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

## Revised Scope of Work - Year 2

TOPIC AREA 1: Continued Development of Regional Coastal Ocean Observing Systems
AWARD TYPE: Cooperative Agreement
PROJECT DURATION: June 1, 2011 – May 31, 2016

This revised grant proposal is submitted in response to the Funding Opportunity Title:
Continued Development of Regional Coastal Ocean Observing Systems
Revision Submitted: March 5, 2012
Year 2: June 1, 2012 - May 31, 2013
Funding Request: $2,236,824
(Funding to be held at NOAA: $40,000 to maintain the NDBC buoy #41036)


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## Introduction

SECOORA has been allocated $2,268,824 for Year 2 of its five-year Regional Coastal and Ocean Observing System (RCOOS) project. This is a slight increase from our FY11 award level but only represents 57% of the funding that was requested. This revised scope of work describes the activities that will be undertaken with this level of funding. As per the FY12 award letter, SECOORA will commit: (1) $600,000 towards supporting priority High Frequency Radars (2) $17,500 towards implementation of biological data services; (3) $3,324 to develop annual strategic initiatives for SECOORA in coordination with the IOOS Advisory committee, and (4) $8,000 to assess the integration of water quality data and advisory modeling output in to the European Environment Agency's Eye on Earth network platform. Of the total allocated to SECOORA, $40,000 should remain at NOAA for NDBC to maintain buoy 41036. Major goals and objectives for Year 2 are described in Table 1.

**Table 1. Major Goals and Objectives**

| Goals | Objectives |
|---|---|
| Goal 1: Sustain SECOORA as a Regional Information Coordination Entity | 1.1 Ensure Stakeholders Inform RA Priorities and RCOOS Development and Implementation.<br>1.2 Coordinate and Implement a Conceptual Operations Plan for a Southeast (SE) RCOOS. |
| Goal 2: Sustain an Observing Subsystem for the SE | 2.1: Sustain Moored and Coastal Stations.<br>2.2: Operate and maintain the priority HF Radars<br>2.3: Support Glider Operations. (NOT FUNDED IN YEAR 1 or 2)<br>2.4: Support Hurricane Wind & Water Level Measurements. (NOT FUNDED IN YEAR 1 or 2) |
| Goal 3: Support a Multi-Scale Multi-Resolution Modeling Subsystem | 3.1: Support Regional and South Atlantic Bight (SAB) Subregional Circulation Modeling.<br>3.2: Implement Forecasting of Storm Surge, Inundation, and Coastal Circulation.<br>3.3: Develop a Nearshore Circulation Model for Rip Current Forecasting. (NOT FUNDED IN YEAR 1 or 2.)<br>3.4: Provide Species-specific Habitat Models that Integrate Remotely Sensed and In Situ Data to Enhance South Atlantic Fisheries Management Council (SAFMC) Stock Assessments.<br>3.5: Improve Beach/Shellfish Water Quality Advisories |
| Goal 4: Enhance the Data Management and Communication (DMAC) Subsystem | 4.1: Service Data Providers and Capture Data.<br>4.2: Provide Information to Users and Stakeholders Rapidly and Effectively.<br>4.3: Coordinate/Collaborate data management efforts with U.S Integrated Ocean Observing System (IOOS®) on biological data services and SOS reference implementations<br>4.4: Achieve Operational Status. (Limited implementation due to funding levels.) |
| Goal 5: Support a Targeted and Leveraged Education and Outreach Subsystem | 5.1: Provide Tools and Opportunities for Observing Related Science Education (NOT FUNDED IN YEAR 2)<br>5.2: Increase Understanding of and Support for Observing Through Targeted Stakeholder Outreach. (NOT FUNDED IN YEAR 2) |

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

SECOORA is an independently operating 501(c)(3). We will provide fiscal management for this award. Megan Lee is SECOORA's Business Manager and serves as fiscal manager, with assistance from an accountant, bookkeeper, and oversight of the Executive Director. We will be responsible for overall project management. Project Management includes fiduciary oversight of all sub-awards, preparation and submission of financial and progress reports, and ensuring coordination and collaboration both among PIs within each RCOOS subcomponent and among PIs across the various RCOOS subcomponents. Sixteen PIs and 13 separate sub-awards contribute to this project necessitating a significant investment of effort for project and fiscal management, technical communications, and task coordination for effective operations. Responsibilities will be shared among the RCOOS manager (V. Subramanian), SECOORA's Executive Director (D. Hernandez), and the Business Manager (Megan Lee). A communication specialist, Megan Treml, will assist with website, e-newsletter and related outreach activities.

SECOORA is a membership-based organization that seeks stakeholders with interests in coastal and ocean data and information to help prioritize our activities and participate in developing stakeholder-based products. With Year 2 funding, SECOORA will continue to seek new members through our Web site, outreach via newsletters and direct recruitment by staff. We will also host an annual member and stakeholder meeting in Spring 2013. SECOORA will partner with stakeholders, such as the South Atlantic Alliance (SAA), federal agency representatives, fishery managers, and others. SECOORA will continue development of a Conceptual Operations Plan for a fully instrumented RCOOS with defined service levels, commensurate with funding, that provides coordinated monitoring, assessment and prediction. We will also be working with SECOORA's Board and Science committee to prioritize activities in recognition of ongoing budget limitations. Hernandez and Subramanian will coordinate these efforts with IOOS and NFRA activities.

Additional coordination responsibilities include working closely with the Gulf of Mexico Coastal Ocean Observing System (GCOOS) in the FL region. We will continue to interact with GCOOS to ensure that messages, products, and projects are coordinated and resources are leveraged. Staff will attend NFRA, IOOS, and other RA meetings as funding allows.

**Table 2. RICE Activities**

| Institution | Funding | Activity |
|---|---|---|
| SECOORA | $422,881 | Ensure Continued and Efficient Governance, Management and operations of the RA.<br>Provide forums, i.e. workshops, meetings, that enable stakeholder assessment and engagement.<br>Coordinate with the SAA, federal and other stakeholders.<br>Ensure SECOORA plans and gaps analysis align with National Federation of Regional Associations (NFRA) and IOOS office guidance and/or requirements.<br>Refine and maintain RCOOS Conceptual Operations Plan.<br>Develop materials for RA Certification. |
| **TOTAL** | **$422,881** | |

## Goal 2: Sustain an Observing Subsystem for the SE

The observing subsystem provides the basis for the RCOOS by supporting and integrating existing assets and observations specific to the development of products identified in this proposal. In most cases, we propose to maintain existing systems deployed as part of pre-SECOORA programs. For all observing assets, the level of funding greatly impacts spare parts and technician support for maintenance of assets and management of data. It also limits principal investigator (PI) time and ability to interface with stakeholders. SECOORA will continue to support the operation and maintenance of offshore moored stations and coastal stations with the caveat that assets in the SECOORA footprint have been purchased through a mix of state, research, and IOOS funding. Operations are not sustainable at current funding levels. USF will maintain as many moorings as possible, but can only commit to operating two of the moored stations with the available funding. Similarly, UNCW is operating without any margin and any significant equipment failures will likely result in removing assets from the water. The SEAKEY network is being removed from operational status at this time, resulting the discontinuation of data collection from long-term monitoring stations, some with 20-year records. SECOORA is allocating $600,000 to the IOOS identified priority HF Radar sites in the SECOORA foot print, which is a 42% increase from last year's funding to these systems. Each observing asset will provide near-real-time data for multiple users, and provide information required to support proposed and existing stakeholder products (e.g., those required for oil spill response, National Weather Service Marine Weather Portal, Beach/Shellfish Water Quality Advisories, and search and rescue (SAR) operation surface current requests). Table 3 below provides specific information on the PI's, funding, and assets for the Observing Subsystem. Note that funding is not available for **Objective 2.3: Support Glider Operations in Year 2; and Objective 2.4: Support Hurricane Wind and Water Level Measurements** has a Year 3 start date.

**Table 3. Observing Subsystem Activities**

| Institution | Funding | Activity |
|---|---|---|
| Objective 2.1: Sustain Moored and Coastal Stations | | |
| University of South Florida (Weisberg) | $130,245 | Funding COMPS surface moorings:<br>C14 and C10 measure wind velocity, relative humidity, barometric pressure, sea surface temperature (SST), air temperature (AT), incoming short and long-wave radiation, in-water velocity and temperature/salinity (T/S).<br>C12 and C13 measure wind velocity, relative humidity, barometric pressure, SST, AT, in-water velocity and T/S. |
| University of South Florida (Merz) | $43,406 | Funding COMPS in-shore tidal meteorological: consists of seven stations located along the Gulf of Mexico's West Florida Coast from Shell Point south to Big Carlos Pass. These stations typically are outfitted with wind velocity, relative humidity, AT, barometric pressure, and precipitation sensors. Marine instrumentation includes: Water Level, T, and S. |
| Florida Institute of Oceanography (Virmani) | $9,999 | The SEAKEYs network is being dismantled, and equipment prepared for storage until such time as funding is available to re-deploy the system. |
| University of North Carolina - Wilmington (Leonard) | $335,068 | Oceanographic data from seven real-time moorings operated through partnerships between UNCW and USC will be maintained along NC and SC. Six systems measure wind velocity, barometric pressure, SST, AT, solar radiation, sea level, in-water velocity, and T/S. Two of the moorings also measure surface-waves. In addition, one coastal pier station that measures wind velocity, barometric pressure, SST, AT, solar radiation, sea level, S, water-column currents, and surface waves also will be supported. |
| **TOTAL MOORED AND COASTAL** | **$518,718** | |

| Institution | Funding | Activity |
|---|---|---|
| Objective 2.2: Maintain High Frequency Radar Operations | | |
| University of South FL (Weisberg) | $143,571 | Support three CODAR sites and transition to adding fourth CODAR site<br>Location: West Florida Shelf |
| Skidaway Institute of Oceanography (SkIO) (Savidge) | $104,286 | Support two WERA radar arrays.<br>Location: St. Catherine's and Jekyll Island, GA |
| University of Miami (Shay) | $143,571 | Support four WERA radar arrays.<br>Location: Crandon, Virginia Key, Broad Key and Dania Beach |
| University of NC - Chapel Hill (Seim) | $104,287 | Support two CODAR radar arrays.<br>Location: Outer Banks of NC |
| University of South Carolina (Voulgaris) | $104,286 | Support two WERA radar arrays.<br>Location: Georgetown, SC and Fort Caswell, NC |
| **TOTAL HFR** | **$600,001** | |

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

All Year 1 modeling components are continuing. The amount of Year 2 funding has caused some decreases in the scope of activities, which are reflected in the Year 2 Milestones.

The modeling components include the following:

Objective 3.1: Support Regional and SAB Subregional Circulation Modeling.
*Since the glider observatory has been eliminated, incorporation of that data was removed from SAB modeling work.*

Objective 3.2: Implement Forecasting of Storm Surge, Inundation, and Coastal Circulation.

Objective 3.3: Develop a Nearshore Circulation Model for Rip Current Forecasting. (Proposed for a Year 3 start.)

Objective 3.4: Provide Species-specific Habitat Models that Integrate Remotely Sensed and In Situ Data to Enhance SAFMC Stock Assessments.
*This project has drastically cut percent time and satellite overhead.*

Objective 3.5: Improve Beach/Shellfish Water Quality Advisories.
*This project has had to remove a primary PI (Kelsey).*

All projects except Objective 3.3, rip current modeling, were initiated in Year 1 and all will be re-assessed in Year 3 for continued funding.

**Table 4. Modeling and Related Product Development**

| Institution | Funding | Activity |
|---|---|---|
| North Carolina State University (He) | $ 129,897 | Support Regional and SAB Subregional Circulation Modeling. |
| University of Florida (Sheng) and North Carolina State University (Xie) | $117,220 and $56,434 | Provide real-time forecasting of inundation and storm surge. |
| ROFFS (Roffer), University of Miami CIMAS (Muhling), SAFMC (Pugliese) | $73,807 | Develop data products derived from satellite and in situ observations for fisheries stock assessment. |
| University of South Carolina (Porter) | $38,845 | Provide a decision support tool for beach/shellfish water quality advisories.<br>Assess the integration of water quality data and advisory modeling output in to the European Environment Agency's Eye on Earth network platform. |
| **TOTAL MODELING** | **$416,202** | |

## Goal 4: Enhance the DMAC Subsystem

Some of the key strengths of SECOORA's DMAC enterprise are the effective working relationships and collaborations fostered by the Data Management Coordinating Committee (DMCC), which is comprised of regional technical personnel responsible for operating and upgrading the data management system of SECOORA. Building on previous work, SECOORA will optimize access to regionally-aggregated information via a web interface that supports SECOORA's thematic priorities. This will be accomplished through continued salary support for members of the DMCC to allow them to enhance the work accomplished under previous SECOORA RCOOS grants, and to incorporate the progress made by the complementary Carolinas RCOOS data management effort.

**Table 5. Data Management and Communication**

| Institution | Funding | Activity |
|---|---|---|
| University of SC (Porter) | $182,386 | Service data providers and RCOOS subsytem PIs<br>Assess SOS response formats |
| University of NC – Chapel Hill (Seim) | $79,136 | Integrate SECOORA asset inventory into the SECOORA webpage<br>Review QARTOD activities |
| IOOS Biological Data Services Implementation) | $17,500 | Work with IOOS Program office and GCOOS-RA on a pilot project to implement IOOS DMAC Biological Observations Standards in IOOS RAs |
| **TOTAL DMAC** | **$279,022** | |

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

Due to funding limitations, objectives under this goal have been severely reduced. For Year 2, the primary focus of the Education and Outreach (E&O) subsystem is to engage stakeholders regarding observing technologies, data, products, and services. Note that Goals 1, 3, and 4 include outreach activities that complement and contribute to the E&O subsystem.

**Table 6. Education and Outreach Activities**

| Institution | Funding | Activity |
|---|---|---|
| SECOORA (Hernandez/Treml) | Funding allocated in Goals 1 & 4 | Develop success stories and related outreach information. |
| **TOTAL EDUCATION AND OUTREACH** | **Funding allocated in Goals 1 & 4** | |

## Milestone Chart

**Table 7. Milestones for Year 2 by Quarter**

| | 2012-2013 Quarter | | | |
|---|---|---|---|---|
| **Goals and Milestones** | **1** | **2** | **3** | **4** |
| Goal 1: Sustain SECOORA as a regional information coordination entity | | | | |
| A. Provide timely grant reports to NOAA | | x | | x |
| B. Hold Board Meeting Fall 2012 and Member Meeting Spring 2013 | | x | | x |
| C. Publish e-newsletters and other outreach material | x | x | x | x |
| D. Coordinate with GCOOS on FL activities | x | | | x |
| E. SECOORA Web site updates focused on data portal expansion, and PI project news | | | | x |
| F. Work with NFRA and IOOS office to effectively respond to NOAA and other National level requirements, including RA Certification | x | x | x | x |
| G. Refine and maintain RCOOS Conceptual Operations (Build out) Plan | x | x | x | x |
| H. Support regional collaboration | x | x | x | x |
| I. Evaluate mechanisms to track operational statistics, product usage, and outcome measures and metrics | x | x | x | x |
| Goal 2: Sustain an Observing Subsystem for the SE | | | | |
| A. Operate and maintain moored and coastal stations (COMPS and Carolina RCOOS) | x | x | x | x |
| B. Report moored and coastal stations data to secoora.org | x | x | x | x |
| C. Operate and maintain Priority Radars | | | | |
| i. Hourly surface current maps from the various regions via individual and SECOORA web sites | x | x | x | x |
| ii. Estimates of significant wave heights from the HF radar data | x | x | x | x |
| iii. Develop/report performance metrics of CODARs and WERAs throughout the SE including accuracy estimates of the surface currents | x | x | x | x |
| iv. Provide the radial currents to the National Servers (SIO/Rutgers) for the National HF radar network | x | x | x | x |
| D. Update Asset inventory/ provide performance metrics | | x | x | x |
| Goal 3: Support a multi-scale multi-resolution Modeling Subsystem | | | | |
| A. Support and enhance SABGOM model | x | x | x | x |
| i. Sustain and enhance NCSU Ocean circulation Nowcast/ Forecast modeling system and serve model output through the THREDDS server | | | x | x |

| Goals and Milestones | 2012-2013 Quarter | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| ii. Model skill assessment for all physical variables through appropriate comparisons with available observations; implement a web interface for online model skill assessment, including near real-time comparisons with available coastal sea levels, buoy measured temperature/ salinity, HF Radar currents, satellite observations; | | | | |
| iii. Establish the coupling of wave, atmosphere and ocean circulation models to the extent possible with FY12 funding | | | | |
| iv. Explore ocean data assimilation to the extent possible with FY12 funding | | | | |
| v. Explore ecosystem model coupling with circulation model to the extent possible with FY12 funding | | | | |
| B. Provide real-time forecasting of inundation and storm surge | | | | |
| i. Raw data availability | x | x | | |
| ii. 3rd FL domain (NGOM) 2D model | | | x | |
| iii. 4th FL domain (SE) 2D model | | | | x |
| iv. Validate FL domain forecast and make forecast data available to partners – UF/NCSU | x | x | x | x |
| v. Annual PURC Conference | | | | x |
| vi. Workshops with District Partners | | | x | |
| vii. Solicit partner feedback | x | x | x | x |
| C. Develop data products derived from satellite & in situ observations for fisheries stock assessment | | | | |
| i. Assemble satellite derived environmental datasets | x | x | x | x |
| ii. Assemble in situ environmental datasets | x | x | x | X |
| iii. Process satellite data (SST, ocean color, altimeter) for SEAMAP cruises | x | x | x | x |
| iv. Extract and compile habitat and environmental data for all species of interest | x | x | x | x |
| v. Define relationships between species distributions and environment | x | x | x | x |
| vi. Develop and refine satellite data products | x | x | x | x |
| vii. Provide satellite data products to SEAMAP cruises as needed | x | x | x | x |
| viii. Analyze fish (larvae and adults) data and environmental data. | x | x | x | x |
| ix. Define temporal and/or spatial shifts for all species | | | | x |
| x. Model interactions between species | | | x | x |
| xi. Evaluate apparent changes in species dominance | | | x | x |
| xii. Team meetings in Charleston and Miami | | | x | x |

| Goals and Milestones | 2012-2013 Quarter | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| D. Provide decision support tool for beach/shellfish WQ advisories | | | | |
| i. Enhance a mobile (Smartphone and iPad) application that allows users to see their location and the location of swimming advisory issuances and associated data in their area. | x | x | | |
| ii. Develop Geographic Information Systems-based modules to extract modeled salinity and HFR data over user specified boundaries | | | x | x |
| iii. Integrate new data inputs (modeled salinity and HFR) and develop and assess new statistical analyses to predict bacterial concentration based on data available from all input sources | | | x | x |
| iv. Assess the integration of water quality data and advisory modeling output in to the European Environment Agency's Eye on Earth network platform. | x | x | | |
| Goal 4: Implement a DMAC Subsystem | | | | |
| A. Service Data Providers and RCOOS Subsystem PIs – | x | x | x | x |
| B. Assess Sensor Observation Service response formats | x | x | x | x |
| C. Integrate the SECOORA Asset Inventory into the web site | x | x | x | x |
| D. Review QARTOD activities | x | x | x | x |
| E. Implement IOOS Biological Data Pilot Project in coordination with IOOS Program Office and GCOOS-RA | x | x | | |
| Goal 5: Support a targeted and leveraged Education and Outreach Subsystem | | | | |
| A. Maintain web portal for BOB and other outreach activities | x | x | x | x |
| B. Develop outreach materials | x | x | x | x |
| C. Conduct community outreach highlighting the importance of observatories and SECOORA's products. | x | x | x | x |
| D. Develop success stories with PIs to highlight on Web site, newsletters, one-pagers, etc. | x | x | x | x |

## Appendix A: SECOORA Priority Radar Sites

All Radar Sites identified in the table below support IOOS Key Activities: Search, Rescue, Oil Spill Response, Major Ports and Shipping Lanes; USF, with the support received will find a location and install the 4 CODAR site.

| Responsible Agency/Vendor | Station Name/State | Latitude (oN) | Longitude (oW) | Nominal Frequency (MHz) |
|---|---|---|---|---|
| University of North Carolina/ CODAR | Duck, NC | 36.18 | -75.75 | 5.0 |
| University of North Carolina/ CODAR | Cape Hatteras, NC | 35.26 | -75.52 | 5.0 |
| University of South Carolina/ WERA | Georgetown, SC1 | 33.25 | -79.15 | 8.3 |
| University of South Carolina/ WERA | Caswell Beach, NC2 | 33.88 | -78.11 | 8.3 |
| Skidaway Institute of Oceanography/WERA | St. Catherine, GA | 31.69 | -81.13 | 8.3 |
| Skidaway Institute of Oceanography/WERA | Jekyll Island, GA | 31.06 | -81.41 | 8.3 |
| University of Miami/WERA | Dania Beach, FL | 26.08 | -80.12 | 12.6 |
| University of Miami/WERA | Virginia Key, FL | 25.74 | -80.15 | 12.6 |
| University of Miami/WERA | Crandon Park, FL | 25.71 | -80.15 | 16.0 |
| University of Miami/WERA | Broad Key, FL3 | 25.35 | -80.25 | 16.0 |
| University of South Florida/CODAR | Redington Shores, FL | 27.83 | -82.83 | 5.0 |
| University of South Florida/CODAR | Venice, FL | 27.08 | -82.45 | 5.0 |
| University of South Florida/CODAR | Naples, FL | 26.16 | -81.81 | 5.0 |
| University of SF/CODAR | To be determined | N/A | N/A | 12.6 |