might not be the best idea.

That was okay with me. Cathy and Jody know a lot of things about a lot of things. Being around them and learning aboard the Savannah will make for more impactful lessons for my students.

One of the major tenets of the Rivers to Reefs program is following the watershed from its origins in North Georgia to the coastal ocean. For this trip, we would concentrate on the mixing area between the rivers and the reefs, the estuary. We would look at it from the perspectives of water chemistry, geology, and biology, and the human impacts that affect each.

A CTD (conductivity, temperature, depth) was used to look at water chemistry. The CTD is a collection of Niskin bottles used to collect water. They are mounted on a rosette with instruments to collect water quality measurements in real time. We deployed the CTD at several stations and collected water and recorded measurements. Students will be able to see that over the course of just a few miles, the salinity in the estuary increased from 29 ppt to 33 ppt as we got closer to the ocean. Students could further hypothesize about other abiotic factors that would affect salinity. What would



happen as we move further inland? Does the tide play a role? Does precipitation play a role? Would it change throughout the year based upon seasons? What will happen with nutrient dynamics? There are so many ways that students could look at ocean chemistry.

We looked at other changes as well as we moved about the estuary. We used a Ponar grab to collect sediment from the bottom. We examined sediment size changes and found a few benthic critters crawling around in the samples. Cathy had brought along some pottery that she made from the clay collected along the Georgia coast. The clay had changed colors when it was removed from the anoxic conditions in the benthos and into a kiln. The color of the fired clay resembled the sediments that can be found in the Appalachian Mountains in North Georgia. I imagine that if a student was shown some of that pottery and a sediment sample from the mountains of North Georgia, there is a connection that could be made pretty easily.



The crowd pleaser for the day was a pair of trawls that were done in two different locations. Examining changes in benthic fauna from one location to the next is sure to spark some curiosity in students. How does the form affect function? A closer examination will help explain some of the life history of each species. Cathy is adept at providing little tricks for students in that regard.

Towards the end of the day, we met in the cabin and discussed the overarching themes for the day. Jody and Cathy discussed how this system of moving water from the watershed to the coastal ocean is this incredibly complex network of waterways and processes that are impacted by human involvement. Jody explained some of the significant research projects being done in and around Gray's Reef. Jody also explained how riverine inputs, depending upon tides and river stages, can be seen within several days at Gray's Reef. Jody also pointed us to resources for students to get involved and learn more.

Many thanks to Marc Frischer, Jody Patterson, Cathy Sakas, and Michelle Riley and the National Science Foundation for organizing and providing a fantastic learning experience! Thanks as well to Captain T.J., Cam, Morgan, Ben, and Joe aboard the Savannah. You are amazing!