

**Southeast Coastal Ocean Observing Regional Association (SECOORA):
Coordinated Monitoring, Prediction and Assessment to
Support Decision-Makers Needs for Coastal and Ocean Data and Tools**

Program Performance Report

Award Number: NA11NOS012003

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Project Summary

Southeast Coastal Ocean Observing Regional Association (SECOORA) and its members are integrating and augmenting existing observational, modeling, data management and education assets in the southeastern US domain to create an end-to-end Regional Coastal Ocean Observing System (RCOOS) in support of user-defined needs for improved coastal and ocean decision making.

With this grant funding SECOORA is:

1. Sustaining SECOORA as a Regional Information Coordination Entity (RICE). This will ensure that stakeholder needs are met through assessment and governance mechanisms that effectively prioritize the distribution of RCOOS-related funding, and coordination of projects and other resources that are required to meet critical regional needs;
2. Sustaining and expanding a coastal and ocean observing subsystem for the Southeast that provides coordinated monitoring, assessment and prediction, and includes moored and coastal stations, high frequency radars (HFR), gliders and storm event monitoring subcomponents;
3. Supporting a multi-scale modeling subsystem that includes regional ocean, shelf and estuarine circulation (nowcast/forecast); estuarine and surge/inundation prediction (nowcast/forecast); and user-defined modeling needs; and which uses the observing subsystem for verification, assimilation, and operation;
4. Supporting the Data Management and Communication (DMAC) subsystem to optimize operations, facilitate technology evolution / transfer, and address structural / project management complexities; and
5. Supporting an education and outreach subsystem partnered with other RAs and marine education efforts, that engages diverse education and stakeholder audiences to understand the benefits of ocean observing to society.

Progress and Accomplishments

Official notification of this award was received from NOAA on August 15, 2011, two and one-half months after the initial start of the funding period. After the contractual review and account establishment for the award, funding for SECOORA subawards were disbursed by SECOORA (administrator of the award) in late August and early September to subaward institutions. Due to this delay in getting subawards established and finalized, only three of the subawardees have expended funds from this award during the reporting period. However, a significant amount of ongoing work is proceeding via previously established federal grant funding, i.e. NA08NOS4730298 and NA08NOS4730409, that will support the planned tasks.

Specific details regarding progress are provided in the tables below. Unless it is explicitly stated that a subawardee is using a portion of the Year One funding for the work, the notes in the "Progress" portion of the table are for informational purposes. For consistency, the goals and objectives numbering remains the same as the "Revised Scope of Work - Year 1" submitted for funding on May 6, 2011.

Goal 1: Sustain SECOORA as a Regional Information Coordination Entity (RICE)

Milestones

The following milestones were met for this goal. Additional details are provided in the table which follows.

- A. Provide timely grant reports to NOAA: Completed as required for this reporting period
- B. Hold Board Meeting Fall 2011: Held September 7-9, 2011
- C. Host joint meeting with SAA in Fall 2011: Hosted September 7-9, 2011
- D. Publish e-newsletters and other outreach material: Bi-weekly
- E. Complete joint FL materials with GCOOS: Available on Web site (<http://secoora.org/about/inmystate/FL>)
- F. Release a new version of the SECOORA Web site, focused on data, maps, and SECOORA in the states: Complete July 2011
- G. Work with NFRA and IOOS office to effectively respond to NOAA and other National level requirements: Completed as required for this reporting period. Examples include Build Out Plan, Tourism Request, etc.
- H. Refine and maintain RCOOS Conceptual Operations Plan: Supported through the Build Out Plan development and ongoing refinement
- I. Support regional collaboration: Supported through monthly conference calls with GCOOS and participation in NFRA activities
- J. Evaluate mechanisms to track operational statistics, product usage, and outcome measures and metrics: Tracking with Google Analytics

SECOORA Activities	Progress
<ul style="list-style-type: none"> • Ensure Continued and Efficient Governance, Management and Operations of the RA. • Provide forums, i.e. workshops, meetings, that enable stakeholder assessment and engagement. • Coordinate with the South Atlantic Alliance. • Ensure SECOORA plans and gaps analysis align with NFRA and IOOS office guidance and/or requirements. • Refine and maintain RCOOS Conceptual Operations Plan. 	<p>SECOORA is providing the fiscal and overall project management for this award. After receiving the award notification, 13 sub-awards to primary partner institutions were established.</p> <p>The SECOORA Executive Committee continues to meet monthly. A part time bookkeeper (Chiaki Kight) and new business manager (Megan Lee) have been hired to replace Susannah Sheldon.</p> <p>SECOORA has established a monthly conference call between 18 PIs to ensure coordination and collaboration among PIs within each RCOOS subcomponent and among PIs across the various RCOOS subcomponents.</p> <p>SECOORA has coordinated with the SAA on CSMP funding.</p> <p>SECOORA’s Build Out Plan has been developed and submitted to IOOS and NFRA</p>

Goal 2: Sustain an Observing Subsystem for the SE

Milestones

The following milestones were met for this goal. See details in the table under each individual PI for more information.

- A. Operate and maintain moored and coastal stations (COMPS, SEAKEYS, and Carolina RCOOS)
- B. Report moored and coastal stations data to secoora.org
- C. Maintain HFR operations
 - i. Hourly surface current maps from the various subregions via individual and SECOORA web sites
 - ii. Estimates of significant wave heights from the HF radar data
 - iii. Develop/report performance metrics of CODARs and WERAs throughout the SE including accuracy estimates of the surface currents
 - iv. Provide the radial currents to the National Servers (SIO/Rutgers) for the National HF radar network
- D. Update Asset inventory and provide performance metrics

Institution/Activities	Progress
Objective 2.1: Sustain Moored and Coastal Stations	
University of South Florida (Weisberg) Support COMPS moorings	Support of moorings continues.
University of South Florida (Merz) Support in-shore tidal meteorological stations	Support of stations continues.
Florida Institute of Oceanography (Virmani) Support SEAKEYS moored network	Support of moorings continues. Note: SEAKEYS has seven moorings, and recently five of the seven have required servicing due to data transmission, sensor replacements, maintenance, and infrastructure issues. Year One funding will be used to support the service and maintenance of these stations. Note: The US Coast Guard does not have plans to repair the lighthouses, but intends to sell them to non-profit entities because they are historic structures. To address the future of SEAKEYS, a meeting with the user community was held at the Keys Marine Lab in November and a meeting summary will be available in December.
University of North Carolina - Wilmington (Leonard) Support Carolina RCOOS network	Support of moorings continues.
Objective 2.2: Maintain High Frequency Radar Operations	
University of South FL (Weisberg) Support three CODAR and two WERA radar arrays on the West Florida Shelf	Support of HFR continues.
Skidaway Institute of Oceanography (SkIO) (Savidge) Support two WERA radar arrays on St. Catherine's and Jekyll Island, GA	Skidaway Institute of Oceanography has used Year One funding to support operation of two WERA HFRs in Georgia on St. Catherine's Island and Jekyll Island. These radars measure surface ocean current vector velocities at half hourly intervals, which are being continuously provided to the national archive in near-real time. Estimates of wave and wind parameters are also made, as experimental products.
University of Miami (Shay) Support three WERA radar arrays at Crandon, Virginia Key and Dania Beach	Support of HFR continues. Note: These radars continue to provide significant wave heights for the National Weather Service marine forecast models and provide mean radials at hourly intervals to the US National HF Radar Network archive maintained by the Scripps Institution.
University of NC - Chapel Hill (Seim) Support two CODAR radar arrays on the Outer Banks of NC	Support of HFR continues. Note: Both systems acquired observations during the passage of Hurricane Irene, which relied on generator power at the Buxton installation. Hourly vector maps are delivered to SECOORA web site, and has continued with limited blackouts. Operation during the Hurricane Irene's passage up the coast was a major accomplishment.

Institution/Activities	Progress
Objective 2.1: Sustain Moored and Coastal Stations	
University of South Carolina (Voulgaris) Re-install, operate and maintain 1 HFR in SC (potentially Long Bay).	Support of HFR continues. Note: USC is tasked with finding a new location for the installation of the WERA system removed from Pritchard's Island to enhance coverage in the SECOORA region. This reporting period all efforts have been focused on system refurbishment and securing a new location.

Goal 3: Support a Multi-Scale Multi-Resolution Modeling Subsystem

Milestones

The following milestones were met for this goal. See details in the table under each individual PI for more information.

- A. Support and enhance SABGOM model
- B. Provide real-time forecasting of inundation and storm surge
 - i. Begin forecasting in Domain 1 and 2
 - ii. Establish Necessary Data Standards with DMAC
- C. Provide decision support tool for beach/shellfish WQ advisories
 - i. Develop Geographic Information Systems-based modules to extract and visualize radar derived rainfall data and modeled currents and salinity estimates over user specified boundaries (e.g. watershed boundaries)

Institution/Activities	Progress
North Carolina State University (He) Support Regional and SAB Subregional Circulation Modeling.	Support of modeling continues. Note: The North Carolina State University-enhanced South Atlantic Bight Gulf of Mexico (SABGOM) model that is being run on 24/7-basis, providing 3-D regional nowcast/forecast of ocean circulation. The model output (temperature, salinity and currents) is made available via the SECOORA web site http://secoora.org/models/ .
University of Florida (Sheng) and North Carolina State University (Xie) Provide real-time forecasting of inundation and storm surge.	Support of modeling continues. Note: The University of Florida is establishing a forecasting system with two domains in Florida running a CH3D-based storm surge and inundation modeling system (CH3D-SSMS) using a 2D version of CH3D model and is developing data standards and metadata to facilitate data exchange between UF, NCSU and end users. The North Carolina State University is also establishing a real-time coastal ocean forecasting system for the Florida to North Carolina domain.
ROFFS (Roffer), University of Miami CIMAS (Muhling), and SAFMC (Pugliese) Develop data products derived from satellite and in situ observations for fisheries stock assessment.	This activity is scheduled to start in third quarter.

Institution/Activities	Progress
University of South Carolina (Porter) Provide a decision support tool for beach/shellfish water quality advisories.	Support of modeling continues. In partnership with the South Carolina Department of Health and Environmental Control (SCDHEC), the University of South Carolina and the University of Maryland are enhancing a user-requested application for prediction and analysis of a public health concern; i.e. primary contact to bacterial-laden swimming waters. A mobile component is also in development to allow SCDHEC users access to the results via smartphones.

Goal 4: Enhance the DMAC Subsystem

Milestones

The following milestones were met for this goal, primarily with previous grant funding.

- A. Develop data aggregation techniques for new data providers within one quarter (3 months) of data provider coming onboard: Complete for Sanibel-Captiva
- B. Provide Quarterly Google Analytics reports to analyze users and uses of data and Web site
- C. Attend IOOS bi-weekly conference calls with IOOS/RA representatives and review IOOS certification documents as needed: Ongoing
- D. Enhance SECOORA data inventory to allow user maintenance:
 - A. Improve “searchability” of information through enhancements to Web site and Interactive Maps: Ongoing
 - E. Provide alert capabilities for new providers and enhance alerts for ongoing datasets or applications as needed.

Institution	Progress
University of SC (Porter), University of NC – Chapel Hill (Seim), University of South Florida (Weisberg): <ul style="list-style-type: none"> • Enhance dissemination of data products. • Implement QA/QC flags. • Implement data/product/service usage statistics (metrics). • Document DMAC interruptions & identify operational remedies. • Coordination with IOOS DMAC and with other RAs. • Optimize servers to address, within expected funding scenarios, issues of redundancy and uninterrupted operations. 	Support for data management continues. DMAC members participated on an IOOS team to draft a plan to create a Sustainable QA/QC Program modeled after QARTOD as a funded and working entity within IOOS. The team has received IOOS approval to develop a project plan. In support of maintaining the data portal, DMAC continues to provide WFS, WMS, and OpeNDAP, SOS web services and the initial steps have been taken to develop the next phase of the asset inventory. DMAC members are participating in IOOS DMAC monthly calls and have initiated discussions with SECOORA and GCOOS for leveraging resources and to establish redundancy

Goal 5: Support a Targeted and Leveraged Education and Outreach Subsystem

Milestones

The following milestones were met for this goal. See details below under each individual PI for more information.

- A. Develop Aquatic Observatory Module for Master of Arts in Teaching pre-service teachers at KSU: In progress
- B. Supporting Basic Observation Buoy Efforts: Ongoing
- C. Develop prototype STEM educational products focusing on Observatory/Modeling applications: This has not begun due to delay in funding.
- D. Plan and develop EARTH 2012, SECOORA Observatories and RTD in K-16 Summer 2012: Progress is ongoing. The announcement is available here: <http://secoora.org/node/343>
- E. Conduct community outreach highlighting the importance of observatories and SECOORA's products. Specific focus will be on the engagement of water quality agencies and decision makers related to the water quality modeling efforts: SECOORA has hired a part time contractor to address stakeholder engagement.
- F. Develop success stories with PIs to highlight on Web site, newsletters, one-pagers, etc.: Ongoing

Institution	Progress
<p>Kennesaw State University (Adams)</p> <p>Conduct EARTH / SECOORA Workshop.</p> <p>Develop aquatic observatory module for Master of Arts in Teaching pre-service teachers.</p> <p>Support existing BOB activities.</p>	<p>KSU has used Year One funding to plan and develop the aquatic observatory unit scheduled for the Spring 2012 Teaching Practicum Course for the MAT students. A partnership with the Chattahoochee Nature Center (CNC) was established. The CNC has agreed to host pre-service teachers on site to deploy the BOB unit. The team was also successful in leveraging equipment support for the MAT proposed observatory unit through the KSU MAT and Biology Education acquisition of 6 Pasco data-loggers and water quality sensor kits (approximate value of \$4,500) that will be used for the MAT Observatory unit as well as KSU MAT and Biology Education Courses.</p> <p>Work is in progress on 2012 Education and Research: Testing Hypotheses (EARTH) workshop with MBARI and SECOORA.</p>
<p>University of North Florida (Welsh)</p> <p>Support advanced BOB activities.</p>	<p>UNF has used Year One funding to host the Fourth SECOORA BOB Workshop, which was held at the University of North Florida Student Union on 16 September 2011. A preliminary draft of elementary lessons and introduction to the BOB program as a vehicle for inquiry, STEM and creativity have been outlined. A plan on how to introduce the BOB concepts into elementary schools is underway. The draft has been given to participating teachers in two Charleston County schools that are currently involved with the COSEE SE's South Carolina Amazing Coast and review of the document by teachers is in progress.</p>

Institution	Progress
University of North Carolina - Wilmington (Leonard) Conduct community outreach to formal and informal education centers. Develop and maintain web portal for BOB and other outreach activities. Develop prototype STEM Education products.	Progress continues.
COSSEE-SE (Spence) Develop BOB for elementary level students. Support EARTH / SECOORA workshop.	Progress continues.
SECOORA (Hernandez/TremI) Manage regional BOB Sustainability Fund. Develop success stories and related outreach information.	No progress to date on the BOB Sustainability Fund for Year One. SECOORA has developed a new success stories for the Carolina RCOOS .

Scope of Work

It is anticipated that work will begin to ramp up on many of these supported projects now that the institutions have the funding in place.

Personnel and Organizational Structure

SECOORA is undergoing a staff transition. Susannah Sheldon, Program Manager, who handled much of the business side of the organization, has left SECOORA effective December 1, 2011. SECOORA is replacing Ms. Sheldon with a part-time bookkeeper, Chiaki Knight, to assist with financial management who will work 10 hours per week. We are also adding another full time person, Megan Lee, as of January 1, 2011 to assist with business development and grant management. It is anticipated this will be a very smooth transition as there has been overlap among the new staff and Ms. Sheldon. SECOORA will notify the IOOS office of new emails and phone numbers of the Megan Lee when she begins full time employment.

Budget Analysis

As noted earlier in this report, the delayed arrival of funding has impacted the expenditure of funds by SECOORA and our subawardees. Limited expenditures have occurred for education and outreach activities by Kennesaw State University and the University of North Florida. Skidaway Institute of Oceanography has billed for HFR operations. SECOORA has also expended funds for personnel support. Total expenditures for this reporting period are \$26,249.69. We anticipate significant increases in spending during the next reporting period.

Publications and Presentations

Savidge, D. K., J. A. Amft, A.E. Gargett, M. Archer, D. Conley, G. Voulgaris, L. Wyatt, K.-W. Gurgel (2011), Assessment of WERA Long-Range HF-radar performance from the User's Perspective, Proceedings on the IEEE/OES/CWTM 10th Working Conference on Current Measurement Technology, pp. 31-38.

Voulgaris, G. 2011. VHF Radar Measurements of Waves and Currents in the Nearshore Region. Third Workshop on Remote Ocean Sensing (ROS 2011).

G. Voulgaris , N. Kumar, K.-W. Werner, J.C. Warner and J. H. List, 2011. 2-D Inner-Shelf Current Observations from a Single VHF WEllen RADar (WERA). Current, Waves and Turbulence Measurements (CWTM), IEEE/OES 10th Working Conference on., 20-23 March, 2011, pp 57-65 ISBN: 978-1-4577-0022-4.

Gurgel, K-W., T. Schlick, J. Seemann, F. Ziemer and G. Voulgaris , 2011. HF Radar observations in the German Bight: measurements and quality control). Current, Waves and Turbulence Measurements (CWTM), IEEE/OES 10th Working Conference, 20-23 March, 2011, pp 57-65 ISBN: 978-1-4577-0022-4.

Porter, D.E., H. Kelsey, S. Berry, S. Torres, D. Ramage, G. Scott and V. Shervette. 2011. Beach swimming advisory prediction tools using beach monitoring, remote sensing and coastal and ocean observing data. Coastal and Estuarine Research Federation 2011: Societies, Estuaries and Coasts Adapting to Change. Daytona Beach, FL. November 2011.

Scott, G., D.E. Porter, H. Scott, L. Wickliffe, F. Holland, A. Blair and M. Reiter. 2011. Integrating risk assessment of environmental stressors with impacts on ecosystem services and human health. Coastal and Estuarine Research Federation 2011: Societies, Estuaries and Coasts Adapting to Change. Daytona Beach, FL. November 2011.

Leonard, L., J. Dorton, D. Porter and M. Fletcher. 2011. Coastal ocean observing in the Carolinas. Coastal and Estuarine Research Federation 2011: Societies, Estuaries and Coasts Adapting to Change. Daytona Beach, FL. November 2011.

Adams, L. G. and G. I. Matsumoto. 2011. The Benefits and Challenges of Using Real-Time Data in the Classroom: Perspectives From the Students, Educators, and Researchers. *Marine Technology Society Journal*, (45) 5: 55–58.

Levin, D., Spence, L. and L.G. Adams. 2011. Students monitoring coastal and inland waters with the Basic Observation Buoy (BOB). *Marine Technology Society Journal*.