

**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, as well as coordinate 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, and high frequency radars (HFR);
3. Supporting a multi-scale modeling subsystem that includes regional ocean, shelf and estuarine circulation (nowcast/forecast); estuarine and surge/inundation prediction (nowcast/forecast); beach/shellfish water quality advisories; species specific habitat models; and which uses the SECOORA's observing subsystem for validation, assimilation, and nowcast/ forecasts;
4. Supporting the Data Management and Communication (DMAC) subsystem to optimize operations, improve access to regional data, facilitate technology evolution/transfer, and address structural/project management complexities; and
5. Supporting an education and outreach subsystem by SECOORA core staff 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

SECOORA Project Contractual Subawards Update

The administration of the NOAA Year 4 award and subawards are being continued by SECOORA. For the Year 4 award, SECOORA issued no cost extensions to eight subawardees during this reporting period. We also kicked-off the following RCOOS integration projects: (1) rip currents forecast model validation, and (2) measurements of fish sounds and movement using passive acoustics and acoustic telemetry. We received notice of the NOAA Year 5 (FY15) award and after the contractual review and account establishment for the Year 5 award, we will be submitting our Year 5 descope proposal to NOAA and issuing Year 5 subawards on or before July 31, 2015. Specific details regarding progress made on goals and objectives in each subsystem projects are detailed in the following sections.

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

Milestones: The following provides updates for this goal. Additional details are described in the table that follows.

- A. Provide timely grant reports to NOAA:** Ongoing.
- B. Hold Board Meeting Fall 2014 and Annual Meeting 2015:** Held Dec. 9, 2014 Board meeting and Annual meeting (Stakeholders, Members Business, and Board) on May 19-20, 2015.
- C. Publish e-newsletters and other outreach material:** SECOORA continued to engage in marketing and outreach activities via e-newsletter, e-mails, social media and website. During this reporting period, SECOORA sent 1 e-newsletter, 1 holiday email, and 2 Annual Meeting emails to our listserv, referring a combined 98 sessions to our website through our e-outreach. We sent five emails outlining staff updates to the Board and produced 19 stories highlighting staff, Members' and PIs work. SECOORA newsletters, stories and videos were published on our [website](#). We continue to engage in outreach and education events as well as provide materials to RCOOS PIs and Board Members who attend science meetings, provide information to governmental representatives, etc. SECOORA staff and Members engaged in over 33 in-person and conference call outreach events. During this reporting period, SECOORA and the NOAA Ocean Acidification Program facilitated the formation of the Southeast Ocean and Coastal Acidification Network ([SOCAN](#)) to support and encourage discussions on ocean and coastal acidification in the Southeast region. We have sent 10 SOCAN webinar e-newsletters to the 163 people subscribed to the SOCAN listserv, referring 107 sessions to our website. We developed new 2015 State ([NC](#), [SC](#), [GA](#), [FL](#)) one pagers. We sent information to House and Senate representatives on SECOORA activities in their districts. We also produced our second annual report highlighting 2014 activities, which can be accessed via 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. Work with IOOS Association and U.S. IOOS Program Office to effectively respond to NOAA and other National level requirements:** Debra Hernandez, Vembu Subramanian and Megan Lee attended the monthly IOOS Association calls. Debra Hernandez and Conrad C. Lautenbacher attended the IOOS Spring meeting (March 2-4, 2015). Debra and Conrad visited six congressional offices in DC: Congressman David Rouzer (R-NC); Congressman Ander Crenshaw (R-FL); Congressman Barry Loudermilk (R-FL); Congresswoman Debbie Wasserman Schultz (D-FL) and Senator Marco Rubio (R-FL). Megan Lee and Abbey Wakely attended the IOOS/IOOS Association Education and Outreach calls. Vembu Subramanian attended the monthly IOOS RA

DMAC calls. SECOORA staff continues to coordinate input on RA certification, QARTOD manuals, the glider strategy, animal telemetry network and the modeling strategy; and submitted comments as appropriate to the IOOS program office.

G. Refine and maintain RCOOS Conceptual Operations Plan: No action to report.

H. Support local, regional and national collaboration: SECOORA staff and PIs regularly collaborate through co-sponsored meetings, participation in working groups and committees, and through coordination with regional and national colleagues. Some meetings and coordination activities of note include:

- a. Southeast Ocean and Coastal Acidification Network (SOCAN) state-of-the-science webinar series on ocean acidification;
- b. SECOORA Fisheries Habitat Modeling - South Carolina Department of Natural Resources (SCDNR) and South Atlantic Fisheries Management Council (SAFMC);
- c. IOOS Vocabulary efforts, Sensor Observation Service (SOS) and Catalog efforts – SECOORA, IOOS and all other RAs;
- d. SECOORA in-situ data archival efforts – National Oceanographic Data Center;
- e. IOOS Association and congressional outreach efforts;
- f. HF Radar Steering team;
- g. Modeling Strategy;
- h. Glider Strategy;
- i. Governors’ South Atlantic Alliance Leadership, Partner, and Ad hoc Offshore Energy Committees; Data Portal maintenance and meeting attendance; and
- j. Weather Ready Nation (WRN) Ambassador.

I. Evaluate mechanisms to track operational statistics, product usage, and outcome measures and metrics: We continue to use Google Analytics to track our data and products access via our website. We are utilizing the National Data Buoy Center (NDBC) partner statistics (<http://www.ndbc.noaa.gov/partnerstats/>) report, which shows the number of hits and data requests on each in-situ monitoring station supported by SECOORA. During this reporting period, the SECOORA funded in-situ coastal and buoy stations had 2.6 million web page views and data requests on the NDBC website. The in-situ observing system operators are also starting to track and provide performance metrics of their sensors (see under Goal 2, Objective 2.1). HF Radar operators use the National HF Radar site for reporting the priority radar site uptime statistics. Marine Weather Portal web pages, a product that was integrated into SECOORA website in early 2012 continue to redirect visitors to SECOORA data portal and web site. From December 1 2014 to May 31 2015, Facebook “likes” have grown 10% (from 215 to 237) and Twitter “followers” have grown 25% (165 to 207). During the reporting period SECOORA shared approximately 153 Facebook posts and 131 Twitter “tweets”, referring a combined 533 sessions to SECOORA website. There were 65,165 sessions on our website, growing 54% since the last progress reporting period (42,204 sessions).

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, 	<p>Staff fiscal activities:</p> <ul style="list-style-type: none"> • Provided fiscal and overall project management for Year 3 and 4 awards, and continued to manage primary partner institutions subawards. • Held bi-monthly administration meetings to ensure efficient and effective fiscal

SECOORA Activities	Progress
<p>meetings, that enable stakeholder assessment and engagement.</p> <ul style="list-style-type: none"> • Coordinate with the Governor’s South Atlantic Alliance (GSAA). • Ensure SECOORA 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>operations.</p> <ul style="list-style-type: none"> • A part-time Bookkeeper (Chiaki Kight) and Business Manager (Megan Lee) managed the contracts and financials for these awards. • SECOORA staff held a staff retreat at Charleston, Feb. 5 -6, 2015. • Preparations are underway for FY15 SECOORA A-133 audit. <p>SECOORA Board and PI Coordination</p> <ul style="list-style-type: none"> • Continued to hold conference calls with RCOOS PIs to ensure in-reach, coordination and collaboration within each RCOOS subcomponent and among PIs. Also held DMAC activities prioritization and coordination meetings and calls. • Executive Committee continued to meet monthly. The Finance and Audit Committee met every quarter. • Held Fall Board meeting (Dec. 9, 2014 – Charleston, SC) and SECOORA Annual Members Business and Board meetings (May 19-20, 2015 – Jacksonville, FL). Presentations and 2015 annual meeting materials can be accessed via the SECOORA website. <p>External Coordination Activities:</p> <ul style="list-style-type: none"> • Continued to actively participate in the Governors’ South Atlantic Alliance (GSAA) and GSAA Regional Information Management System (RIMS) portal is being maintained. • Debra continued to participate on monthly “Leadership Arm” calls of the GSAA. • Debra attended the GSAA Executive Planning Team and GSAA World Ocean Council Industry Forum meetings held in Charleston, SC (April 7-8, 2015). • Participated in monthly IOOS Association and IOOS conference calls, including Debra’s participation on the IOOS Association Executive Committee. • Debra and Conrad attended the IOOS Association Spring Meeting held in Washington D.C. (March 2015). • Coordinating and hosting Southeast Ocean and Coastal Acidification Network (SOCAN) webinars with National Oceanic and Atmospheric Administration's Ocean Acidification Program. • Beach Water Quality Modeling Stakeholders meeting (January 9, 2015, Sarasota, FL): “Transferability of beach water quality modeling to Sarasota beach areas”. Representatives from SECOORA, GCOOS-RA, University of South Carolina, Mote Marine Laboratory, Florida Department of Health (FDOH), FWC/FWRI, Sarasota Estuary Program and Sarasota and Manatee counties GIS, utilities and water quality monitoring programs attended and provided input at the meeting. • South Carolina SECOORA members outreach social (February 5, 2015, Charleston, SC). • SECOORA at Charleston STEM Festival (February 7, 2015). • South Atlantic Ecosystem Model workshop (February 10-11, 2015), St. Petersburg, FL. • Other meetings, events, conference calls and activities: Weather Ready Nation (WRN); West Central Florida American Meteorological Society; Weather Forecast Office, Ruskin, Tampa; Integrated Tracking of Aquatic Animals in the Gulf of Mexico (iTAG); Florida Atlantic Coast Telemetry (FACT); Florida Gulf Coast University Real-time Basic Observation Buoy Deployment; New College of Florida, Sarasota, FL Faculty Seminar Series; SC Wind Regulatory Task Force meeting; Florida Institute of Oceanography, FWC/FWRI, USGS and University of South Florida outreach meetings; South Atlantic Landscape Conservation Coalition workshop; NOAA Southeast and Caribbean Regional Collaboration Team (SECART); National Harmful Algal Bloom (HAB) and Hypoxia webinar hosted by HABHRCA.

SECOORA Activities	Progress
	<p>Efforts to Leverage IOOS Funding:</p> <ul style="list-style-type: none"> • Continued partnership with GSAA, and maintained the Regional Information Management System portal for the GSAA. • The PIs who receive SECOORA subawards also leverage either their institutional funds or other external grants to carry out their projects. • Onslow Bay Buoy Fund: In partnership with University of North Carolina Wilmington and area boating and fishing community groups raised funds needed to deploy the Onslow buoy. • Donate to SECOORA: We launched a “Shop AmazonSmile and contribute to SECOORA” campaign. Amazon will donate 0.5% of the price of eligible AmazonSmile purchases to Southeast Coastal Ocean Observing Regional Association whenever one shops on AmazonSmile. Funds generated will be invested to educate students and the public about coastal ocean observing activities in the Southeast.

Goal 2: Sustain an Observing Subsystem for the SE

Milestones: The following provides updates for this goal. Additional details are included in the table that follows.

- A. Operate and maintain moored and coastal stations:** University of South Florida Coastal Ocean Monitoring and Prediction System (COMPS) and University of North Carolina Wilmington Coastal Ocean Research and Monitoring Program (CORMP) 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 is being continued.
 - iv. **Provide the radial currents to the National Servers for the National HF radar network (Scripps Institute of Oceanography):** Ongoing.
- D. Maintain the sensors on Gray’s Reef National Marine Sanctuary (GRNMS) Buoy 41008:** University of Georgia (UGA) is funded to maintain the Ocean Acidification sensors on the NOAA’s GRNMS buoy. Funding is also being allocated to University of Delaware for Ocean Acidification field data collection and validation.

Objective 2.1: Sustain Moored and Coastal Stations	
Institution/Activities	Progress
University of South Florida (USF) (Weisberg) Support COMPS moorings	USF currently maintains three real-time surface and two non-real-time subsurface moorings, along with one near real-time shore tower. Performance statistics for the 3 near real-time stations (C10, C12 and C13) are: water velocity (100%); 1m SST/Salinity (100%); winds and air pressure (100%); in-water CTD (real-time 25% and delayed mode 100%); long-wave radiation (C10 – 100%); shortwave radiation (C10 – 75%); relative humidity (RH) and air-temperature (AT) (75%). The 25% and 75% data return in real-time in-water CTD and RH/AT sensors are attributed to the inductive cable parting and awaiting for ship time to replace the sensor respectively. The real-time data collected by the moorings are delivered to SECOORA and NDBC, and are made available via Global Telecommunication System (GTS). USF continues to partner with IOOS/SECOORA and Florida Gulf Coast University (FGCU) to educate and train undergraduates in participation of mooring maintenance cruises, configuration of sensors and deployment of moorings and data analysis.
University of South Florida (USF) (Luther) Support in-shore tidal meteorological stations	University of South Florida College of Marine Science continues to maintain the in-shore Coastal Stations to the extent possible with the funding provided. A new radar-based water level sensor on a NOAA designed mounting frame with bubbler back-up was added to the Clam Bayou station. They are attempting to get the site surveyed into the NAVD88 datum by the City of St. Petersburg, as it is useful for storm water management. The USF Institute for Marine Remote Sensing (IMaRS) and the Florida Fish and Wildlife Research Institute (FWRI) are collecting monthly water samples from the Clam Bayou site to correspond to maintenance and calibration of the water quality sonde. Construction of the new test station on the USF-CMS docks is nearly complete. Physical infrastructure was installed in September 2014. Installation of data collection and telemetry systems at the test site is underway. Consolidation of the COMPS Egmont Key and Anna Maria sites into a single nearby site remains in the planning stages. General upkeep of the remaining COMPS inshore sites (Shell Point, Aripeka, Fred Howard Park, and Big Carlos Pass) continues. The tower at Big Carlos Pass needs replacement. They are engaging engineering support from YSI/Xylem to design a new mast base that can accommodate anticipated loads on the new tower and comply with Florida Department of Transportation requirements, as it is located on a state highway drawbridge.

<p>University of North Carolina - Wilmington (Leonard) Support Carolina RCOOS network</p>	<p>University of North Carolina Wilmington (UNCW) continued to operate and maintain 7 nearshore real-time moorings and 1 coastal pier station. Periodic buoy turnarounds (March 24-26, 2015) and station maintenance were continued. The moorings (ILM2, ILM3, OCP1, SUN2, CAP2, FRP2) data return statistics are : air temperature and pressure - 72%, 100%, 93%, 100%, 97%, 100%; wind speed and direction - 72%, 100%, 92%, 100%, 97%, 100%; surface water temperature and salinity - 72%, 100%, 94%, 98%, 42%, 23%; waves (ILM2 – 89%, SUN2 – 64%) and currents (SUN2 – 64%). LEJ3 (mooring 41036) is not included in buoy stats since it was removed from service on January 15, 2015. SUN2 waves and currents have not reported since April 4, 2015 due to the need for a battery swap. Mooring technicians hope to replace the batteries in early June 2015. CAP2 and FRP2 CTD's have been problematic the entire reporting period; however, the CTD at CAP2 has reported at 100% since the mooring turnaround on March 25, 2015. The FRP2 CTD will be swapped by divers on June 3, 2015. All data collected are provided to SECOORA and NDBC and made available via Global Telecommunication System (GTS).</p>
<p>Objective 2.2: Maintain High Frequency Radar Operations</p>	
<p>Institution/Activities</p>	<p>Progress</p>
<p>HF Radar data delivery from all SECOORA priority stations</p>	<p>The data from all radars are being continuously provided to SECOORA and the US National HFR Network in near real-time.</p>
<p>University of South FL (Weisberg) Support four CODAR stations on the West Florida Shelf</p>	<p>USF currently operates, maintains and delivers data from three CODAR priority radar sites (Naples, Venice and Reddington Shores). USF continues to maintain the 2 co-located WERA stations. The fourth priority CODAR site will be deployed in Year 5 of the project. Operational uptime and average range statistics of three priority CODAR sites for this reporting period: NAPL – 98.9%, 185Km, VENI – 92.1%, 157km and RDSR – 97%,174km.</p>

<p>University of South Carolina (Voulgaris) Support two WERA radar arrays in Long Bay, SC</p>	<p>The operation of the two USC priority radars (Fort Caswell (CSW) and Georgetown (GTN)) was continued without major interruptions during the reporting period. The maintenance work, apart from regular visits for recovering the raw data that are not transmitted to our data center included the following activities which are listed per site: CSW: Routine site visitations for backing up raw data files and basic maintenance work; GTN: Due to northeasters (storm activity) during 2014, coastal erosion had impacted the antenna array on this site. Following the actions taken during the previous reporting period (July 1 to Nov. 30 2014) that included: (a) retreat of the transmit (Tx) array by approximately 20m inland; (b) replacement of 2 receiver (Rx) antennas; and (c) temporal relocation (inland) of 4 antennas on the northern part of the Rx array, significant effort was undertaken to permanently relocate the whole Rx array inland. This relocation was completed on March 11, 2015 when all 12 antennas were moved inland and re-installed. The new positions of the Rx antennas were surveyed using an RTK-GPS and the signal processing software was updated accordingly. Following data collection and after local processing of the raw data, the estimated surface currents (radial velocities) are transmitted to the National HF Radar network. The time elapsed between data collection and receipt of the radial velocities by the National Network is less than 1 hr. on average. During this period we continued the generation of monthly climatologies of surface ocean currents from the area covered by the sites. Also during this period one graduate student (USC internal funds) has been involved in developing an algorithm for the improvement of the radar surface current measurements through the inclusion of the Stokes drift component not captured by the HF radars. The theoretical development has been finalized, but its implementation will require experimental verifications. Efforts have been initiated for the development of a method for antenna pattern measurements using a micro-transmitter on an airborne or shipborne platform. Using internal funds USC has acquired a drone system for carrying a calibration transmitter around the Tx array. Successful completion of this project will contribute in better accuracy for currents, but more importantly for wave estimation. The method will be tested during the summer / fall 2015. The systems operate on the experimental frequency of 8.35 MHz. Operational uptime and average range statistics of two priority HF Radar sites for this reporting period: CSW – 98.0%, 180km and GTN – 94.4%, 229km.</p>
<p>Skidaway Institute of Oceanography (SkIO) (Savidge) Support two WERA radar arrays on St. Catherine’s and Jekyll Island, GA</p>	<p>Skidaway Institute continues to operate and maintain the US IOOS/SECOORA identified priority WERA system radar sites (St Catherine’s and Jekyll Island installations) to the extent possible with the Year 4 funding. Each site is visited bimonthly and additionally as needed. Data from these sites are sent to SECOORA and National High Frequency Radar Network for integration, display and dissemination. The data are also posted on the Skidaway Institute of Oceanography website. Operational uptime and average range statistics of two priority HF Radar sites for this reporting period: CAT – 97%, 181km and JEK – 99%, 197km.</p>

<p>University of Miami (Shay) Support three WERA radar arrays at Crandon, Virginia Key and Dania Beach and HF Radar Waves Project</p>	<p>Operated existing HF radar instrument installations at Key Biscayne (CDN), Virginia Key (VIR) and Dania Beach (STF). VIR site was damaged by a fire set by park visitors on the evening of May 24, 2015. UM is still assessing the damage. UM was asked by the USCG Admiral to relocate the STF site container and the site has been down from Jan – May 2015. UM had to redeploy cables at CDN due to the damages caused by park maintenance crews. Mean radials are provided at hourly intervals to the US National Network archive through Scripps Institution of Oceanography in real time. Working with the USCG to ingest UM data into their data system for SAROPS. Estimated significant wave heights for the National Weather Service marine forecast models and engage stakeholder groups such as the NWS and United States Coast Guard (for currents). Processed data from the AWAC (Nortek) mooring recovered in August 2015. Data recovery from the AWAC was 100%. Based on our analysis, we retrieved 100% of the time series of currents, but only 19% of the surface wave information. These data have been provided to NWS (current and wave data). Operational uptime and average range statistics of three priority HF Radar sites for this reporting period: CDN – 89%, 124km, STF – 34.1%, 107km and VIR – 83%, 125km.</p>
<p>University of NC - Chapel Hill (Seim) Support two CODAR radar arrays on the Outer Banks of NC</p>	<p>The UNC-CH operates 3 CODAR-radar installations on the Outer Banks of North Carolina with SECOORA/IOOS funds. UNCCH continues testing quality control procedures for radials from these sites. They have implemented post-processing of the threshold tests advocated by Kirinich et al. (2012) and have made considerable progress in generating weighted-averages. UNCCH continues to develop Gulf Stream landward edge tracking capabilities with the NC radars, and compare them with existing data products. Preliminary analysis of edge spatial and temporal variability estimates from the Cape Hatteras site are consistent with known behavior of the Gulf Stream, with decaying meander characteristics seen in radials that view the Gulf Stream south of Cape Hatteras. A very different character of the edge time history is seen to the northeast where instabilities start to grow again with longer time scales. Operational uptime statistics for the three radars: DUCK-99.9%, 198km; HATY- 99.7%, 188km and CORE – 92.3%, 189 km.</p>
<p>Objective 2.5: Maintain the sensors on NOAA Gray’s Reef National Marine Sanctuary (GRNMS) buoy</p>	
<p>Institution/Activities</p>	<p>Progress</p>
<p>University of Georgia (Noakes) and University of Delaware (Wei-Jun Cai) Support to NOAA’s Ocean Acidification Program NDBC Gray’s Reef National Marine Sanctuary (GRNMS) buoy</p>	<p>UGA continues to monitor the carbon dioxide in surficial waters offshore Georgia at the GRNMS site. In December 2014, it was noticed that the pH data from the GRNMS mooring was becoming erratic. In April 2015, sea conditions allowed for the visit and sensor swap, the SAMI-pH was replaced with the new instrument resulting in the pH measurements reporting back on line and stable. 10 discrete water samples were also collected for DIC and TA analysis. These samples were shipped to the University of Delaware for analysis. So far, eight and a half years of nearly continuous CO₂ and water quality data have been collected at the GRNMS coastal mooring. Typical pCO₂ values range from 300 uatm in the winter months to 500-600 uatm in the summer months. These values have been repeated annually and have come to be expected for the South Atlantic Bight (SAB). It is still early in the data collection phase, but attempts to discern annual trends have proven interesting with positive pCO₂ seawater (2.4%/year) and atmospheric (0.789%/year) increases apparent. As more data is collected, these trends will most likely vary and will be appropriately adjusted. University of Delaware attended OA cruise (December 8 – 18, 2014) to collect water samples for Dissolved Inorganic Carbon (DIC), Total Alkalinity (TA), Dissolved Oxygen (DO), pH(spec) and salinity analysis for groundtruthing the Gray’s reef mooring sensors. Water samples collected during the cruise as well as collected by UGA were analyzed and the results were submitted for publication in refereed journals.</p>

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

Milestones: The following table provides progress on the modeling subsystem projects.

A. Support Regional SABGOM model	
Institution/Activities	Progress
North Carolina State University (He) Support and enhance SABGOM model	The North Carolina State University South Atlantic Bight Gulf of Mexico (SABGOM) model continues to run on a 24/7-basis, providing 3-D regional ocean predictions. Model predictions are served in public domain via http://omgsrv1.meas.ncsu.edu:8080/ocean-circulation/ and SECOORA interactive maps portal and THREDDS server. SABGOM model has been coupled with biogeochemical prediction model. PI and his team are working with other project scientists funded by SECOORA on model coupling, model skill assessments, long-term analysis, and generations of several value-added products. PI and his team are also testing data assimilation (DA) schemes within the SABGOM modeling system using 3Dvar and 4Dvar data assimilation schemes. The DA system, once fully implemented, will be able to assimilate observations including satellite sea surface temperature, sea surface height, HF Radar surface currents, glider observed hydrography to improve SECOORA regional ocean circulation predictions.
B. Implement Forecasting of Storm Surge, Inundation and Coastal Circulation	
Institution/Activities	Progress
University of Florida (Sheng) and North Carolina State University (Xie) Provide real-time forecasting of inundation and storm surge.	<p>University of Florida: The final report for the project is being compiled. The report will cover the development, setup, work and data flows, and verification process of the Advanced Coastal Modeling System (ACMS). The outline and contents of the report are: Introduction; ACMS history and development; ACMS Models; Model setup; ACMS work and data flows; ACMS supporting infrastructure and prerequisites; verification of ACMS; ACMS forecast error assessment and model benchmarking and Lessons learned and Conclusions.</p> <p>North Carolina State University: They continue to maintain the NCSU Coastal Marine and Atmospheric Environment Prediction System (CMAEPS) which is running in the near-real-time mode on the NCSU IBM Blade Center Linux Cluster. CMAEPS 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 regional atmospheric model by providing initial and lower boundary conditions and 6-hourly updated lateral boundary conditions. Atmospheric forcing fields 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 forecasting results can be accessed from the CMAEPS web server (http://cdf1.meas.ncsu.edu/SECOORA/index.html). The final report for the project is being compiled.</p>

C. Provide Species Specific Habitat Models that integrate remotely sensed data and in-situ data to enhance South Atlantic Fisheries Management Council Stock Assessments

Institution/Activities	Progress
<p>ROFFS (Roffer), University of Miami CIMAS (Muhling), and SAFMC (Pugliese) Develop data products derived from satellite and in situ observations for fisheries stock assessment.</p>	<p>During this reporting period, the PI worked with fisheries stock assessment stakeholders on the transferability and incorporation of habitat modeling approach in the stock assessment process. It has been officially recommended by the South Atlantic red snapper triggerfish Advisory Committee that our additional “habitat” covariate, become part of the SouthEast Data, Assessment, and Review (SEDAR) research plan for grey triggerfish. This was achieved by continued engagement in the stock assessment process via several teleconferences and other communications related to the grey triggerfish assessment committee. At the SEDAR meetings the conclusions were that habitat modeling had great value to stock assessment in general as it provided a good mechanism to introduce environmental variability into the stock assessment indices. However, habitat model output cannot presently be incorporated into the presently used stock assessment index calculations as the habitat model would add environmental co-variants that were, in some manner, already included in the model. Substantial amount of work will be required to develop a new model that only incorporates the habitat model output and thus was recommended for the near future research plan. It was also felt that successful use of this modeling would allow future evaluation for use in the golden crab, tilefish, scamp grouper, gag grouper and other species of interest to the South Atlantic Fisheries Management Council.</p>

D. Improve Beach/Shellfish water quality advisories

Institution/Activities	Progress
<p>University of South Carolina (Porter) Provide a decision support tool for beach/shellfish water quality advisories.</p>	<p>During this reporting period, the PI and his team worked on the transferability of their beach water quality modeling approach to Sarasota beach areas in FL. Based on recommendations from local stakeholders, the study area in Sarasota beach area was refined and consists of 12 sampling sites (five marine sites are located on Anna Maria Island, two on Longboat Key, three on Lido Key, one on the causeway to Anna Maria Island, and one on Ringling Causeway) west of Sarasota, FL. On January 8, 2015, windshield surveys of our study area were conducted. For the study, data were collected, collated, and summarized from multiple observing systems, remotely sensed products, and monitoring programs. Data utilized in this effort include tidal ranges, tidal max/min values, wind speed/direction, NEXRAD rainfall totals (24-168 hr.), dry day counts, rainfall intensity, rainfall delays (1, 2, and 3 day), salinity max/min values, salinity averages (24-168 hr.), water temperature max/min values, and 24 hr. water temperature averages. Specifically, in-situ (C-10 USF buoy) and modeling (HYCOM) data sources were utilized to provide salinity and water temperature values. Data collection was completed in April 2015. Since mid-April 2015, statistical modeling has been conducted on the Lido Key site to ensure our data needs are being met. For this modeling, the EPA’s Virtual Beach (VB) statistical modeling toolbox is being used to create multiple linear regression models from roughly 82 variables. This approach will be utilized at each of the 12 sites in the study area; island-level scale models will also be developed for Anna Maria Island, Longboat Key, and Lido Key. Modeling efforts will be conducted throughout the 2015 summer.</p>

E. SECOORA Model Skill Assessment	
Institution/Activities	Progress
<p>Independent Contractor (Filipe Pires Alvarenga Fernandes, Oceanographer, Brazil) Collaborator and consultant role (Richard Signell, USGS)</p> <p>Development of Model Skill Assessment on-line tool</p>	<p>Sea Surface Height (SSH), Sea Surface Temperature (SST), and Sea Surface Salinity (SSS) observations are fetched and automatically paired with the nearest water grid point of several numerical models. Model data is only compared with observations when the distance does not exceed 5 km. The comparisons are saved in HTML tables and displayed both in the interactive map and as a standalone table. The SSH has a second comparison metric regarding the vertical bias of the elevations versus the North American Vertical Datum of 1988 (NAVD88). The data endpoints for the download are discovered using the NOAA Catalog Service Web (CSW - http://www.ngdc.noaa.gov/geoportal/csw). Models are downloaded via the more robust OPeNDAP endpoint. Observations, on the other hand, are downloaded via a mix of SOS endpoints and SECOORA THREDDS server. The results webpage is hosted in the URL: http://ocefpaf.github.io/secoora. A SECOORA/IOOS binstar channel was generated in order to create a reproducible development environment. All the software needed to run the notebooks in the SECOORA skill score exercise can be installed on Mac, Windows, and Linux following the instructions at https://github.com/ioos/conda-recipes/wiki. All the notebooks make use of a collection of functions called utilities. These functions are used to find nearest data points in space and time using high level abstractions. Several improvements and many bugs were fixed by factoring this sub-module out as a standalone module. The latest Iris version has implemented the most common Ocean Dimensionless Vertical Coordinates (ODVC) used by numerical models. The next step is to implement <code>nc_genslice</code>, in order to compare numerical models and glider observations using vertical slices.</p>
Year 4 RCOOS Integration Projects	
Institution/Activities	Progress
<p>Trap Puckett, RPS Evans Hamilton, John's Island, SC – Rip current model validation</p>	<p>Rip currents model validation project contract was established in May 2015. The primary goals of this project are to collect nearshore wave observations in the Emerald Isle, NC study area in support of NOAA's Rip Current Forecast Model (RCFM) and National Weather Prediction System (NWPS) modeling efforts, and to collect rip current observations. The secondary goal is to utilize a camera to collect rip current observations. Work plan development in collaboration with NOAA has been completed for the deployment of two wave measurement devices and installation of a camera system.</p>
<p>James Locascio, Mote Marine Laboratory, Sarasota, FL – Ocean Observing Experiment: Incorporation of Passive Acoustics and Acoustic Telemetry on an Established Regional Coastal Ocean Observatory to Measure Fish Sound Production and Behavior as an Indicator of Ecosystem Function</p>	<p>The Southeast Ocean Observing Experiment project SOW and contract was established in June 2015. The investigators propose to install a hydrophone for passive acoustic recording of fish sound production and an acoustic receiver for detection of acoustically tagged fishes to the COMPS – SECOORA Big Carlos Pass's sensor array. They will tag up to 20 fishes (common snook, redfish, and seatrout) with acoustic tags in or near Big Carlos Pass to determine timing of movement patterns in response to changing environmental conditions. The main objective of this project is to demonstrate that acoustic measurements of fish sounds and behavior (movement) can be integrated with other measurements of atmospheric and oceanographic conditions and coupled to a node of an established regional scale ocean observatory. The main benefit of this study is that it will demonstrate the utility of acoustics as a complement to the sensor array typically found on ocean observatories to provide a more</p>

	comprehensive ecosystem level perspective with high-resolution data.
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Goal 4: Enhance the DMAC Subsystem

Milestones: Updates on activities are described in “progress” column of the following table.

Institution	Progress
<p>University of South Carolina (Porter), University of NC – Chapel Hill (Seim)</p> <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 data providers and RCOOS Manager on implementation of QA/QC flags based on the published QARTOD manuals. • Collaborate with SECOORA product development contractor. <p>University of North Carolina – CH (Seim)</p> <ul style="list-style-type: none"> • Improve and test SPARQL queries. • Investigate the quality of information of ESRI Geoportal side response of catalog search of metadata records. <p>Second Creek Consulting (Charlton Galvarino) Product Development Support Services</p>	<p>The main database server is running at capacity. They have begun moving some of the data ingestion processes (NOS, NDBC and NWS), the most CPU intensive, over to another server. This seems to have alleviated some of the bottlenecks we had been experiencing. Long-term plan is to create a data processing virtual server to move most of the data ingestion onto. The idea is to move towards the database machine just handling database transactions and move the data ingestion onto a separate server.</p> <p>They have added new “Data Intro” and “Map Portal” features to the data portal. “Data Intro” page provides access to map layers grouped by parameter, instrumentation and SECOORA theme areas. The Map Portal has the following new features: 'responsive' website design (using 'bootstrap' css templates) which should allow the site to change layout as needed depending on the display device (desktop, table, smartphone, etc.) - show/hide layers/legend, expand full-screen options; layer loading indicators (spinning dial next to layer name or within control); time-slider widget (map display widgets on the map bottom side-right) which can be used with 'time' coverage layers such as models, satellite, radar, etc. to update the active layers by +/- 24 hours Clicking the 'i' information button on the layer displays the layer relevant metadata including the date and time of the layer info; regional model, radar layer status indicator – plan add similar feature for global models or others; point/time-series query widget (map widgets third from bottom); in-situ observations are now available to layer display on a parameter basis with latest value labels and gradient color icon/legend; and in-situ platforms are also layer available by federal provider (NDBC, NERRS, etc.). The GSA Data Portal is now in maintenance mode, updates to data endpoints and server software performed. They also have added new data catalog capability to our data portal. Users will be able to search the SECOORA data holdings (keyword/geographic area/temporal) via the new “Catalog Search” capability.</p> <p>SECOORA RCOOS Manager and USC Data Management continued to participate on monthly IOOS DMAC calls. Represented SECOORA at the IOOS RA DMAC meeting held at the IOOS Program Office, Silver Spring, MD (May 27 – 29, 2015). We continue to maintain the netCDF version (ncSOS) and implement upgrades to the established service as and when new versions become available. We continued to archive our near real-time in-situ observations at National Oceanographic Data Center (NODC). We continued to provide input on QARTOD manuals as well as other data management related issues.</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 continue to work with data providers and PIs on: THREDDS data server installation and making model and</p>

Institution	Progress
	<p>observations available via the same; added drifter tracks from Horizon Marine Inc. and educational institutions participating and deploying drifters in NOAA science fisheries science centers educational programs. We continue to post glider tracks on SECOORA web site in coordination with IOOS glider DAC and regional glider operators.</p> <p>.</p> <p>IOOS Parameter Vocabulary</p> <p>UNC-CH completed the IOOS Parameter Vocabulary work during this reporting period and handed it over to Rob Ragsdale, US IOOS PO. The tasks completed are listed below:</p> <ol style="list-style-type: none"> 1. Demonstrate IOOS Vocabulary visualization capability -- orrviz <ol style="list-style-type: none"> a. Build test cgi-server b. Developed python cgi script with simple HTML GUI to dynamically generate SPARQL and return result back to the GUI selectable lists c. Deployed under campus cgi-server -- available at http://www.unc.edu/usr-bin/haines/orrviz.py d. Updated https://github.com/ioos/vocabularies Readme.md with new visual tools. 2. Vocab Search Use-Cases for IOOS Catalog <ol style="list-style-type: none"> a. Met with Rob and David Foster (ASA) discussed MMI ORR vocabulary search concept and the IOOS Catalog b. Wrote up use-cases and posted at http://github.com/ioos/catalog/wiki/ 3. Addressing other Vocabulary Mapping needs <ol style="list-style-type: none"> a. Reviewed and updated mappings to IOOS Parameter Vocab to CF Terms (v27). Notes provided at https://github.com/ioos/vocabularies/wiki/Review-of-Mapping-IOOS-Parameter-Vocabulary-to-CF-Standard-Names-%28v27%29 b. Mapped IOOS Core Variable to CF Terms (v27). Notes added to https://github.com/ioos/vocabularies/wiki/Mapping-IOOS-Core-Variables-to-CF-Standard-Names-%28v27%29 c. Verified that updates in mapping show up in other tools like <ol style="list-style-type: none"> i. SPARQL examples of List all Core Variables - http://www.unc.edu/~haines/orriios.html#Example4 ii. IOOS Vocabulary Visualizer - http://www.unc.edu/usr-bin/haines/orrviz.py iii. CF Standard Name Browser Tool - http://mmisw.org/cfsn/# <p>Product Development</p> <p>Second Creek Consulting completed the product development support service contract work during this reporting period. Second Creek developed two climatology products. Both products leverage IOOS and OGC standards and share a similar programming library code base. While both products have much in common, each is unique in that the first climatology product focuses on time-series (historical buoys and SABGOM model data) extraction and analysis in a graphical format while the second climatology product allows the user to view historical trends (SABGOM hindcast model data) in a mapping context. The final report and the software code were delivered to SECOORA. Documentation and notes on the products developed are made available via github (time-series and SABGOM hindcast).</p>

Institution	Progress
SECOORA DMAC operations transition	<p>In December 2014, the SECOORA Board recommended incorporation of DMAC within SECOORA core operations to meet the RA needs and enable continued growth. SECOORA initiated the transfer from the current co-PI structure (academic/grant model) to one that offers direct operational engagement (contractor/operational) of DMAC functions and activities by SECOORA staff. SECOORA conducted an open competitive solicitation for selecting a DMAC services contractor. SECOORA received four applications towards the solicitation and with an expert review panel and interview process, we have offered the contract to Axiom Data Science Inc. University of South Carolina DMAC team will continue to carry out and support the SECOORA DMAC activities in Year 5. USC DMAC team will also develop and submit a final project report in Year 5. USC DMAC team, SECOORA staff and Axiom Data Science will work together to coordinate the transitioning of the DMAC services to SECOORA core operations in Year 5. SECOORA staff are coordinating the establishment of statement of work (SOW) for USC and Axiom Data Science Inc.</p>

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. SECOORA's engagement in outreach and education activities are listed under "Goal 1: Sustain SECOORA as a Regional Information Coordination Entity (RICE)" of this report. We have listed the outreach work carried out by the RCOOS PIs during this reporting period below. No Education and Outreach PIs were funded in Year 4.

Education and Outreach Activities (RCOOS PIs)
<p>SECOORA RCOOS PIs Outreach: University of South Florida in-shore stations - The cities of Gulfport and St. Petersburg, USF Institute of Marine Remote Sensing (IMaRS), FWC/FWRI and YSI on Clam Bayou water quality station data utilization and station maintenance; ocean observing exhibit development with St. Petersburg Pier Aquarium Inc., and MOU with the Port of Tampa to collaborate in maritime workforce development, in research for resilient and sustainable maritime operations; University of North Carolina, Wilmington (in-situ stations) - NOAA's North Carolina Sentinel Site Cooperative on sea level rise research and outreach; NC Coastal Atlas Steering Committee and IOOS Federal Advisory Committee Act (FACA); University of South Carolina Beach Water Quality Modeling: Beach water quality modeling stakeholders meeting, Sarasota, FL; Roffer's Inc. Fisheries Habitat Modeling– Boat shows (New York National, the Atlantic City International Powerboat, and the Miami International). NASA – NOAA Fisheries Oceanography and Climate Change Workshop (Miami, FL, Dec. 08-10, 2014), Saltwater Sportsman National Seminar series (Myrtle Beach, SC and Port St. Lucie, FL, February 28 and March 06, 2015); NASA's Annual Earth Science and Biodiversity and Ecological Forecasting annual meetings (College Park, MD April 13-17, 2015); Habitat modeling, environmental change and fish stock assessment meeting in Orlando, FL (May 28, 2015); North Carolina State University SABGOM modeling – Engaging National Weather Service on nearshore circulation and wave predictions (NWS/Newport), Supporting NOAA fishery science and service on fish/turtle migration and sampling study (NOAA fishery- Beaufort Lab, Southeast Fishery Science Center and FWC/FWRI: Kathleen O'Keife) and a NC state funded Ocean Energy project by providing SABGOM simulated Gulf Stream results; University of South Carolina HF Radar - SC Department of Natural resources regarding the HF radar installation in Georgetown, SC and routine interaction with public visiting the beaches, especially residents of DeBordieu Colony and explain the principle of operation and the uses of HF radar data; University of South Florida Moorings and HF Radar – SECOORA/IOOS/FGCU undergraduate internship,FGCU real-time water quality buoys deployment in Estero Bay, Fort Myers, Outreach lectures at: San Jose Elementary School, Dunedin, FL, Useppa Island Club, Bokeelia, FL and Pinellas County, St. Petersburg, FL, HF Radar graduate student collaboration with USCG, Helzel Messtechnik GmbH, Germany and Actimar S.A.S., France on improvement of real-time quality control of WERA current data and CODAR AIS Automated Antenna Pattern Measurement (APM) Pilot Project Participant currently in operation at the USF Venice site.</p>

Scope of Work

Scope of work remains as proposed for Year 4. The Education and Outreach subcomponent remains unfunded as outlined in the revised scope of work for Year 4. Year 5 descope proposal development and establishment of subawards with partner institutions are in progress.

Personnel and Organizational Structure

At the May 2015 Annual meeting we held the election for the Board of Directors. Bob Weisberg, USF CMS (Academic/Research/Education Sector), George Maul (FIT) At Large Seat- Florida, Ruoying He (NCSU) At Large Seat- North Carolina, George Voulgaris (USC) At Large Seat- South Carolina, Jeff Copeland (WeatherFlow) Industry/Private Sector and Marcel Reichert (SCDNR) Public Agencies/ Non-Profit/ Other Sector.

Budget Analysis

SECOORA's financial records as of April 30, 2015 show the following has been expensed: over \$2.2M of Year 3 funds and over \$700K of Year 4 funds. There were eight no cost extensions granted for Year 4 subawardees. We anticipate that IOOS Year 3 subaward funds will be expensed by August 31, 2014. IOOS Year 4 funds are being drawn down rapidly. Overall, we are within budget and on track with spending. Megan Lee continues to manage no cost extensions with the Year 4 awards. SECOORA continues to receive invoices regularly from our subawardees and we process them at one of two bi-monthly 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

Archer, Shay, Jaimes and Martinez: Observing frontal Instabilities of the Florida Current Using HF radar to Elsevier's monograph entitled Coastal Ocean Observing Systems: Advances and Syntheses (Paper in press).

Janet J. Reimer, Wei-Jun Cai, Liang Xue, Rodrigo Vargas, Scott Noakes, Xinping Hu, Baoshan Chen, Jeremy T. Mathis, Richard A. Feely, Adrienne J. Sutton, Christopher Sabine, Sylvia Musielewicz, and Rik Wanninkhof. U.S. South Atlantic Bight sub-decadal secular pCO₂ trends at the Gray's Reef mooring (submitted to JGR-Ocean).

Kourafalou V.H., P. De Mey, M. Le Hénaff, G. Charria, C.A. Edwards, R. He, M. Herzfeld, A. Pascual, E. Stanev, J. Tintoré, N. Usui, A. van der Westhuysen, J. Wilkin, and X. Zhu (2015) Coastal Ocean Forecasting: system integration and evaluation. *Journal of Operational Oceanography*, 7(3) 129-148, doi: 10.1080/1755876X.2015.1022336.

Liang Xue, Wei-Jun Cai, Xinping Hu, Christopher Sabine, Stacy Jones, Adrienne J. Sutton, Li-Qing Jiang and Janet J. Reimer. Sea surface carbon dioxide at the Georgia time series site (2006-2007): air-sea flux and controlling processes (submitted to *Progress in Oceanography*).

Liu, Y., R.H. Weisberg, and C. Lembke (2015) Glider salinity correction for unpumped CTD sensors across a sharp thermocline. In *Coastal Ocean Observing Systems*, Elsevier (in press).

Liu, Y., H. Kerkering, and R.H. Weisberg (Editors) (2015) *Coastal Ocean Observing Systems*. ISBN 978-0-12-802022-7, Elsevier (in press).

Liu, Y., H. Kerkering, and R.H. Weisberg (2015) Preface, *Coastal Ocean Observing Systems*, Elsevier (in press).

Liu, Y., H. Kerkering, and R.H. Weisberg (2015) Introduction to coastal ocean observing systems, Elsevier (in press).

Liu, Y., R.H. Weisberg, and C. Lembke, (2015). Glider salinity correction for unpumped CTD sensors across a sharp thermocline, in *Coastal Ocean Observing Systems*, Y. Liu, H. Kerkering and R.H. Weisberg, eds., Elsevier (in press).

Liu, Y., R.H. Weisberg, and C. Lembke, (2015). Glider salinity correction for unpumped CTD sensors across a sharp thermocline, in *Coastal Ocean Observing Systems*, Y. Liu, H. Kerkering and R.H. Weisberg, eds., Elsevier (in press).

Liu, Y., R.H. Weisberg, and C. Lembke, (2015). Glider salinity correction for unpumped CTD sensors across a sharp thermocline, in *Coastal Ocean Observing Systems*, Y. Liu, H. Kerkering and R.H. Weisberg, eds., Elsevier (in press).

Meyers, S., M. C. Wilson, and M. E. Luther, 2015. Observations of Hysteresis in the Annual Exchange Circulation of a Large Micro-Tidal Estuary. *J. Geophys. Res.* doi: 10.1002/2014JC010342.

Meyers, S., M. C. Wilson, and M. E. Luther, 2014. Observations of Hysteresis in the Annual Exchange Circulation of Tampa Bay; AGU 2014 Fall Meeting, December 15, 2014.

Muglia, M., H. Seim and S. Haines, Measuring the landward Gulf Stream front variability off Cape Hatteras with HF radar, IEEE/OES Current Waves and Turbulence Workshop: March 2-6, 2015. St. Petersburg FL.

Muglia M., R. He, J. Bane, P. Taylor, H. Seim, B. Edge, "Observation and regional model based Gulf Stream marine hydrokinetic energy resource estimates for North Carolina", MTS/IEEE Oceans 2015: May 18-21, 2015. Genova, Italy.

Muglia, M, B. Edge, C. Lowcher, Gulf Stream Hydrokinetic Energy Observations for North Carolina. AGU Fall Meeting, 2014. San Francisco.

Neet, M., R.H. Kelsey, D.E. Porter, D. Ramage and A. Jones. Model performance results in Myrtle Beach, SC using Virtual Beach and R regression software. Submitted to South Carolina Water Resources Journal.

Neet, M., D.E. Porter, H. Kelsey, D. Ramage and A. Jones. 2015. Modeling bacteria concentrations in Southwest Florida: integrating historic in situ, remotely sensed and coastal observation system data sources. 2015 SECOORA Annual Meeting. Jacksonville, FL. May 2015. (Attached).

North, E., E. Adams, A. Thessen, Z. Schlag, R. He, S. Socolofsky, S. Masutani, and S. Peckham (2015) The influence of droplet size and biodegradation on the transport of subsurface oil droplets during the Deepwater Horizon spill: A model sensitivity study. *Environmental Research Letters*, 10(2015) 024016, doi: 10.1088/1748-9326/10/2/024016.

Pan, C., L. Zheng, R.H. Weisberg, Y. Liu, and C. Lembke, 2014: Comparisons of different ensemble schemes for glider data assimilation on West Florida Shelf, *Ocean Modelling*, 81, 13–24, doi10.1016/j.ocemod.2014.06.005

Pan, C., L. Zheng, R.H. Weisberg, Y. Liu, and C. Lembke, 2014: Comparisons of different ensemble schemes for glider data assimilation on West Florida Shelf, *Ocean Modelling*, 81, 13–24, doi10.1016/j.ocemod.2014.06.005

Porter, D.E., J. Dorton, L. Leonard, H. Kelsey, V. Subramanian and D. Hernandez. In press. Integrating environmental monitoring and observing systems in support of science to inform decision making: case studies for the Southeast. Chapter in *Coastal Ocean Observing Systems*. Y. Liu, H. Kerkering and R. Weisberg (eds.). Elsevier Press.

Porter, D.E. 2015. The role of environmental monitoring in supporting science to inform decision making: the power of partnerships. Coastal States Organization / National Estuarine Research Reserve Association Congressional Briefing. March 2015. Washington, DC. Invited presentation.

Porter, D.E., M. Neet, D. Ramage, H. Kelsey and A. Jones. 2015. Supporting public health and local beach economies by incorporating in situ monitoring, remotely sensed products and coastal / ocean observing systems. Southwest Florida Beach Managers Meeting. Sarasota, FL. January 2015.

Ren, W. H. Tian, B. Tao, J. Yang, S. Pan, W. Cai, S. E. Lohrenz, R. He, and C. S. Hopkins (2015) Large increase in dissolved inorganic carbon flux from the Mississippi River to Gulf of Mexico due to climatic and anthropogenic changes over the 21st century, *Journal of Geophysical Research - Biogeosciences*, 120, doi: 10.1002/2014JG002761.

Shay and Martinez: Coastal Ocean Current and Wave Response to Hurricane Jeanne Using High Frequency Radar: Implications for Surge Modeling. World Meteorological Organization's International Workshop on Tropical Cyclones Landfall Processes-3 in Jeju, South Korea on 9 December 2014. Torres, H., F. Muller-Karger, D. Keys, H. Thornton, M. Luther, and K.

Alsharif, 2015. Whither the U.S. National Ocean Policy Implementation Plan? J. Mar. Policy (2015), pp. 198-212, 10.1016/j.marpol.2014.11.013.

Weisberg, R.H, L. Zheng, Y. Liu, S. Murawski, C. Hu, and J. Paul (2015), Did Deepwater Horizon Hydrocarbons Transit to the West Florida Continental Shelf? Deep-Sea Res., Part II, doi:10.1016/j.dsr2.2014.02.002.

Weisberg, R.H., L. Zheng, and Y. Liu (2015) Basic tenets for coastal ocean ecosystems monitoring: A West Florida perspective. In Coastal Ocean Observing Systems, Elsevier (in press).

Xue, Z., J. Zambon, Z. Yao, Y. Liu, and R. He (2015) An integrated ocean circulation, wave, atmosphere, and marine ecosystem prediction system for the South Atlantic Bight and Gulf of Mexico, Journal of Operational Oceanography, doi:10.1080/1755876X.2015.1014667.

Zeng, X., Y. Li, and R. He (2015) Predictability of the Loop Current variation and eddy shedding process in the Gulf of Mexico using an artificial neural network approach, Journal Atmospheric and Oceanic Technology, doi: 10.1175/JTECH-D-14-00176.1.

Zeng, X., Y. Li, R. He, and Y. Yin (2015) Clustering of the Loop Current patterns based on satellite observed sea surface height and self-organizing map, Remote Sensing Letters, 6:1, 11-19, doi: 10.1080/2150704X.2014.998347.

June 2015 SECOORA Annual Supplemental Information

Education and Outreach Activities (IOOS Education and Outreach Inventory Tool)

During this reporting period, we used the [2012-2013 IOOS Cloud/Education and Outreach](#) Inventory Tool (Google Collaboration tool spread sheet) and updated the SECOORA Education and Outreach activities.

Regional Ocean Governance Organization Activities

Staff fiscal activities:

- Megan Lee (Business Manager) attended via webinar NOAA's Grants Management Division "Into the Current – What's New In Financial Assistance" Workshop– Silver Spring, MD, May 5-6, 2015.
- Provided fiscal and overall project management for Year 3 and Year 4 awards, and continued to manage primary partner institutions subawards.
- Added two subawards (Rip currents forecast model validation project and measurements of fish sounds and movement using passive acoustics and acoustic telemetry) with Year 4 funds during this reporting period.
- Held bi-monthly administration meetings to ensure efficient and effective fiscal operations.
- A part time Bookkeeper (Chiaki Kight) and Business Manager (Megan Lee) managed the contracts and financials for these awards.
- SECOORA staff held a staff retreat at Charleston, Feb. 5 -6, 2015
- Federal Financial Report for IOOS funds was submitted during this reporting period.
- During this reporting period SECOORA's Indirect Cost Rate was increased to 12.98%.
- Preparations are underway for FY15 SECOORA A-133 audit.
- In partnership with IOOS Association, SECOORA is in the process of converting the Part-time SECOORA Communications Specialist (Abbey Wakely) to full-time. Abbey continued work with SECOORA staff and members on outreach materials and activities.

SECOORA Board and PI Coordination

- 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 prioritization and coordination meetings and calls.
- Executive Committee continued to meet monthly. The Finance and Audit Committee met every quarter. Board conference calls were held when needed.
- Held Board meeting (Dec. 9, 2014 – Charleston, SC) and SECOORA annual Members Business and Board meetings (May 19-20, 2015 – Jacksonville, FL). Presentations and 2015 annual meeting materials can be accessed via [2015 May meeting summary website](#).

External Coordination Activities:

- Continued to actively participate in the Governors' South Atlantic Alliance (GSAA) and GSAA Regional Information Management System (RIMS) portal is being maintained.
- Debra continued to participate on monthly "Leadership Arm" calls of the GSAA.
- Debra attended the GSAA Executive Planning Team GSAA World Ocean Council Industry Forum meetings held in Charleston, SC (April 7-8, 2015).
- Participated in monthly IOOS Association and IOOS conference calls, including Debra's participation on the IOOS Association Executive Committee.
- Debra and Conrad attended the IOOS Association Spring Meeting held in Washington D.C. (March 2015).
- We are coordinating and hosting Southeast Ocean and Coastal Acidification Network ([SOCAN](#)) webinars with National Oceanic and Atmospheric Administration's Ocean Acidification Program.
- Beach Water Quality Modeling Stakeholders meeting (January 9, 2015, Sarasota, FL) – "Transferability of beach water quality modeling to Sarasota beach areas". Representatives from SECOORA, GCOOS-RA, University of South Carolina, Mote Marine Laboratory, Florida Department of Health (FDOH), FWC/FWRI, Sarasota Estuary Program and Sarasota and Manatee counties GIS, utilities and water quality monitoring programs attended and provided input at the meeting.
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- South Carolina SECOORA members outreach social (February 5, 2015, Charleston, SC).
- [SECOORA at Charleston STEM Festival](#) (February 7, 2015)
- South Atlantic Ecosystem Model workshop (February 10-11, 2015), St. Petersburg, FL.
- Other meetings, conference calls and activities: Weather Ready Nation events; West Central Florida American Meteorological Society events; Weather Forecast Office, Ruskin, Tampa and Weather Ready Nation (WRN) events; Integrated Tracking of Aquatic Animals in the Gulf of Mexico (iTAG) conference calls; Florida Atlantic Coast Telemetry (FACT) events; Florida Gulf Coast University Real-time Basic Observation Buoy Deployment; New College of Florida Faculty Seminar Series, Sarasota; SC Wind Regulatory Task Force meeting; Florida Institute of Oceanography, FWC/FWRI, USGS and University of South Florida outreach meetings; South Atlantic Landscape Conservation Coalition workshop; NOAA Southeast and Caribbean Regional Collaboration Team (SECART).

Efforts to Leverage IOOS Funding

- Continued partnership with GSAA and maintained the Regional Information Management System portal for the GSAA.
- The PIs that receive SECOORA subawards also leverage either their institutional funds or external grants to carry out their projects.
- [Onslow Bay Buoy Fund](#): In partnership with University of North Carolina Wilmington and area boating and fishing community groups raised funds needed to deploy the Onslow buoy.
- Donate to SECOORA: We launched Shop AmazonSmile (Shop AmazonSmile and contribute to SECOORA). Amazon will donate 0.5% of the price of your eligible AmazonSmile purchases to Southeast Coastal Ocean Observing Regional Association whenever you shop on AmazonSmile. Funds generated will be invested to educate students and the public about coastal ocean observing activities in the Southeast.

Update to RA Membership, Board of Directors and Active Committee Members

RA Membership

During this reporting period, the following organization joined SECOORA:

- Mote Marine Laboratory, Sarasota, FL.

Board of Directors

The following Board Members are rotating off of the SECOORA Board of Directors at the end of June 2015:

Rick DeVoe – South Carolina Sea Grant

Mitch Roffer – ROFFS®

Steve Woll – Weatherflow

Dick Dodge – NOVA Southeastern University

The following members were elected/re-elected to serve on the SECOORA Board (starting July 1, 2015) at the May 2015 Board meeting:

Bob Weisberg (USF CMS): Academic/Research/Education Sector

George Maul (FIT): At Large Seat- Florida

Ruoying He (NCSU): At Large Seat- North Carolina

George Voulgaris (USC): At Large Seat- South Carolina

Jeff Copeland (WeatherFlow): Industry/Private Sector
Marcel Reichert (SCDNR): Public Agencies/ Non-Profit/ Other Sector

SECOORA Committees

Finance and Accounting Committee: Chair: Peter Hamilton

Members:

Rick DeVoe – South Carolina Sea Grant Consortium

Conrad Lautenbacher – GeoOptics

Peter Hamilton – Leidos Corp.

Board Development Committee: Chair: Mitch Roffer

Members:

Peter Hamilton

Nick Shay

Mitch Roffer

Steve Woll

Governance Committee: Chair: Mitch Roffer

Manhar Dhanak

Mitch Roffer

Lynn Leonard

Marcel Reichert

Note: The RA membership, Board of Directors and Committee members are on the SECOORA website, which is updated on July 1 of every year and periodically updated as and when necessary, and provided in IOOS PO template in Appendix A.

Appendix A: Updates to SECOORA Board Membership

Region	Type of Governance	Distribution of Governance Board Membership								Total Number of Board Members
		Government				Non-Government			Foreign (all sectors)	
		State*	Local	Tribal	Federal	Research Institute	Industry	NGO**		
SECOORA	501(c)(3)	1				10	4	1		16

* includes Sea Grant and territorial governments

** includes Fishery Management Councils