

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

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Important Note on SECOORA's 1 October 2011 – 30 November 2012 Progress Report

During this reporting period, SECOORA submitted the [revised scope of work and funding request for Year 2](#) (June 1, 2012 – May 31, 2013). After the contractual review and account establishment for the Year 2 award, funding for SECOORA sub-awards were disbursed to partner institutions. The administration of the NOAA Year 1 and Year 2 awards are being continued by SECOORA. This report details the progress and accomplishments over the reporting period.

LONG-TERM GOALS

The long-term goal of this project is to integrate and augment existing observational, modeling, data management and education assets in the Southeast Coastal Ocean Observing Regional Association (SECOORA) 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.

OBJECTIVES

SECOORA will:

1. Ensure that stakeholder needs are met through assessment and governance mechanisms that effectively prioritize the distribution of RCOOS-related funding and other resources that are required to meet critical regional needs.
2. Coordinate and execute an operations plan for a fully instrumented RCOOS in the SE with defined service levels, commensurate with funding, that provides coordinated monitoring, assessment and prediction.
3. Maintain an observing subsystem that includes moored and coastal stations, high frequency radars (HFR), gliders and storm event monitoring subcomponents.
4. Support a multi-scale, multi-resolution modeling framework that includes shelf and estuarine circulation, estuarine and surge/inundation prediction, addresses user-defined modeling needs, and uses the observing subsystem for verification, assimilation, and operation.

5. Build upon the SECOORA Data Management and Communication (DMAC) infrastructure to optimize existing operations, facilitate technology evolution / transfer, and address structural / project management complexities.
6. Support an education and outreach (E&O) program partnered with other RAs and marine education efforts that engages diverse education and stakeholder audiences to understand the benefits of ocean observing to society.

APPROACH AND WORK PLAN

SECOORA is a [membership](#)-based organization that seeks and invites stakeholders with interests in coastal and ocean data and information to help prioritize our activities and participate in developing stakeholder-based products. SECOORA will be responsible for overall project management. SECOORA is an independently operating 501(c)(3) organization, and has implemented a strategy to sustain observations in the SECOORA domain, and support the development and implementation of predictive models and decision-making tools as identified by a broad user community. As described in the funded [Year 1](#) and [Year 2](#) descope proposals, SECOORA is focusing on the following goals during this period of the five-year Regional Coastal and Ocean Observing System (RCOOS) project:

1. Sustain SECOORA as a Regional Information Coordination Entity (RICE).
2. Sustain and expand a coastal and ocean observing subsystem for the Southeast (SE).
3. Support a multi-scale modeling subsystem.
4. Support the Data Management and Communication (DMAC) subsystem.
5. Support an education and outreach subsystem.

Specific approaches and key organizations in support of Year 1 and Year 2 goals include the following:

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

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 and success of implementing a RCOOS for the SE. Responsibilities will be shared among the RCOOS manager (V. Subramanian), SECOORA's Executive Director (D. Hernandez), Business Manager (M. Lee) and two Program Managers (J. Dorton and M. Treml via contracts).

With Year 1 and Year 2 funding, SECOORA will continue to seek new members through our Web site, outreach via newsletters and direct recruitment by staff. SECOORA will also host a Board meeting in December 2012 and annual member, RCOOS PIs and stakeholder meetings in Spring 2013. SECOORA will partner with stakeholders, specifically through the engagement of the Governors' South Atlantic Alliance. As opportunity allows, joint meetings will be held to solidify the relationship between the two organizations.

SECOORA is focused on facilitating the 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. Hernandez and Subramanian will coordinate these efforts with ongoing IOOS efforts including the Cost Analysis Requirements Document, RICE Certification process, the National Inventory of Observation Assets, and the RA Gaps Analysis.

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

2. Sustain and expand a coastal and ocean observing subsystem for the Southeast (SE)

The observing subsystem provides the basis for the RCOOS by providing observations specific to the development of products. SECOORA is supporting the maintenance of existing systems deployed as part of pre-SECOORA programs, which include the operation and maintenance of offshore moored stations, coastal stations, and HFR sites. Assets in the SECOORA footprint have been purchased through a mix of state, research, and IOOS funding. Primary partners include the University of South Florida (B. Weisberg and C. Merz), Florida Institute of Oceanography (J. Virmani), University of North Carolina System (L. Leonard and H. Seim), Skidaway Institute of Oceanography (D. Savidge), University of Miami (N. Shay) and the University of South Carolina (G. Voulgaris).

Each observing asset provides near-real-time data for multiple users, enabling the development of 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.)

3. Support a multi-scale modeling subsystem

In support of user-identified modeling needs, all the modeling components funded during Year 1 are continued in Year 2. The decrease in funding for the modeling components compared to Year 1 has caused some decreases in the scope of modeling activities and the removal of a Primary PI (Kelsey, University of Maryland) from the beach/shell fish water quality advisories effort. The modeling components include the following (primary partners):

- Regional and sub-regional circulation modeling (North Carolina State University, R. He)
- Forecasting of storm surge, inundation, and coastal circulation (University of Florida, P. Sheng; North Carolina State University, L. Xie)
- Species-specific habitat models that to enhance South Atlantic Fisheries Marine Council stock assessments (ROFFS, M. Roffer; University of Miami, B. Muhling; SAFMC, R. Pugliese)
- Improved models in support of issuing beach swimming advisories (University of South Carolina, D. Porter).

4. Support the Data Management and Communication (DMAC) subsystem.

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 data and information via a web interface that supports SECOORA's thematic priorities. Primary partners include the University of South Carolina (D. Porter), University of North Carolina at Chapel Hill (H. Seim). The optimization of the SECOORA DMAC infrastructure and the reduction in funding resulted in elimination of University of South Florida (B. Weisberg) partner in Year 2. SECOORA also received a small portion of funding from IOOS in year 2 to focus on implementation of the Biological Data Services in the SE region in collaboration with South Carolina Department of Natural Resources (SCDNR).

5. Support an education and outreach subsystem.

The primary focus of the education and outreach (E&O) subsystem is to engage formal and informal education audiences and stakeholders regarding observing technologies, data, products, and services. Through this subsystem, SECOORA will transition from opportunistic stakeholder engagement to a deliberate E&O engagement program designed to increase our understanding of stakeholder needs and requirements, and showcase results from investments in product development. Note that Goals 1, 3 and 4 include outreach activities that complement and contribute to the E&O subsystem. Primary partners include Kennesaw State University (L. Adams), University of North Florida (P. Welsh), University of North Carolina System (L. Leonard), COSSEE-SE (L. Spence) and SECOORA (D. Hernandez). Due to funding limitations, objectives under this goal have been severely reduced. For Year 2, the primary focus of the E&O subsystem is to engage stakeholders regarding observing technologies, data, products, and services.

WORK COMPLETED AND ASSOCIATED RESULTS

For the current reporting period, the progress to date and associated results for each goal are as follows:

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

SECOORA provides a network and structure for engagement of regional stakeholders. We have approximately 50 members, a 23 person Board, and hold monthly Executive Committee and Board conference calls. We also held an annual Members meeting in Miami, FL May 7-9, 2012, and held a 1/2 day Board meeting and a 1/2 day PIs meeting. We continue to host monthly conference calls between PIs to ensure coordination, collaboration among PIs within each RCOOS subcomponent and among PIs across the various RCOOS subcomponents.

SECOORA coordinated with the Governors' South Atlantic Alliance (GSAA) on ocean planning funding and received a Year 1 award to develop and implement an Information Management System GSAA. The project started Jan. 1, 2012 and a kickoff meeting for team members (NCDENR, Duke, SCDHEC-OCRM, SCDNR, TNC, USC, GADNR, GA Tech, FLDEP, FWCC FWRI) in Columbia, SC on March 5-6, 2012. During this reporting period, we also developed and submitted SECOORA asset inventories and 10 Year Regional Build Out Plan to assist in the development of Independent Cost Estimate (ICE) required by ICOOS Act. SECOORA continued to actively participate in NFRA (name recently changed to IOOS Association) and IOOS Program Office activities (progress reports, meetings, conference calls and input to requests) on moving IOOS forward.

SECOORA continues to provide the fiscal and overall project management for this project. SECOORA submitted the Year 2 descope proposal to the NOAA IOOS® Program Office on March 5, 2012, received the Year 2 award, and established sub-awards. The management of sub-awards to primary partner institutions established in Year 1 and Year 2 are being continued. SECOORA has bi-monthly administration meetings to ensure efficient and effective fiscal operations.

2. Sustain and expand a coastal and ocean observing subsystem for the Southeast (SE)

Year 1 and Year 2 funds to SECOORA are sustaining existing sub-regional observing networks, established previously via federal and state grants. Specific progress and results to date include the following.

University of South Florida Coastal Ocean Monitoring and Prediction System (COMPS) four surface (now five temporarily) and two subsurface moorings, along with one near shore tower installation were maintained for real time and delayed mode observations (surface meteorology and water column currents and T/S on surface moorings, water column V and bottom T/S on subsurface moorings, and surface meteorology, water column currents and waves on the near shore tower). Support is continued for seven USF COMPS Coastal Stations that collect Physical and Meteorological data in real-time. Tide well survey (to reference water level measurements to NAVD 88 datum) was carried out for Aripeka and Big Carlos Pass Coastal stations. The real-time data collected by the moorings and coastal stations are delivered to SECOORA and NDBC, and made available via Global Telecommunication System (GTS).

University of North Carolina Wilmington (UNCW) operates and maintains six oceanographic buoys and two wave buoys in Onslow and Long Bay and one pier station in Brunswick County, NC. These stations collect and provide hourly reports of the following variables: wind velocity, barometric pressure, sea surface temperature, atmospheric temperature, solar radiation, sea level, in-water velocity, salinity, and waves. All data collected are provided to SECOORA and NDBC and made available via Global Telecommunication System (GTS).

The SEAKEYS network has been operational for over 20 years and provides a long time series of observations in the Florida Keys. Florida Institute of Oceanography held a meeting at Keys Marine Lab in November 2011 to determine the future of the SEAKEYS network. Federal, State and non-profit agencies that uses this network attended the meeting. FIO determined that is not possible to sustain the network with the limited funding the network currently receives; it will be decommissioned in December 2012. Of the 8 SEAKEYS stations, one station is reporting meteorological and oceanographic data; three stations are only reporting meteorological data; one is reporting intermittent meteorological data and the other three stations are no longer operational. The Year 1 funding vis this award concluded in May 2012. Funds allocated in Year 2 were used to close down the FIO SEAKEYS operations, transport instruments and documents, and wrap-up any outstanding costs to ensure that the program has been fully shut down. PI has submitted support letters from stakeholders as to the importance of the network that could be used for funding requests.

The University of Miami operates WERA HF-radar installations on Key Biscayne, Virginia Key and Dania Beach. These radars are estimating significant wave heights for the National Weather Service marine forecast models and provide mean radials at hourly intervals to SECOORA and the US National HF Radar network archive. The principal investigator is currently working with Broad Key Florida personnel on site identification and associated logistics to deploy an eight element WERA HF-radar system. The performance metrics of the system indicate operation for 92.5%, 86.8% and 88.2% for the period from October 2011 to November 2012 for Key Biscayne, Virginia Key and Dania Beach, respectively.

The University of North Carolina Chapel Hill operates two CODAR-radar installations on the Outer Banks of North Carolina. System performance and data delivery from the sites have been excellent for this reporting period. The systems were fully operational for the duration of Hurricane Sandy, with only a two day communication outage for the Buxton Radar which relied on generator power. Hourly data from the systems are delivered to SECOORA and US National HF Radar network archive. The performance metrics of the system indicate operation for 95.4% and 84.5% for the period from October 2011 through November 2012 for the Duck, NC and Cape Hatteras, NC stations, respectively.

Skidaway Institute of Oceanography (SkIO) continued to operate two WERA HF-radars on St. Catherine's Island and Jekyll Island GA for this reporting period. The data are being continuously provided to SECOORA and the US National HFR Network archive in near-real time. Estimates of wave and wind parameters are also made, as experimental products. The performance metrics of the system indicate operation for 92.3% and 93.9% for the period from October 2011 through November 2012 for the St.Catherine's, GA and Jekyll Island, GA stations, respectively.

The University of South Carolina is currently operating two WERA HF radar stations on Georgetown, SC (south part of Long Bay – relocated from Pritchards Island, SC) and Fort Caswell, NC. The Fort Caswell station was established with funding from a NSF project. In Year 2, the Fort Caswell, NC HF radar site was identified as one of the priority radars for the SE. USC will maintain these two stations with the funding from SECOORA. USC focused its efforts during most of this reporting period on maintaining and fine tuning the two systems for their continuous, reliable operation. Since June 2012, both stations have been in operation continuously and provide half-hourly surface current maps and estimates of significant waves heights, on an experimental basis, via the PI's and the SECOORA web sites . The performance metrics of the system indicate operation for 94.3% and 96.7% for the period from March 2012 to November 2012 for the Fort Caswell, NC and Georgetown, SC stations, respectively. The data from each station are provided in near real-time to SECOORA and US National HF Radar network.

The College of Marine Science (CMS), University of South Florida (USF) continues to operate five HF-radar systems on the West Florida Shelf (WFS). These HF Radar systems consist of three CODAR long range SeaSonde systems, with units at Redington Shores, Venice, and Naples, FL, and two WERA systems, with units installed in Ft De Soto Park near Tierra Verde, FL and Venice, FL. Performance evaluation is currently underway between CODAR/WERA/Offshore buoy measured velocity data with report in preparation. Preliminary results show that WERA has at least about the same accuracy as the CODAR in measuring the surface currents. Preliminary comparison of WERA and wave model derived significant wave heights was performed for a period of two months, and more detailed comparison is in progress. USF CMS hosted the NOAA/IOOS HF Radar ROWG#6 meeting from November 13-15, 2012. The data from the stations are provided in near real-time to SECOORA and US National HF Radar network maintained by the Scripps Institution. The performance metrics of the CODAR systems indicate operation for 97.0%, 99.5% and 95.0%, for the period from October 2011 to November 2012 for the Reddington Shore, Venice and Naples, respectively. The performance metrics of the WERA systems indicate operation for 94.4% and 96.0% for the period from October 2011 to November 2012 for the Fort DeSoto and Venice, respectively.

3. Support a multi-scale modeling subsystem

The North Carolina State University-enhanced South Atlantic Bight Gulf of Mexico (SABGOM) model is being run on a 24/7-basis, providing 3-D regional ocean predictions. The model output (temperature, salinity and currents) is made available via SECOORA web site. Data Assimilation (DA) schemes are currently being tested within the SABGOM modeling system. The DA scheme once fully implemented, will be able to assimilate observations

including satellite sea surface temperature, sea surface height, HF Radar surface currents, and glider observed hydrography to improve SECOORA regional ocean circulation predictions. The NCSU SABGOM modeling team is currently working with the SECOORA data management team to standardize model output and data products via the establishment of THREDDS server and SECOORA interactive map display.

The North Carolina State University Coastal Marine Environment Prediction System (CMEPS) has completed storm surge inundation forecast system for Florida southeast domain, Georgia South Carolina domain (GASC) and South Carolina North Carolina domain (SCNC). The Coastal Marine and Atmospheric Environment Prediction System (CMAEPS), running on NCSU computing cluster environment performs a 3-day forecast daily with the system being initialized at 00 UTC. Near real-time forecasts from NCEP 0.5 degree Global Forecast System (GFS) data from NOAA National Operational Model Archive & Distribution System (NOMADS) are used to drive the atmospheric model by providing initial and lower boundary conditions and 6-hourly updated lateral boundary conditions. Atmospheric forcings such as surface winds from the atmospheric model then drive the surface wave model and the storm surge model. Tidal boundary conditions are specified according to the ADCIRC tidal database.

The University of Florida has established a storm surge inundation forecasting system for east coast of Florida (ECF) and south west Florida (SWF). Work is in progress to extend and establish the forecasting system to southeast Florida (SEF) and northern Gulf of Mexico (NGOM). The forecasting systems will use HF Radar data (supported by SECOORA) on the east Florida coast near Miami to validate the SEF model domain simulations. Model output consists of water surface elevation and velocities. Snapshots of output variables over the entire model domain are generated every 6 hours. Currently, work is in progress to standardize NCSU and UF model outputs and data products via the establishment of THREDDS server and SECOORA interactive map display.

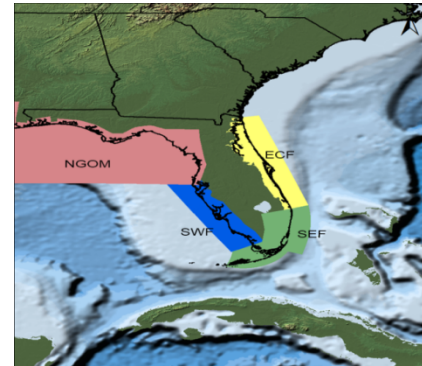


Fig 1: UF Florida Modeling Domains

University of South Carolina and University of Maryland continued to support the enhancement of the pre-emptive decision support tool for issuance of beach swimming advisories by South Carolina Department of Health and Environmental Control (SCDHEC). The CART and Linear Regression Models were enhanced and the automated system runs once a day at 6:00am or upon user request and consists of two main parts: 1) Data retrieval - The prediction system uses observational data from the SECOORA near real-time database, NEXRAD precipitation data downloaded and processed from the Southeast River Forecast Center and NOS Tide Data downloaded and processed from the NOS website, and; 2) Product output – An email of the test results and map output is made available to SCDHEC users via [SECOORA web site](#). The web and Mobile Phone application design and development have been completed. The applications are under evaluation and will be integrated into SECOORA web site during the next reporting period.

Roffer's Ocean Fishing Forecasting Service, Inc (ROFFS Inc.), University of Miami Cooperative Institute for Marine and Atmospheric Studies (CIMAS) and South Atlantic Fisheries Management Council (SAFMC) are developing data products derived from satellite and in situ observations for fisheries stock assessment. The project team acquired fisheries data from South Carolina Department of Natural Resources (SCDNR) Marine Resources Monitoring, Assessment, & Prediction (MARMAP) program. After receiving and reviewing the data, the efforts were focused on four ecologically and economically important species: grey triggerfish (*Balistes caprisucus*), black seabass (*Centropristis striata*), red porgy (*Pagrus pagrus*), and vermillion snapper (*Rhomboplites aurorubens*) over the 1990-2008 period. These were derived from the MARMAP fishery independent research cruises instead of the SEAMAP cruises. Working habitat models for these species were derived based on location, depth, water temperature and salinity using neural networks classification modeling. The models were evaluated using the catch during the June – August, 2008 fish trap sampling season as shown in Figure 2. This marks significant progress for the project as it demonstrates that the derived habitat model provides realistic results in that the fish were mostly caught in the high probability of occurrence areas.

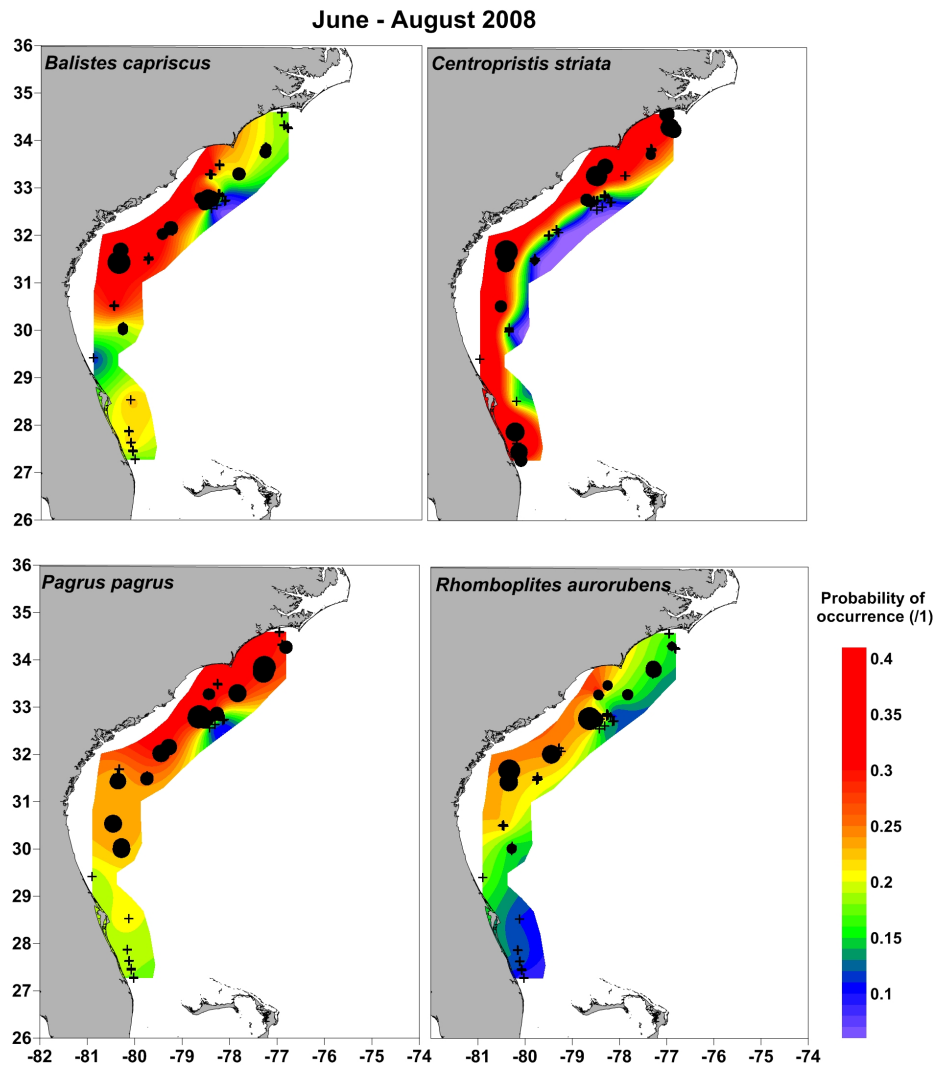


Figure 2: Comparison of the derived working habitat models based on 18 years (1990-2008) of catch and environmental data and actual catch from MARMAP fish trap surveys from grey triggerfish (*Balistes capriscus*), black seabass (*Centropristis striata*), red porgy (*Pagrus pagrus*), and vermilion snapper (*Rhomboplites aurorubens*) over the 1990-2008 period. These were derived from the MARMAP fishery independent fish trap surveys. The probability of occurrence was derived from neural network modeling with v-fold cross validation. Large dots indicate catch locations and the “+” symbol indicates where fish were not caught.

4. Support the Data Management and Communication (DMAC) subsystem

University of South Carolina, Columbia, SC and University of North Carolina, Chapel Hill, NC are the primary partners of SECOORA DMAC activities and the details of on-going data management activities are described in this section.

The SECOORA DMAC has established [THREDDS](#) and [ERRDAP](#) servers to enhance data dissemination. SECOORA DMAC conducted conference calls with the SECOORA subsystem PIs and modelers within the SE region to demonstrate the established server capabilities. The observations (in-situ, HF Radar and satellite) and model data (circulation, atmospheric, storm surge and run by SECOORA region modelers) will be made available via the SECOORA [interactive map display web site](#). SECOORA DMAC has also enhanced its data and interactive

maps portal. The enhancements include hurricane track display, glider mission tracks display and incorporating SECOORA PIs suggestions/ideas and needs.

SECOORA DMAC is working with IOOS RA DMAC on Sensor Observation Service (SOS) reference implementation. IOOS SOS service 52 North Schema was reviewed for possible use for SECOORA data delivery. After review, SECOORA decided to continue adapting OOSTethys Sensor Observation Service. The SOS service validate and comparison script/wiki documentation are available at <http://code.google.com/p/foostech/wiki/SOSTesting>. SECOORA also participated in the annual IOOS RA DMAC planning meeting and led the session on defining roles and responsibilities of RA DMAC within Federal backbone at the meeting held in September 2012.

The SECOORA Governors South Atlantic Alliance (GSAA) Regional Information Management System project is underway. SECOORA DMAC efforts are supporting ESRI catalog 'geoportal' installation and review for use within the project, and an ArcGIS server was installed for GIS infrastructure needs. [GSAA IMS Portal](#) has been established.

SECOORA DMAC together with NERRS CDMO participated in drafting the Manual for Real-Time Quality Control of Dissolved Oxygen. Work also involved soliciting comments from the membership, compiling and submitting input to IOOS Program Office and NDBC.

NWS Marine Weather Portal product was integrated into [SECOORA web site](#) during this reporting period. The Marine Web Portal provides marine observations, forecasts and short and long-fuse warnings for the coastal waters of North Carolina, South Carolina and northern Georgia and the Atlantic and Gulf Coast areas of the southern region. Currently, region-specific information on marine and coastal conditions is collected by, stored and disseminated from a wide range of government and academic institutions and includes a variety of information types and protocols. This product helps meet the need for improved, coordinated delivery of relevant information to a broad user community. SECOORA continues to partner with local NOAA NWS Weather Forecast Offices (WFOs), since the public already relies on these offices for marine observations and forecast needs.

SECOORA worked on a collaboration project with the Northwest Association of Networked Ocean Observing System (NANOOS), the IOOS Program Office, Eye on Earth, and ESRI. The outcome was an IOOS web map application that combines the latest water temperature, salinity, and water levels from the NANOOS and SECOORA Regional Associations. The web map integrates U.S. IOOS data and the Eye on Earth Network.

US IOOS Program Office, SECOORA and GCOOS-RA organized and hosted the first workshop of the IOOS Biological Observations Data project June 25 - 26, 2012 at Florida Fish and Wildlife Commission/Fish and Wildlife Research Institute (FWC/FWRI) in St. Petersburg, FL. Attendees included subject matter experts, data managers, data providers and customers from NOAA National Coastal Data Development Center (NCDDC), FWC/FWRI, University of South Florida College of Marine Science, Duke University Nicholas School of the Environment, USGS Ocean Biogeographic Information System USA, South Carolina Department of Natural Resources (SCDNR), NOAA Southeast Fisheries Science Center (SEFSC) Galveston Lab and South Atlantic Fishery Management Council (SAFMC). Data providers (SCDNR Marine Resources Monitoring, Assessment and Prediction (MARMAP) and SEFSC Galveston Lab Comparative Analysis of Gulf Estuarine EcoSystems (CAGES)) and data users (USF, FWC/FWRI and SECOORA) presented their requirements at the workshop. Participants reviewed the project goals/objectives and developed an implementation plan to move forward. SECOORA is working with SCDNR and OBIS USA to deliver MARMAP fisheries independent data via ERRDAP server.

SECOORA DMAC participated in a NOAA Coastal Service Center sponsored Regional Data Management and Portal Development Workshop June 27-28 in Charleston, SC. At this meeting, twenty-six participants including CMSP regional data managers, nongovernmental organizations, IOOS regional associations, and federal agencies came together to develop a strategy to link national and regional information management approaches in the ocean and coastal planning community; to identify common standards and procedures to be adopted by regional ocean governance groups; and to establish a practitioner's network of data and tool developers and contributors to ocean.data.gov and the larger network of data portals.

SECOORA DMAC has been working on upgrading and completing the SECOORA asset inventory application. The inventory application will have a versatile inventory interface, platform manager editing and display capabilities of SECOORA region coastal ocean observing assets. The workflows and inventory application documentation will be made available once the application is integrated and rolled out live via SECOORA web site.

SECOORA DMAC completed an update to SECOORA Parameter Vocabulary and transitioned it to IOOS Parameter Vocabulary. This vocabulary, now expanded to nearly 200 terms, improves the accessibility and understanding of data and observations of winds, tides, currents, water quality, and chemistry of our coastal waters and oceans. The [SECOORA Vocabulary](#) and the [IOOS Parameter Vocabulary](#) are both registered with Marine Metadata Initiative's Ontology Registry and Repository.

5. Support an education and outreach subsystem

On April 25, 2012, the Masters of Arts in Teaching (MAT) for pre-service teachers at Kennesaw State University met at the Chattahoochee River in Roswell, GA to take part in the aquatic observatory module that the PI developed. The students were able to aid in the deployment of the Basic Observation Buoy (BOB) and as a group collect data from the Chattahoochee River. The pre-service teachers learned about the importance of ocean observing and SECOORA's observing systems. KSU continued to maintain the Hilton Head BOB Monitoring Station at Jarvis Creek, located at the Coastal Discovery Museum in Hilton Head Island.

UNCW, in conjunction with the Monterey Bay Aquarium Research Institute, KSU and SECOORA, hosted the EARTH educator's workshop from July 8-July 13, 2012 on the UNCW campus. Twenty-five participants, representing 12 states, attended the workshop. The focus of the 2012 workshop was on ocean observatories and the theme was "Real Time Science". SECOORA PIs made presentations on their observing, data management, education and outreach, and research activities. Carolinas RCOOS oceanographic field technicians provided hands-on demonstrations of oceanographic instruments that are used for research cruises as well as on moorings (e.g. CTD, WeatherPak, YSI). EARTH 2012 workshop materials are available at <http://www.mbari.org/earth/>. UNCW teamed with USC HF Radar PI and education staff at North Carolina Baptist Assembly and developed education and outreach materials for HF Radar systems and continue to maintain the [web portal](#) for the SECOORA Basic Observation Buoy effort. UNCW was also engaged in teaching students to design, construct and deploy Basic Observation Buoy.

COSEE SE and University of Georgia Marine Extension Service have piloted the elementary basic observation buoy (eBOB) project in five schools: two Charleston County schools, Mitchell Elementary School and Murray LaSaine Elementary School, both currently involved with the COSEE SE's South Carolina Amazing Coast elementary project; two Savannah schools, St Andrews School and independent school; and two Athens-Clarke County schools, Whit Davis Elementary and Fowler Drive Elementary. Over 100 elementary students have constructed 22 buoys with at least 15 teachers observing and being engaged.

SECOORA is engaged in networking and outreach activities such as distribution of monthly e-news letter, developing success stories articles and other outreach materials, and displaying regional coastal ocean observing projects and observing capabilities at Oceans Sciences and Marine Technology society and other relevant conferences. The staff and SECOORA PIs are also actively engaged in reaching out to stakeholders such as National Weather Service Weather Forecasting Offices (WFOs), Emergency Managers and United States Coast Guard (USCG) on developing products and services that will be utilized in emergency response situations.

Note: In Year 2 (June 2012 – May 2013), no funding was provided to the Year 1 Education and Outreach subsystem PIs.

IMPACT AND APPLICATIONS and TRANSITIONS

The coastal and ocean data monitoring and associated models and decision-support tools supported by SECOORA are all being collected/developed to address specific user-described needs relevant to all four of the NOPP evaluation factors. Monitoring data are used by federal, state, private and local agencies for a wide range of applications including weather forecasting, water quality predictions, and search and rescue. Developed models are

being used by federal and state agencies to support coastal evacuation orders, issuance of beach swimming advisories, storm surge inundation and rip tide advisories, and fisheries management. SECOORA has partnered with private industry to support the development of commercial products related to commercial and recreational fishing. Outreach and education efforts are being transitioned to K-12 and college/university programs. During this reporting period, several undergraduate students from Georgia Tech University utilized HF Radar data during summer internship projects at SKIO. A Graduate student from Georgia Tech University used the HF Radar data collected by SKIO stations to assist in the development of automated glider control algorithms. A visiting student from University of Utrecht, Netherlands developed an instability model of the shelf edge eddies detected in radar data along the Georgia coastline, using radar data to define important model parameters.

RELATED PROJECTS

SECOORA and its partners received funding from a NOAA Regional Ocean Partnership grant through the Governors' South Atlantic Alliance (Alliance). The team is building a prototype regional information management system to support coastal and marine planning and other information management needs of the Alliance. Project team members include state managers who have identified current state and regional data sets and planning tools, and are assessing products and tools against decision making needs. A multi-state and regional, information management portal is in development; and, will provide access to spatial decision support tools for addressing priority multi-scale, multi-sectoral coastal and ocean planning needs. Partners include: Duke University, NC Department of Environment and Natural Resources, SC Department of Health & Environmental Control Office of Ocean and Coastal Resource Management, South Carolina Department of Natural Resources, The Nature Conservancy, GA Department of Natural Resources, Georgia Institute of Technology, and FL Department of Environmental Protection (DEP), and University of South Carolina. The goals of this project include the development of an information portal for the southeastern U.S. through: (1) Development of relevant decision-support tools based on South Atlantic Alliance Action Plan priorities in multi-use ocean planning and hazards planning and (2) distribution of regionally compatible and relevant spatial data and information to support multi-scale coastal and ocean management decision-making.

PUBLICATIONS AND PRESENTATIONS

- Liu, Y., A. MacFadyen, Z.-G. Ji, and R.H. Weisberg (Editors), (2011), [Monitoring and Modeling the Deepwater Horizon Oil Spill: A Record-Breaking Enterprise](#), Geophysical Monograph Series, Vol. 195, 271 PP., ISSN: 0065-8448, ISBN 978-0-87590-485-6. AGU/geopress, Washington D.C.
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- Archer, M., A. B. Parks, L. K. Shay, and J. Martinez-Pedraja, Resolving oceanic eddy variability in HF radar derived surface currents using Okubo-Weiss. *2012 Ocean Sciences Meeting*, Salt Lake City, Utah (Abstract) (Awarded one of the Best Ocean Science Student Papers)
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- Xie, L., H. Liu, B. Liu, and S. Bao, 2011: A numerical study of the effect of hurricane wind asymmetry on storm surge and inundation. *Ocean Modelling*, **36**, 71-79.
- Xie, Lian, Bin Liu, and Huiqing Liu, The Coastal Atmosphere Marine Environment Prediction System, 2012 SECOORA Annual Meeting, May 7-10, 2012, Miami, FL.
- Xie, L. and B. Liu, 2012: Improving tropical cyclone track-intensity-size forecasts using Scale Selective Data Assimilation, Seventh International Conference on Tropical Cyclones, October 30-November 2, 2012, Zhoushan, China.
- Li, R., L. Xie, and C. Guan, 2012: Influence of domain size on storm surge simulation, Seventh International Conference on Tropical Cyclones, October 30-November 2, 2012, Zhoushan, China.
- Rob Ragsdale, Eric Vowinkel, Dwayne Porter, Pixie Hamilton, Ru Morrison, Josh Kohut, Bob Connel, R. Heath Kelsey, and Phil Trowbridge. 2011. Successful integration efforts in water quality from the integrated ocean observing system regional associations and the national water quality monitoring network. *Marine Technology Society Journal* 45(1): 19-28.
- Adams, L., Levin, R. D., Spence. L. 2012. Students Monitoring Coastal and Inland Waters With the Basic Observation Buoy (Bob) *Marine Technology Journal* Vol. 46 (Number 2) 56-64
- Debra Hernandez, Vembu Subramanian, Megan Lee: Regional Coastal Ocean Observing System (RCOOS) for the Southeast Region of the US. Poster presented at the Oceans 2012 Conference, Salt Lake City, UT, Feb 2012.
- Debra Hernandez, Josie Quintrell, Vembu Subramanian, Rick DeVoe: Mapping the Future of Coastal and Ocean Observing in the Southeast. Presentation at The Coastal Society Meeting, Miami, FL, June 4, 2012.
- Haines, S., V. Subramanian, E. Mayorga, D. Snowden, R. Ragsdale, C. Rueda and M. Howard. IOOS

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Martinez-Pedraja, J., L. K. Shay, B. K. Haus, and C. Whelan, 2012: Interoperability between CODAR and WERA high frequency radar surface current signals in the Florida Current. J. Atmos. and Oceanogr. Tech., (to be submitted).

OUTREACH MATERIALS

USF Robert Weisberg

Written and oral testimony before the US House of Representatives, Committee on Transportation and Infrastructure, Washington DC, December 7th 2011, as pertaining to H.R. 3096, the Restore Act.
Weisberg, R.H. (2012). Cuba oil spill, the scenarios. Invited op-ed piece in the St. Petersburg Times 2/5/12
Invited lecture at WFCAMS annual banquet at Tampa Yacht Club on 4/4/12
Invited lecture at Useppa Is. Museum, Useppa, FL on 5/2/12
Invited lecture to Springs/Nature Coast community group on 5/16/12.
Invited lecture to UNESCO student group on 5/24/12
Invited Lecture on WFS Modeling to FIO-USCG on Oil Spill tracking, 10/23/2012

UNCW Lynn Leonard

UNCW developed outreach materials for HF Radar (Poster and Flyers)

ROFFS Inc. Mitch Roffer

Invited Lecture Gainesville (FL) Offshore Sport Fishing Club on 10/23/2012
Invited Lecture SPIE Remote Sensing & Security+Defense Conference. Sept. 24-27, 2012.

USC George Voulgaris

Invited Lecture and HF Radar site visit at Management of DeBordieu Colony Community Association, 10/26/2012
Invited Lecture on the use of HF Radars in the NC Beach, Inlet and Waterway Association Annual 2012 Annual meeting

UM Nick Shay

How real-time data and models help forecast oil spills and hurricanes, Monty's Raw Bar, 2550 South Bayshore Dr., Coconut Grove, FL, 10/24/2012

UF Peter Sheng

Invited Lecture on Storm surge modeling to FIO-USCG on Oil Spill tracking, 10/23/2012

Numerous outreach materials have been developed for specific audiences and are available at www.secoora.org.