

Basic Observation Buoy (BOB) Estuarine Monitoring Program



Final Project Report

Contract Number 5179

Grant period 3/1/13-9/30/2013

\$12,000

December 10, 2013

Prepared For:

Albemarle-Pamlico National Estuary Partnership

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Project Summary:

The UNC Coastal Studies Basic Observation Buoy (BOB) Project began in 2011-2012 through funding provided by APNEP. The program provides students the opportunity to collect atmospheric and water quality data from the Albemarle and Pamlico Sound estuaries and surrounding bodies of water.

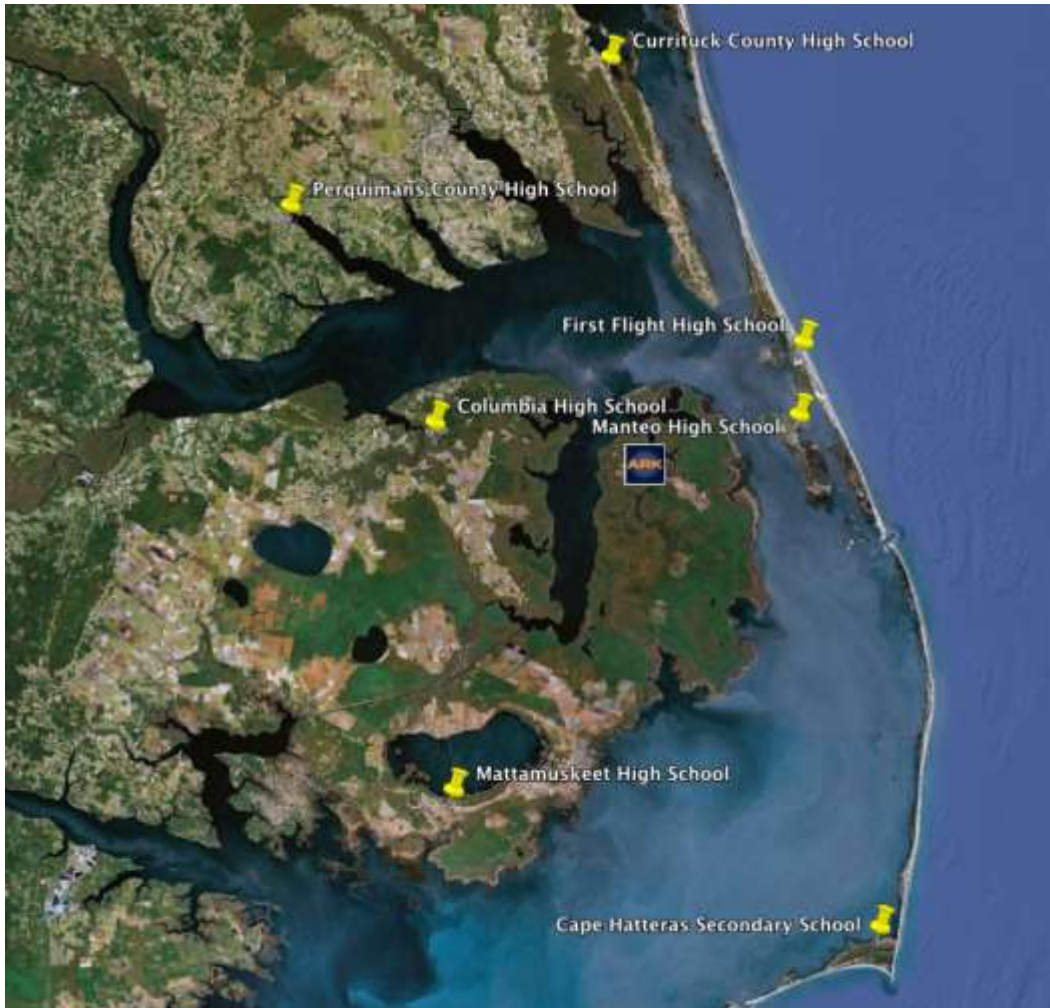
In 2013 the number of schools involved has increased from five to seven. A teacher workshop (serving two teachers from each school) was held before the start of the 2013-2014 school year to improve the program based on the needs of the participants and to address logistical challenges. Acting on teacher suggestions, the BOB buoy was redesigned in 2013 to be smaller and lighter in weight. Improvements were also made to the sensors, waterproofing of the computers, and a prototype dissolved oxygen sensor was developed utilizing computer boards and written software.

This project continues to provide students the opportunity to construct an observation buoy outfitted with environmental sensors that collect water quality and meteorological data. Students learn about the importance of water quality and are involved in the collection of valuable data that is shared with the rest of BOB network, and available for public use through a Southeast Coastal Ocean Observing Regional Association (SECOORA) website as part of the integrated ocean observing system.

Scope of Work:

In 2013 the network of schools participating in the BOB program has continued to expand. Currently 7 schools have committed to collecting water quality data:

- Perquimans High School
- Manteo High School
- Cape Hatteras Secondary School
- Currituck High School
- Columbia High School
- Mattamuskeet High School
- First Flight High School



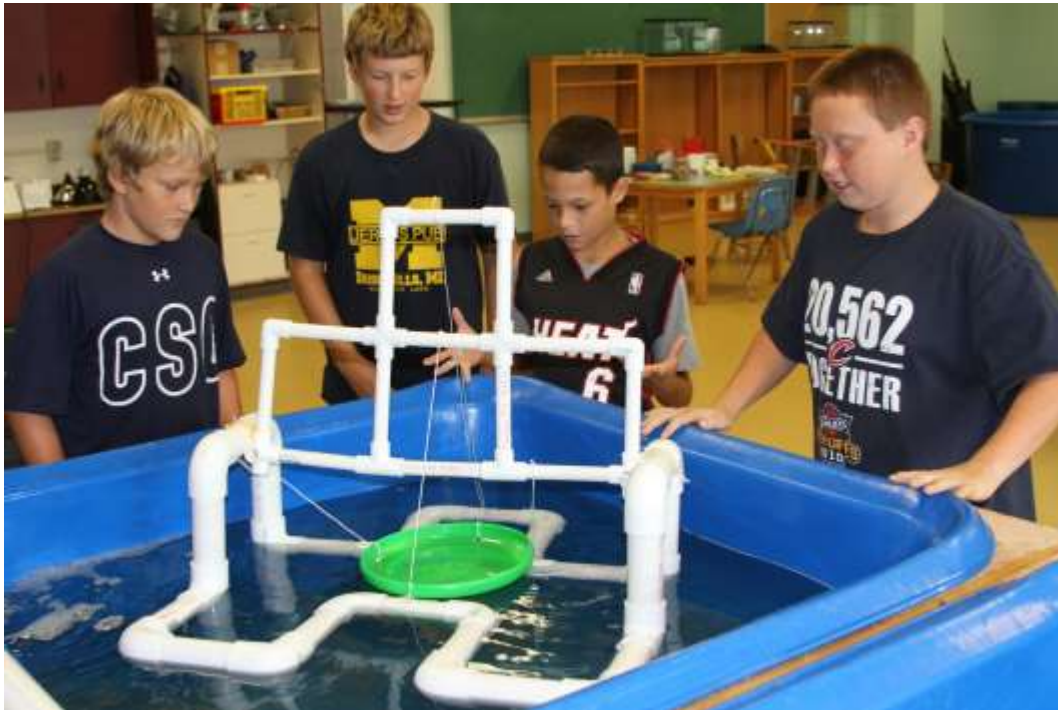
Schools involved in the BOB project are spread throughout the region

The number of students participating varies depending on the school and how the program best fits into their curriculum. Conservatively, the BOB program will reach over 150 students this school year. The data collected from the program is available to the general public, and has been shared with curriculum developers for math and science curriculum for NC public schools.

Results and Discussion

The creation of the Albemarle-Pamlico BOB network provides valuable data on this estuarine system, and exposes youth to the technology and importance of observing systems. The data obtained from the education-grade observing equipment has been added to existing BOB data networks and provides area teachers and students with insights into the biological and physical processes occurring in their surrounding estuarine systems. In addition to the data collected, this program expansion brought project-based learning opportunities to students in traditionally underserved areas. Curriculum created in conjunction with the project teaches important scientific concepts and terminology coupled with the collection real-time

data. This project engages students in a manner that highlights STEM (Science, Technology, Engineering, and Math) education and encourages career paths in related fields.



The Build a Basic Buoy program allows students to learn about buoyancy, center of gravity and payload while creating a buoy of their own design.

The ongoing collection of data from BOB units deployed at schools surrounding the Albemarle and Pamlico Sounds will create a legacy project for students to contribute to year after year. Long-term data collection will allow students and teachers to identify trends in their local systems and relate them to national and global trends in climate change and ocean acidification.

The BOB units continuously collect water quality data and give students and the public insight into water quality parameters and physical conditions that may affect local habitats and fisheries. Access to data and the ability to interpret it in meaningful ways encourages classroom discussions on factors that may influence water quality and the impact they may have on natural systems.

By engaging the students in the collection and analysis of water quality data, the importance of this data and their values become more relevant. Throughout the project, students observed local changes in water quality parameters during rain events, drought conditions and major weather phenomena such as Nor'easters. Seeing these changes first hand gives students a better understanding of the impact of these events on receiving waters and how they may affect local ecosystems.



Students calibrate sensors and prepare the GLX for a 5 day deployment

Final Budget

The funds received from APNEP were used to fund a teacher workshop, supplies used for lesson plans and curriculum associated with the BOB project, design of a prototype DO sensor and buoy construction. A basic breakdown of these charges include:

- \$617.52 used to fund teacher workshop, travel to schools and freight.
- \$9363.77 used to fund equipment and supplies for curriculum activities, BOB new design, DO prototype and waterproofing upgrades.
- \$1497.17 used for Indirect Overhead Cost to East Carolina University

The cost for the BOB project totaled \$11,478.46

Match and Leverage

Total amount of funds requested from APNEP - \$12,000

Total amount of in-kind contributions - \$15,790.11

Project Partners and Contributors

The BOB project is a collaboration of federal and state partners, led by John McCord, Education Programs Coordinator and David Sybert, K-12 Education Specialist at the UNC Coastal Studies Institute. This partnership, with NC Sea Grant and NOAA'S Monitor National Marine Sanctuary was critical to the successful development and implementation of the BOB project. Terri Kirby-Hathaway, Marine Education Specialist at North Carolina Sea Grant and Lauren Heesemann, Field Research

Coordinator from NOAA's Monitor National Marine Sanctuary served as content experts and school liaisons to three of the BOB schools.



Students are asked to troubleshoot problems and redesign as new challenges arise.

Future Work

It is our intention to continue this project, seeking additional funding sources to fund future years and growth of the BOB project. We hope to include more schools, while also increasing the amount and quality of data collected by each school. A dissolved oxygen prototype sensor designed and built by UNC-CSI, will be tested and ready to be added the sensor package this spring.

Mike Phelan, the technology teacher at Manteo High School obtained a grant to outfit their buoy with solar panels and is attempting to send data real time back the classroom. These upgrades will allow the buoy to be deployed for much longer periods of time. If successful, these upgrades could be added to all buoys in our BOB network.

As the BOB project continues, we will foster a growing network of schools working together to record and analyze water quality data in bodies of water in and around the Albemarle and Pamlico Sounds.