Sound advice for sonde deployment: Water Quality Monitoring at the North Carolina Coastal Reserve

When asked to accompany Research Coordinator Dr. John Fear on a "sonde run", I agreed enthusiastically, but then began to wonder "What exactly is a sonde"? Dr. Fear informed me that a sonde is an instrument used for water quality monitoring, and that the day's research activities would involve the monthly swap out of equipment. Armed with data sheets, replacement sondes, and water quality measurement tools, the research team headed out into the field.

Interns Craig and Veronica assemble a new sonde for deployment.

Sondes are used to measure various aspects of water quality such as turbidity (how material suspended in the water column affects the passage of light), pH (acidity), dissolved oxygen (amount of oxygen present in water), and temperature, and are useful tools for long-term data collection. As Dr. Fear explains, "Water quality is often used as an indicator for system health. If there is a negative trend in water quality measurements, it may be associated with a larger issue affecting the observed area". Thus, monitoring the water quality around North Carolina Coastal Reserve sites serves as an important tool in assessing the health of Reserve ecosystems and surrounding coastal watersheds. There are two sonde stations surrounding the Rachel Carson Reserve, one located on the sound side of Shackleford Banks and the other in the Middle Marsh area of the Rachel Carson Reserve. The two sonde stations are maintained through a partnership between the N.C. Coastal Reserve and the National Park Service, and provide valuable continuous data for many organizations.

Each visit to a sonde station begins with gathering basic water quality information. Water clarity is observed using a secchi disk. Water samples are taken that are used to assess nutrient (nitrate, ammonium, and phosphate) concentrations. Nutrients are important components needed by plants to photosynthesis; a primary first step in the estuarine food web. Then the sonde is lifted out of the water and the amount of fouling is noted on the collection datasheet. Fouling on individual sensors can affect the sensor's accuracy and is one of the reasons sondes are replaced every month. Before placing a new sonde in the appropriate housing for each site, the equipment is tested, and initial data about water temperature, dissolved oxygen, pH, and turbidity are collected. Collecting data from multiple sensors allows researchers to analyze a full range of water quality indicators to better understand trends in water quality and its connections to various coastal processes. As I learned from my sonde adventure, collecting data involves lifting heavy objects, handling finely calibrated and expensive equipment, and perhaps working up a bit of a sweat. But the data gathered each month from the sonde stations is literally priceless in terms of understanding trends and changes in our coastal ecosystems.

Veronica uses a black and white secchi disk to determine water clarity.