

**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

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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 other 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

During this reporting period, SECOORA received the funding allocation for Year 3 and submitted the revised [scope of work](#) (June 1, 2013 – May 31, 2014). After the contractual review and account establishment for the Year 3 award, agreements for SECOORA subawards were disbursed to partner institutions. The administration of the Year 2 award and subawards are being continued by SECOORA. Support to maintain NOAA's Ocean Acidification Gray's Reef National Marine Sanctuary buoy was added to the Year 3 Scope of Work. We have also added the following new tasks in Year 3 that further address the integration of our existing on-going projects and user needs: (1) assessing validity of accurate wave estimates from High Frequency Radars; (2) model skill assessment; (3) enhance and develop new data products, and (4) website enhancement. This report details the progress and accomplishments over the reporting period.

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

Milestones: The following provides a milestones update for this goal and additional details are described in the table that follows.

- A. Provide timely grant reports to NOAA:** Submitted 2013 NOPP annual report and IOOS Semi-annual report with December 2013 annual supplemental information as required during this reporting period.
- B. Hold Board Meeting Fall 2013 and Member Meeting 2014:** Held Fall 2013 Board meeting in Charleston, SC (Dec. 4-5, 2013). Planning for Spring 2014 (Savannah, GA, May 13-15, 2014) Annual Member meeting is underway.
- C. Publish e-newsletters and other outreach material:** Compiled and sent relevant news and distributed it via e-newsletters. We also posted event-based news (hurricane, red tide, [Glider Palooza 2013](#) etc.) and outreach materials on the "Latest News" section of our [website](#).
- D. Coordinate with neighboring RAs:** We continue to work closely with the neighboring Regional Associations and state and federal government agencies to ensure that messages, products, and projects are coordinated and resources are leveraged.
- E. SECOORA website updates focused on data portal expansion, and PI project news:** Ongoing.
- F. Refine and maintain RCOOS Conceptual Operations Plan:** Ongoing.
- G. Support local, regional, and national collaboration:** The following is a list of collaboration efforts, which include SECOORA, and partners: Glider Palooza 2013; Eye On Earth – NANOOS and IOOS; GSAA Ocean and Coast Portal – SE states, TNC, Duke, USC, EcoTrust and NOAA; IOOS Vocabulary, IOOS Catalog, IOOS DMAC, RA Certification rules, Common Products Initiative, Marine Technology Industry Study and IOOS Education and Outreach efforts - IOOS, IOOS Association and all other RAs; Beach Forecast Model and Swimming Advisories – NERACOOS; HF Radar Steering team and Modeling Strategy; IOOS Advisory Committee; Sensor FFO LOI effort – GCOOS-RA and CariCOOS. Additionally, SECOORA continues to actively participate in IOOS Association and IOOS Program Office activities (progress reports, committees, meetings, conference calls and input to requests).
- H. Evaluate mechanisms to track operational statistics, product usage, and outcome measures and metrics:** Continue to track website usage with Google Analytics (GA). We periodically review the [GA metrics](#) to understand the end users and time spent on sections of the web site to implement improvements to the website. SECOORA DMAC technical personnel have

implemented alert services to track the data flow from data providers (observations and modeling subsystems).

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 Governor’s South Atlantic Alliance (GSAA). • Ensure SECOORA’s plans and gaps analysis align with IOOS Association and IOOS office guidance and/or requirements. • Refine and maintain RCOOS Conceptual Operations Plan. • Develop materials for RA Certification. 	<p>Staff fiscal activities:</p> <ul style="list-style-type: none"> • Provided fiscal and overall project management for IOOS awards, and continued to manage primary partner institutions subawards. • Held bi-monthly administration meetings to ensure efficient and effective fiscal operations. • A part time bookkeeper (Chiaki Kight) and business manager (Megan Lee) continue to manage the contracts and financials for these awards. • The FY13 SECOORA A-133 audit was conducted by the firm Elliott Davis, LLC and was finalized on September 23, 2013. There were no negative findings. <p>SECOORA Board and PI Coordination</p> <ul style="list-style-type: none"> • Continued to hold monthly conference calls with RCOOS PIs to ensure in-reach, coordination and collaboration within each RCOOS subcomponent and among PIs. Also held DMAC activities coordination calls. • Held monthly Executive Committee conference calls. The Finance and Audit Committee met twice during this reporting period. SECOORA held occasional board calls as needed. • Held Fall 2013 Board meeting in Charleston, SC, December 4 – 5, 2013 <p>External Coordination Activities:</p> <ul style="list-style-type: none"> • The GSAA Regional Information Management System (RIMS) project team deployed the new GSAA Portal: http://gsaaportal.org. • Throughout the summer of 2013, project team members met with State Agency representatives (e.g. FL DEP, SCDNR) to provide a project overview, hands on training, and discuss future data integration and visualization opportunities. • Debra Hernandez attended the GSAA Annual meeting held in Raleigh, NC (Sept. 4-6, 2013). • Executive Director continued to participate in monthly “Partner Arm” calls of the GSAA. • Debra Hernandez attended the MARACOOS Annual Meeting in Baltimore, MD (Oct. 2013). • Participated in monthly IOOS Association and IOOS conference calls, including Executive Director participation on the IOOS Association Executive Committee, and attended the IOOS Association/IOOS Annual meeting. • Debra Hernandez presented a talk on SECOORA's Regional Coastal Ocean Observing System: Providing critical marine weather data and information products for weather forecasters and the marine community at the 38th National Weather Association Annual Meeting, Charleston, SC, 12 – 17, October 2013. • A poster titled “Southeast Coastal Ocean Observing Regional Association Data Management System: Fostering data access and visualization of coastal observations in the Southeast US” was displayed at the Coastal and Estuarine Research Federation (CERF) 2013 Conference held in San Diego, CA, November 3-7, 2013. • SECOORA shared an exhibit booth with GCOOS-RA at the Science Festival in St. Petersburg, FL on October 18, 2013. • Vembu Subramanian represented SECOORA/IOOS at the EarthCube real-time data workshop at Boulder, CO (June 17-19, 2013). • Vembu Subramanian attended the EarthCube End-User workshop for Ocean Ecosystem Dynamics workshop held from Oct. 7-8, 2013 at Woods Hole, MA. • Our Global Estuary workshop: Vembu served on the Steering Team for the FAU

SECOORA Activities	Progress
	<p>organized initiative. The workshop was held at FAU HBOI from October 21-23, 2013. Debra also participated, and moderated a session. Gerhard Kuska (MARACOOS), Jan Newton (NANOOS), other SECOORA members and IOOS partners attended. For more information: http://wordpress.fau.edu/oge/</p> <ul style="list-style-type: none"> • Vembu represented SECOORA at the Gulf of Mexico Alliance All Hands meeting held in Tampa, FL (June 25 – 27, 2013). • Vembu represented SECOORA at the 2013 Clean Gulf Conference held in Tampa, FL (Nov 12-14, 2013). <p>Efforts to Leverage IOOS Funding:</p> <ul style="list-style-type: none"> • Continued partnership with GSAA.

Goal 2: Sustain an Observing Subsystem for the SE

Milestones: The following provides milestones updates for the observing subsystem goal and additional details are described in the table that follows.

- A. Operate and maintain moored and coastal stations:** COMPS and Carolina RCOOS assets are maintained.
- B. Report moored and coastal stations data to secoora.org and NDBC:** Ongoing.
- C. Operate and Maintain Priority Radars**
 - i. **Hourly surface current maps from the various subregions via individual and SECOORA web sites:** Ongoing.
 - ii. **Estimates of significant wave heights from the HF radar data:** Estimates of significant wave heights from the HF radar data are provided on an experimental basis by WERA HF Radar operators within the region.
 - iii. **Develop/report performance metrics of CODARs and WERAs throughout the SE including accuracy estimates of the surface currents:** HF Radar operators in our region use the National HFR site to report the site performance metrics. The work on accuracy estimates of the surface currents work is being continued.
 - iv. **Provide the radial currents to the National Servers (SIO/Rutgers) for the National HF radar network:** Ongoing.
- D. Maintain the sensors on Gray’s Reef National Marine Sanctuary (GRNMS) Buoy 41008:** New activity started in Year 3. Scott Noakes, University of Georgia (UGA) is funded to maintain the Ocean Acidification sensors on the NOAA’s GRNMS buoy.
- E. HF Radar Waves Project:** Developed the contract solicitation and distributed to ocean observing community via SECOORA newsletter and website etc. Received four proposals towards the solicitation. Assembled peer reviewers, developed review criteria, and the review of the proposals were completed. The University of Miami proposal received the highest ranking by the reviewers, and we are currently finalizing the statement of work and establishing the contract.
- F. Asset inventory and provide performance metrics activities update:** SECOORA [Asset inventory](#) upgrade work (state based search capability) was completed and integrated into the website. HF Radar operators use the National HF Radar network to provide their site uptime performance metrics, which are summarized for each radar station in the table below. In-situ operators currently use their in-house performance metrics to report their uptime metrics.

Institution/Activities	Progress
Sustain an Observing System for the SE: Sustain Moored and Coastal Stations; Maintain Priority Radars	
University of South Florida (Weisberg) Support COMPS moorings	Support is continued for three surface moorings (C10, C12 and C13), two subsurface moorings (C11 and C15) and one offshore tower. USF has started deploying our new data loggers/telemetry, which should lead to much improved data returns from moorings. Data acquired from the moorings are sent to SECOORA and NDBC.
University of South Florida (Merz) Support in-shore tidal meteorological stations	Support is provided to maintain five USF COMPS Coastal Stations. Spares purchase and periodic site maintenance visits were carried out during this reporting period. Work is being carried out to consolidate Egmont Key and Anna Maria stations into a single station. All coastal stations are reporting data to SECOORA and NDBC and are made available via Global Telecommunication System (GTS).
University of North Carolina - Wilmington (Leonard)- Support Carolina RCOOS network	University of North Carolina Wilmington (UNCW) continued to operate and maintain 6 oceanographic buoys and 2 wave buoys in Onslow and Long Bay and one pier station in Brunswick County, NC. All data collected are provided to SECOORA and NDBC and made available via Global Telecommunication System (GTS).
University of Georgia (Noakes) – Support to NOAA’ Ocean Acidification Program NDBC Gray’s Reef National Marine Sanctuary (GRNMS) buoy	SECOORA received funds in Year 3 to provide support to NOAA’s Ocean Acidification Program NDBC Gray’s Reef National Marine Sanctuary (GRNMS) buoy (41008) maintained by University of Georgia. The GRNMS buoy is a part of international efforts to quantify the effects of ocean acidification on the world’s oceans. The sensors include pCO ₂ , pH, dissolved oxygen (DO), salinity and water temperature. To date, seven years of mostly continuous monitoring data have been collected at Gray’s Reef National Marine Sanctuary (GRNMS). Seasonal fluctuations in seawater and atmospheric pCO ₂ are apparent throughout the time series. Elevated seawater pCO ₂ concentrations and decreased atmospheric pCO ₂ are present during the summer months. In winter months, just the opposite occurs as seawater pCO ₂ is lower and atmospheric pCO ₂ is higher. However, aside from the seasonal cyclical pattern, there is an overall upward trend in both seawater and atmospheric pCO ₂ . Seawater pCO ₂ has increased 63 uatm over the time series resulting in an average of 2.4% increase per year. The atmospheric pCO ₂ has increased by 20 uatm over the time series resulting in an average of 0.789% increase per year. The annual atmospheric pCO ₂ increase at GRNMS is in line with that measured at the Mauna Loa Observatory in Hawaii, however the annual seawater pCO ₂ increase was higher than expected. The overall trend for seawater temperature at GRNMS has been neutral to slightly positive. Higher summer water temperatures have been offset by lower winter temperatures. As expected, the pH decreased with the increase in seawater pCO ₂ . Data from these sensors are sent to the SECOORA data portal, NDBC and National Ocean Acidification data portal maintained by the NOAA Pacific Environmental Marine Laboratory (PMEL) and archived at the National Oceanographic Data Center.
Maintain High Frequency Radar Operations	
University of South FL (Weisberg, Merz) Support three CODAR and two WERA radar arrays on the West Florida Shelf	The College of Marine Science (CMS), University of South Florida (USF) currently operates, maintains and delivers data from three CODAR priority radar sites (Naples, Venice and Reddington Shores). Acquisition of CODAR equipment spares for installing the fourth site is in progress. USF maintains the two co-located WERA stations and assessment of CODAR and WERA HF Radars in mapping currents were performed. The data from the stations are provided in near real-time to SECOORA and the US National HF Radar network maintained by the Scripps Institution. The performance metrics of the CODAR systems indicate operation for 97.6%, 90.8%

Institution/Activities	Progress
Sustain an Observing System for the SE: Sustain Moored and Coastal Stations; Maintain Priority Radars	
	and 91.7%, for the period October 2012 to November 2013 for the Reddington Shore, Venice and Naples, respectively. The performance metrics of the WERA systems indicate operation for 92.6% and 95.9% for the period October 2012 to November 2013 for the Fort DeSoto and Venice, respectively.
Skidaway Institute of Oceanography (SkIO) (Savidge) Support two WERA radar arrays on St. Catherine's and Jekyll Island, GA	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. SKIO has established improved QA/QC for their archived data and plans to implement these QA/QC practices for the near real-time data. The performance metrics of the system indicate operation for 98.2% and 97.1% for the period October 2012 through November 2013 for the St.Catherine's, GA and Jekyll Island, GA stations, respectively.
University of Miami (Shay) Support three WERA radar arrays at Crandon, Virginia Key and Dania Beach	The University of Miami operates WERA HF-radar installations on Key Biscayne (Crandon), 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 70.4%, 85.8% and 70.5% for the period October 2012 to November 2013 for Key Biscayne, Virginia Key and Dania Beach, respectively. During the summer of 2013, University of Miami radar systems suffered a setback due to severed cable by Park and Recreation maintenance crew.
University of NC - Chapel Hill (Seim) Support two CODAR radar arrays on the Outer Banks of NC	The University of North Carolina Chapel Hill operates two CODAR-radar installations on the Outer Banks of North Carolina. Hourly data from the systems are delivered to SECOORA and the US National HF Radar network archive. Work is being carried out to extract Gulf Stream position information, and the CODAR software was upgraded to a new version (SS7). The performance metrics of the system indicate operation for 98.5% and 95.1% for the period October 2012 through November 2013 for the Duck, NC and Cape Hatteras, NC stations, respectively.
University of South Carolina (Voulgaris) Support two WERA arrays on Fort Caswell, NC and Georgetown, SC	The University of South Carolina currently maintains, operates and delivers data from two priority radar sites (Fort Caswell and Georgetown) covering Long Bay, SC. The sites provide half-hourly surface current maps via the PI's and the SECOORA websites and estimates of significant waves heights on an experimental basis. The performance metrics of the system indicate operation for 95.9% and 97.5% for the period October 2012 to November 2013 for the Fort Caswell, NC and Georgetown, SC stations, respectively. The data from each station are provided in near real-time to SECOORA and the US National HF Radar network.

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

Milestones: The following provides a milestones update for the modeling subsystem goals and additional details are described under each institution's activities.

A. Support and enhance SABGOM model

B. Provide real-time forecasting of inundation and storm surge

C. Develop data products derived from satellite and in situ observations for fisheries stock assessment

D. Improve Beach/Shellfish Water Quality Advisories

Institution/Activities	Progress
<p>North Carolina State University (He) Support and enhance SABGOM model</p>	<p>The North Carolina State University-enhanced South Atlantic Bight Gulf of Mexico (SABGOM) model continues to run on a 24/7-basis, providing 3-D regional ocean predictions. The model provides daily 84 hour nowcast/forecast, and model output (temperature, salinity and currents) is made available via the SECOORA website and the NCSU PI's website. The NCSU SABGOM modeling team worked with the SECOORA data management team to standardize model output and data products via the establishment of THREDDS server and SECOORA's interactive map display.</p>
<p>University of Florida (Sheng) and North Carolina State University (Xie)</p> <p>Provide real-time forecasting of inundation and storm surge.</p>	<p>The University of Florida has completed a 2D Forecasting system coupled with a SWAN wave model for the entire Florida coast and provides a 2 to 3 day forecast depending on the forecast wind fields. The model current fields were compared with SECOORA HF Radar observations and more validation will be performed. Implementation of 3D baroclinic quasi-operational 24/7 nowcast/forecast system for the entire Florida coast is in progress. The 3D model data will be served via SECOORA THREDDS server as well as the PI's website. The North Carolina State University Coastal Marine Environment Prediction System (CMEPS) maintained the near-real-time CMAEPS forecast system and provides atmospheric, sea surface wave, and storm surge forecasts for the SECOORA region, and high-resolution storm surge forecasts for the Northern Florida Coast domain. Test runs are completed for the high-resolution storm surge forecasts for the Georgia and South Carolina (GASC) domain and the South Carolina and North Carolina (SCNC) domain. Exposing the model data and products via THREDDS server (SECOORA) as well as PI's website is in progress.</p>
<p>ROFFS (Roffer), University of Miami CIMAS (Muhling), and SAFMC (Pugliese)</p> <p>Develop data products derived from satellite and in situ observations for fisheries stock assessment.</p>	<p>Roffer's Ocean Fishing Forecasting Service, Inc (ROFFS Inc.), the University of Miami Cooperative Institute for Marine and Atmospheric Studies (CIMAS) and the South Atlantic Fisheries Management Council (SAFMC) are developing data products derived from satellite and in situ observations for fisheries stock assessment. SCDNR MARMAP Chevron Fishery Independent trap survey data (catch, effort and hydrographic station data) were analyzed using neural networks and Habitat model predictions were overlaid on observed catches for June and July 2008. Balistes (trigger), Pagrus (pogy) and Rhomboplites (snapper) were most abundant in the central northern study area and Centropristis (seabass) was most common in shallower waters throughout the SE survey region. Comparisons of Snapper and Trigger models with bottom temperatures show that both the species are more likely to be found where bottom temperatures are warmer at moderate longitudes. We have recently rerun predictive habitat models for four reef-associated fish species of commercial interest, using catch data from fisheries independent trap surveys completed along the South Atlantic coast. Results showed the potential influence of cold events from topographically-induced upwelling along the Florida and Georgia coasts on sampled abundances of gray triggerfish and vermilion snapper, with catches of these species largely absent where bottom temperatures were below</p>

Institution/Activities	Progress
	18C. Upcoming collaborations with staff from the South Atlantic Fishery Management Council and South Carolina Department of Natural Resources will investigate the potential of multivariate habitat indices for standardizing trap catch time series, and accounting for these types of environmental events.
University of South Carolina (Porter) Provide a decision support tool for beach/shellfish water quality advisories.	The University of South Carolina and University of Maryland continued to enhance and support the decision support web and mobile app tools for issuance of beach swimming advisories by the South Carolina Department of Health and Environmental Control (SCDHEC). The beach swimming forecast, advisory and data are available via the SECOORA web site (Beach Swimming Advisory Portlet) .
SECOORA Model Skill Assessment	Towards accomplishing this task, we first interviewed USACE/RPS ASA on existing web based model skill assessment tools developed under SURA modeling test bed project. Then, we had USACE/RPS ASA and Richard Signell, USGS deliver talks on model data comparisons and skill assessment as well as continued discussions with SECOORA RCOOS PIs on model data comparisons and skill assessment tools. Based on the discussions and recommendations, we will work with our RCOOS PIs and showcase the ongoing model skill assessments work via the SECOORA website. Once we accomplish this task, we plan to discuss how to move this activity forward.

Goal 4: Enhance the DMAC Subsystem

Milestones: In Year 3, the University of South Carolina (D. Porter) will be the primary partner who will maintain and support the SECOORA DMAC subsystem and the University of North Carolina at Chapel Hill (H. Seim) will be funded to support IOOS Vocabulary efforts. The details of ongoing data management activities during this reporting period are described in the “progress” column of the following table.

Institution	Progress
University of SC (Porter) <ul style="list-style-type: none"> Maintain SECOORA DMAC Infrastructure. Assess and Advance IOOS recommended SOS implementation. Maintain and upgrade interactive maps and data portal. Service and provide support to data providers. Recruit and integrate new data to SECOORA data portal. Support Eye On Earth Activities. Support data providers and RCOOS Manager on implementation of QA/QC flags based on the published QARTOD manuals. Collaborate with SECOORA product development contractor. University of North Carolina – CH (Seim) <ul style="list-style-type: none"> Improve and test SPARQL queries. Investigate the quality of information of ESRI Geoportal side response of 	<p>The SECOORA DMAC infrastructure and operations were consolidated from two hubs (University of North Carolina – Chapel Hill and University of South Carolina) to a single hub – the University of South Carolina during this reporting period. The University of South Carolina hosts and maintains the hardware and software related to SECOORA’s Data and Maps section of the website.</p> <p>We continue to recruit new data from data providers and also provide services on data management related solutions to data collectors and providers within the region. We also maintain a Wiki site in which documentation and notes on technologies we use are made available. During this reporting period, we added data from USACE/Scripps stations offshore of New River Inlet and Wilmington Harbor. Their NDBC identifiers are: 41109 and 41108 respectively. We also added data from the Florida Institute of Technology (FIT) Sebastian Inlet State Park (NDBC Identifier: SIPP1) and FWRI New Pass Dock stations.</p> <p>We worked with SABGOM model PI, ROFFSTM and FWC/FWRI to make SABGOM model data accessible via GIS format. We are working with other SECOORA member institution modelers and SECOORA funded modelers to standardize their model outputs (ROMS, SWAN and FVCOM) to be served via</p>

Institution	Progress
<p>catalog search of metadata records Product Development support Services Contractor</p> <p>Website upgrades</p>	<p>the SECOORA website. The University of South Carolina is helping the data providers and modelers on the installation of THREDDS servers as well as providing software assistance for HF Radar data processing and creation of netCDF and shape files.</p> <p>SECOORA is participating in the IOOS Sensor Observation Service (SOS) reference implementation activity and is in the process of implementing ncSOS and registering our services on the IOOS Service Registry. The ncSOS implementation will be completed by the end of December 2013. SECOORA is also engaged with the National Oceanographic Data Center on developing a Submission Information Form for SECOORA's in-situ data in order to facilitate archiving.</p> <p>We have implemented a new interactive model map that integrates and provides visualization of observations and model data. Based on our end users and RCOOS Pls input, we are in the process of improving our data portal for easy data discovery, download and visualization. We also have developed software to post the member deployed glider tracks on the SECOORA website.</p> <p>The GSAA Regional Information Management System (RIMS) project team deployed the new GSAA Portal: http://gsaaportal.org.</p> <p>SECOORA continues to work and advance the Eye on Earth collaboration project with the Northwest Association of Networked Ocean Observing System (NANOOS), the IOOS Program Office and ESRI.</p> <p>SECOORA Asset Inventory application was completed and the VMware image of the application is running on USC server infrastructure. The application was demonstrated on an IOOS RA DMAC conference call where some data providers in our region explained its utilization.</p> <p>IOOS Parameter Vocabulary work was continued during this reporting period as follows:</p> <ul style="list-style-type: none"> • Published IOOS Parameter Vocabulary (v2.0) with relationships to CF standard names (v19) and IOOS core variables list; • Published IOOS Platform Vocabulary with mappings to MMI platform ontology and SEAVOX platform classes; • Registered vocabularies and mapping under IOOS. <p>Improving and testing of the SPARQL queries and Investigate the quality of information of ESRI Geoportal side response of catalog search of metadata records are in progress.</p> <p>Developed the contract solicitation for the Product Development Support services contractor and distributed to ocean observing community via the SECOORA newsletter and website, etc. Received seven applications from the solicitation. Assembled peer reviewers, developed review criteria, and the review of the applications were completed. The reviewers recommended SECOORA staff to interview the top three candidates. Vembu and Debra completed the interviews, and Second Creek consulting is being selected for the position. The contractor will be responsible for data product upgrades, developing new data products and providing data management support services.</p>

Institution	Progress
	SECOORA staff will develop a plan for SECOORA website upgrades in the spring of 2014.

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

The primary focus of SECOORA’s Education and Outreach (E&O) subsystem is to engage stakeholders in 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. We have listed work carried out during this reporting period below. No Education and Outreach PIs were funded in Year 3.

Education and Outreach Activities
SECOORA continues to maintain and periodically updates the SECOORA classroom website. The SECOORA classroom web pages are tailored to the public, teachers and other educators in order to enable learning about coastal ocean observing systems and related information on how to incorporate it into classroom and other educational programs. We have hired part-time contractor, Abbey Wakely (undergraduate student from University of South Florida, St. Petersburg) to be our communication specialist. Abbey will be working on the newsletter, website updates, social media, board and member emails, among other things.
SECOORA staff constantly engage in advocating the implementation of regional coastal ocean observing systems to address coastal zone issues by giving talks at institutions and meeting with stakeholders. The week of August 5, 2013, Debra Hernandez and Vembu Subramanian held a series of meetings with SECOORA members, Senator Rubio staffers, and stakeholders (private, state, federal) in Southwest Florida and Miami. The meetings were aimed at understanding ongoing coastal ocean observing activities, recruiting new members to SECOORA, creating support for IOOS/SECOORA, and identifying gaps and opportunities for collaboration. For more details on the Florida Outreach Visits, please visit the SECOORA website .
On August 5, 2013 Debra Hernandez held a demonstration of the recently launched beta version of The Governors' South Atlantic Alliance (GSAA) Coast and Ocean Portal, available at www.gsaaportal.org . Over 25 participants attended the demo, which included scientists and managers from USGS, FWC/FWRI/NOAA/USF, and CMS/Tampa Port Authority. The participants were given a questionnaire to provide feedback on the GSAA portal.
Following is a list of meetings/conferences SECOORA staff attended and/or gave lectures: Florida Gulf Coast University; SRI International; National Hurricane Center; Southeast Fisheries Science Center; West Central Florida American Meteorological Society Chapter Meetings; National Ocean Service representative in St. Petersburg; Tampa Bay Estuary; National Weather Association 2013 meeting; CERF 2013; Clean Gulf 2013; Earthcube Real-time data workshop, June 2013; Earthcube Articulating cyberinfrastructure needs of the Ocean Ecosystem Dynamics Community, October 2013; Our Global Estuary, October 2013; GSAA Meetings; IOOS Association and IOOS DMAC meetings.
December 2013 SECOORA Board of Directors Meeting: During this reporting period, we conducted our Fall Board of Directors meeting at NOAA Coastal Services Center in Charleston, SC (December 4 – 5, 2013). The agenda and meeting materials are available on the website .
SECOORA RCOOS Manager worked with Florida Gulf Coast University (FGCU) and Doug Levin, Washington College to submit an internal grant proposal to FGCU for funding to deploy two Basic Observation Buoys (BOB) at Estero Bay, Fort Myers, FL. The buoys will be deployed by students of FGCU in Spring 2014.
SECOORA fosters student training in buoy deployment: USF’s Dr. Bob Weisberg and FGCU’s Dr. Felix Jose were awarded a 2013 Shiptime Award through the Florida Institute of Oceanography’s state funded shiptime program. The award made possible a 3 day research cruise on the west Florida shelf on board the R/V Weatherbird during which a real-time monitoring buoy was deployed, two bottom mounted instrument packages were deployed and multiple CTD casts were carried out. The purpose of the cruise was to 1) educate and train undergraduate marine science students from USF and FGCU in both the deployment of oceanographic instrumentation and the subsequent use of real-time and in-situ data for both classroom and research use and 2) provide scientific research divers in-situ training in dive planning, diving skills and

Education and Outreach Activities

emergency procedures. The ship time provides a platform for education and research collaboration that is an ongoing project with results to be leveraged to secure additional future funding. SECOORA staff was instrumental in initiating the collaboration and supported the project by providing students with travel expenses for onsite training and hands on experience assembling instrument packages at USF's Ocean Circulation Group facilities.

Scope of Work

In Year 3, SECOORA committed: (1) \$600,000 towards supporting priority High Frequency Radars (2) \$104,661 to the University of Georgia for support of the NOAA's Ocean Acidification Program; (3) \$24,752 to the University of North Carolina-Chapel Hill for IOOS DMAC support of the IOOS vocabulary development and management, particularly with the ontology support to the IOOS Geoportal; (4) \$10,000 to the University of South Carolina for support of the Eye on Earth project, and (5) \$2,800 to support travel and participation by Dr. Lynn Leonard, UNCW at the U.S. IOOS Federal Advisory Committee meetings. We have also added the following new tasks in Year 3 that further address the integration of our existing ongoing projects and user needs: (1) accurate wave estimates from High Frequency Radars; (2) enhance and develop new data products and website upgrade, and (3) model skill assessment. The University of South Carolina (D. Porter) will be the primary partner who will maintain and support the SECOORA DMAC subsystem and the University of North Carolina at Chapel Hill (H. Seim) will be funded only to support IOOS Vocabulary efforts.

Personnel and Organizational Structure

A current list of SECOORA members and Board is available on our [website](#). SECOORA's Board elected new officers on July 29, 2013 (Chair - George Maul, Florida Institute of Technology; Vice Chair - Rick DeVoe, SC Sea Grant Consortium; Treasurer - John Proni, Florida International University; Secretary - Conrad Lautenbacher, GeoOptics). Abbey Wakely, an undergraduate student at the University of South Florida was hired as a communications specialist. We held the Fall 2013 board meeting (December 4-5, 2013) and planning for the Spring 2014 annual members meeting is underway. We have completed the search for HF Radar waves Project and Product Development Support services contractor, and the execution of contracts is in progress.

Budget Analysis

The FY13 SECOORA A-133 audit was conducted by the firm Elliott Davis, LLC and was finalized on September 23, 2013. There were no negative findings. SECOORA's October 31, 2013 financial report shows a budget balance remaining of \$524,430 (Year 2 funds) and a budget balance remaining of \$2,401,329 (Year 3 funds). We are within budget and on track with spending. IOOS Year 1 subawards have been closed. There were nine no cost extensions granted to year 2 Subawardees ranging from six months to one year. We started to draw IOOS Year 3 funds in October 2013. SECOORA continues to receive invoices regularly from our subawardees and we process them at one of two bi-monthly admin meetings. All invoices are paid within forty-five days. SECOORA continues to draw from ASAP monthly. As a reminder SECOORA pays out its monthly operational costs (i.e. payroll, etc.) and then conducts the ASAP draws in the middle of the following month for both the preceding month's operation expenses and the subawardee invoices.

Publications and Presentations

- Liu, Y. and R.H. Weisberg, and C.R. Merz (2013), Assessment of CODAR and WERA HF Radars in Mapping Currents on the West Florida J. Atmos. Oceanic Technol., 2013, submitted.
- Zheng, L. and R.H. Weisberg (2012), Modeling the West Florida Coastal Ocean by Downscaling from the Deep Ocean Across the Continental Shelf and into the Estuaries, Ocean Modeling, 48 (2012), 10 - 29, doi:10.1016/j.ocemod.2012.02.002.
- Weisberg, R.H., L.Zheng, Y.Liu, C. Lembke, J.M. Lenos and J.J. Walsh (2013), Why a red tide was not observed on the West Florida Continental Shelf in 2012. Harmful Algae (in press)
- Huang, Y., R. H. Weisberg, and L. Zheng (2013), Gulf of Mexico hurricane wave simulations using SWAN: Bulk formula based drag coefficient sensitivity for Hurricane Ike. J. Geophys. Res.-Oceans, 118, 1–23, doi:10.1002/jgrc.20283.
- Zheng, L., R.H. Weisberg, Y. Huang, et al., (2013), Implication from the comparisons between two- and three-dimensional model simulations of the Hurricane Ike storm surge. J. Geophys. Res.-Oceans, 118, 3350–3369, doi:10.1002/jgrc.20248.
- Zhao, J., C. Hu, J. M. Lenos, R.H. Weisberg, C. Lembke, et al. (2013). Three-dimensional structure of a *Karenia brevis* bloom: observations from gliders, satellites, field measurements, and numerical models. Harmful Algae, 29, 22–30.
- Putnam, N.F and R. He (2013), Tracking the Long-distance Dispersal of Marine Organisms: Sensitivity of Ocean

- Model Resolutions, *Journal of the Royal Society Interfaces*, doi:10:20120979
- Xue, Z, R. He., Fennel, K., Cai, W.J., S. Lohrenz (2013), Modeling Ocean Circulation and Biogeochemical Variability in the Gulf of Mexico, *Biogeosciences Discuss*, 10, 7785-7830.
- Tang, Q., L. Xie, G. M. Lackmann, and B. Liu, 2013: Modeling the impacts of the large-scale atmospheric environment on inland flooding during the landfall of Hurricane Floyd (1999). *Advances in Meteorology*, (in press)
- Li, R., L. Xie, B. Liu, and C. Guan, 2013: On the sensitivity of hurricane storm surge simulation to domain size. *Ocean Modelling*, 67, 1-12.
- Gomez, R., Kniephoff, M., Petersen, L., Helzel, T., Merz, C., Weisberg, R., "Quality Control of Ocean Radar Currents Maps for individual Grid Cells in Real-Time". Abstract for IEEE Oceans Conference 2014, Taipei, Taiwan, 7-10 April 2014, submitted.
- Lynn Leonard and Jennifer Dorton, 2013: Approached to understanding and meeting the needs of decision makers in the Carolinas, 2012 Coastal and Estuarine Research Federation (CERF),
- Debra Hernandez, Vembu Subramanian, Jennifer Dorton, Dwayne Porter, Charlton Galvarino, Jeremy Cothran
Dan Ramage: SECOORA's Regional Coastal Ocean Observing System: Providing critical marine weather data and information products for weather forecasters and the marine community. 38 th National Weather Association Annual Meeting, Charleston, SC, 12 – 17, October 2013
- Vembu Subramanian, Debra Hernandez, Dwayne Porter, Jeremy Cothran, Dan Ramage and Jennifer Dorton: South East Coastal Ocean Observing Regional Association Data Management System: Fostering data access and visualization of coastal observations in the Southeast US. Coastal and Estuarine Research Federation 2013, San Diego, California, 3 – 7, November, 2013.
- J. Martinez-Pedraja and L. K. Shay: Interoperability of SeaSondes and Wellen Radars in Mapping Radial Surface Currents, 2013: *Journal of Atmospheric and Oceanic Technology*, Volume 30, pp 2664-2675.
- Roffer, M.A., Muhling, B., Pugliese, R and Reichert, M.: Habitat Modeling For Fisheries Independent Trap Surveys. Abstract (ID 14221) Accepted 2014 Ocean Sciences Meeting in Honolulu

Outreach Materials (Non-Refereed)

UNCW Lynn Leonard

US IOOS Advisory Committee Meetings (<http://www.ioos.noaa.gov/advisorycommittee/welcome.html>)

ROFFS Inc. Mitch Roffer

Visit with Senator Bill Nelson (FL) and Congressman Marco Rubio (FL), April 2013.

Invited lecture on "Habitat modeling for fisheries independent trap surveys" South Atlantic Fisheries Management Council.

Habitat and Environmental Protection Advisory Panel meeting in St. Petersburg, FL. Nov. 5 - 6, 2013

UM, Nick Shay

Invited talk on Resolving submesoscale surface current variability along a western boundary current using HF radar measurements, 2013 Gordon Research Conference, June 9-14, 2013.

National HF Radar Technical Steering Team Annual Meeting, Boulder, CO. April 2013

NCSU, Ruoying He

Discussion lead on Interannual and Long-Term Changes in the Coastal Ocean, 2013 Gordon Research Conference, June 9-14, 2013.

SKIO, Dana Savidge

Invited talk on Radar research: Access to a range of scales, 2013 Gordon Research Conference, June 9-14, 2013.

SECOORA Board Member, Vice Admiral Conrad Lautenbacher (Ret),

Statement of Testimony in support of the US IOOS, March 2013

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

UGA, Scott Noakes

Ocean Acidification (OA) PI Meeting: NOAA funded OA PI meeting (only OA projects funded by NOAA), September 16-17, 2013, Silver Spring 2013; OCB PI meeting, <http://www.whoi.edu/page.do?pid=117036>, September 18-20, 2013, Washington DC

December 2013 SECOORA Annual Supplemental Information

Products and Services (Regional and National)

Observations and Model Data Products via SECOORA Data and Maps Portal

We continue to enhance the delivery of SECOORA funded and member generated observational and model data and other associated products via [THREDDS](#) enabled [WMS services](#) onto interactive maps. This allows us to expose SECOORA and SECOORA partner member generated data and related products. The ultimate goal is to allow users to access data and overlay various observational and model data such as South Atlantic Bight Gulf of Mexico (SABGOM) model, storm surge inundation forecast system, West Florida Shelf nowcast/forecast system, beach water quality modeling and swimming advisories, HF Radar data and in-situ data. SECOORA is constantly engaged in enhancing the data and maps section of the website. The enhancements include new data, hurricane track display, and glider mission tracks (Glider Palooza 2013).

Marine Weather Portal

The Marine Weather Portal product continues to be used by Wilmington, NC (<http://www.erh.noaa.gov/ilm/marine/>), and Corpus Christi, TX (<http://www.srh.noaa.gov/crp/?n=marine> and Brownsville, TX (<http://www.srh.noaa.gov/bro/?n=marine>) Weather Forecast Offices. Funding for the project was provided by NOAA's Integrated Ocean Observing System. Adding this product to our website has increased web traffic to the site, particularly during hurricane season.

Governors' South Atlantic Alliance (GSAA) Portal

The GSAA Regional Information Management System (RIMS) project team deployed the new GSAA Portal: <http://gsaaportal.org>.

Product Development Support Services Contractor

We are hiring a product development support services contractor who will be responsible for data product upgrades, developing new data products and provide data management support services. The contractor will work closely with SECOORA staff, data management team, RCOOS Principal Investigators and stakeholders on identifying new product needs under these SECOORA thematic areas: Ecosystems, Water Quality and Living Marine Resources; Marine Operations; Coastal Hazards; and Climate Change.

Data Management

Standards based DMAC and Participation in IOOS Data Management Activities

In Year 3, the University of South Carolina (D. Porter) will be the primary partner who will maintain and support the SECOORA DMAC subsystem. The University of North Carolina at Chapel Hill (H. Seim) will be funded only to support IOOS Vocabulary efforts. The SECOORA DMAC infrastructure and operations were consolidated from two hubs (University of North Carolina – Chapel Hill and University of South Carolina) to a single hub – the University of South Carolina during this reporting period. We are participating in the IOOS Sensor Observation Service (SOS) reference implementation activity and are in the process of implementing ncSOS and registering our services on the IOOS Service Registry. The ncSOS implementation will be completed by the end of December 2013. SECOORA is also engaged with the National Oceanographic Data Center on developing a Submission Information Form and generating netCDF files of in-situ data for SECOORA's in-situ observations in order to facilitate archiving. We will continue our participation and be highly active in national discussions, forums, and workshops focused on IOOS DMAC and its essential role in optimization of ocean observations and their application to important products. We continue to engage in conversations and interactions with other RAs and IOOS, where considerable progress and efficiencies are enabled through shared problem-solving, code sharing, and tool application.

Data Sharing and Provision of Regional in-situ observations to WMO GTS

SECOORA continued to support the University of South Florida COMPS and University of North Carolina Wilmington network of coastal and offshore buoy stations. The meteorological and in-water observations (water level, currents, water temperature and salinity) are provided to National Data Buoy Center (NDBC) for further dissemination to GTS. SECOORA helped Florida Institute of Technology (FIT) Sebastian Inlet State Park (NDBC Identifier: SIFP1) to get the data sent to NDBC. SECOORA also added FWRI/FWC New Pass Dock Station in-situ to the SECOORA data portal. The forecasters have found great value in having access to this data. SECOORA constantly recruits new data providers and will support the new data providers to send their data to NDBC to get disseminated via GTS as well as help them adopt the common standards

required for interoperability. SECOORA will provide guidance and technical assistance to enable additional data capture and incorporation. SECOORA has established access to data via common data formats such as ASCII, ESRI shape file, Google KML file, etc. via its website. SECOORA is working with IOOS RA DMAC on Sensor Observation Service (SOS) reference implementation, and will implement ncSOS by December 2013.

Data Storage and Archive

SECOORA continues to work with National Oceanographic Data Center (NODC) to archive the region's in-situ and remotely sensed observations. The update of Submission Information Form (SIP) is underway and SECOORA aims to establish an automated procedure to archive its observations by the end of December 2013 or early Spring 2014. SECOORA will coordinate with sub-regional data providers on this activity. SECOORA will also work with IOOS and other RAs on archiving HF Radar observations and Glider mission observations.

Observing Assets

Asset Inventory

The SECOORA Asset Inventory application was completed and the VMware image of the application is running on USC server infrastructure. The application was demonstrated on an IOOS RA DMAC conference call where some data providers in our region explained its utilization.