Southeast Coastal Ocean Observing Regional Association (SECOORA):
A Framework for 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.

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Progress and Accomplishments

During this reporting period, SECOORA submitted the revised [scope of work](#) for Year 4 (June 1, 2014 – May 31, 2015). Contractual review and account establishment for the Year 4 award were completed, and funding for SECOORA sub-awards were disbursed to partner institutions. The administration of the Year 3 sub-awards are being continued by SECOORA. Support to Gray's Reef Ocean Acidification buoy, funded by NOAA's Ocean Acidification Program, is being continued. A new sub-award was issued to University of Delaware to support Ocean Acidification field data collection in Year 4. We committed $20,000 of support to maintain the new University of North Carolina at Chapel Hill high frequency radar site located at Core Banks, NC. We are preparing solicitations to add the following new tasks in Year 4 that further address integration of our ongoing projects and user needs:(1) ocean variable experiment; (2) rip current model validation and forecasting, and (3) enhance and strengthen data management infrastructure. This report details the progress and accomplishments over the reporting period.

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

Milestones: Progress continues on this goal, and brief milestone updates are provided below.
Additional details are described in the table that follows.

A. **Provide timely grant reports to NOAA:** Submitted 2014 NOPP annual report, IOOS semi-annual progress report with December 2014 annual supplemental information as required, and the semi-annual Federal Financial report during this reporting period.

B. **Hold Board Meeting Fall 2014 and Member Meeting 2015:** Held Fall 2014 Board meeting in Charleston, SC (Dec. 8-9, 2014). Planning for Spring 2015 (Jacksonville, FL, May 19-20, 2015) Board and Annual Member meeting is underway.

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. In 2014, SECOORA sent 4 e-newsletters, referring 346 sessions to our website through our April, June, and September newsletters. We sent 14 emails outlining staff updates to the Board and produced twenty-nine stories highlighting members' 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 70 in-person outreach events. During this reporting period, we developed new outreach rack cards, one-pagers for each state, provided educational briefs to Congressional staff, and held an outreach event for stakeholders including Congressional staff at UNCW. We also produced our first annual report highlighting 2013 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. **Refine and maintain RCOOS Conceptual Operations Plan:** Ongoing.

G. **Support local, regional, and national collaboration:** The following is a list of collaboration efforts and partners: GliderPalooza 2014, Governors South Atlantic Alliance Ocean and Coast Portal, IOOS Vocabulary, IOOS Catalog, IOOS DMAC, RA Certification rules, IOOS Education and

Outreach efforts(partnering with IOOS Program Office (PO), IOOS Association and all other RAs, NOAA Southeast and Caribbean Regional Team (SECART); Southeast Ocean and Coastal Acidification Network (SOCAN); HF Radar Steering team and Modeling Strategy Committee; IOOS Advisory Committee. 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 website 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
• 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.	**Staff fiscal activities:** • Provided fiscal and overall project management for IOOS awards, and continued to manage primary partner institutions sub-awards. • Held bi-monthly administration meetings to ensure efficient and effective fiscal operations. • Our part-time Bookkeeper (Chiaki Kight) and Business Manager (Megan Lee) continue to manage the contracts and financials for these awards. • The FY14 SECOORA A-133 audit was conducted by the firm Elliott Davis, LLC and was finalized on September 22, 2014. There were no negative findings. • Megan Lee, SECOORA Business Manager attended via webinar the NOAA Grants Management Financial Assistance Workshop Silver Spring, MD held June 24-25, 2014. **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 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 2014 Board meeting in Charleston, SC, December 8 – 9, 2014. **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. • Executive Director continued to participate in quarterly "Partner Arm" calls of the GSAA as well as regular Executive Planning Team calls. • Staff participated in monthly IOOS Association and IOOS PO conference calls, including Executive Director participation on the IOOS Association Executive Committee, and attended the IOOS Association/IOOS Annual meeting. • SECOORA shared an exhibit booth with GCOOS-RA at the Science Festival in St. Petersburg, FL on October 18, 2014. • Other meetings and activities: NOAA Ecological Forecasting webinar and meeting. Weather Ready Nation events; Weather Forecast Office visits in Tampa, Miami and Charleston; Wilmington Sector USCG; North Carolina Sea Grant; North Carolina Member institutes as well as potential new member organizations; Fleet Weather Center, Norfolk, VA; Florida Gulf Coast University; West Central Florida American Meteorological Society Meetings; International

SECOORA Activities	Progress
	Radio Oceanography Working Group meeting; West Central Florida American Meteorological Society Meetings; International Radio Oceanography Working Group meeting; 2014 St. Petersburg Science Festival; Undergraduate Environmental Science Lab Tours USF Clam Bayou Water Quality Monitoring Station; Guy Harvey Fisheries Symposium, St. Petersburg, FL (November 13-15, 2014); Researching Plastic Marine Debris Canterbury School of Florida, St. Petersburg Oceanography Class; and 2014 World GIS Day, University of South Florida, St. Petersburg, FL (November 18, 2014); Glider Palooza 2014 SECOORA and University of Georgia, Skidaway Institute of Oceanography. **Efforts to Leverage IOOS Funding:** • Continued partnership with GSAA. SECOORA partially supports operations and maintenance for the UNC Core Banks HF Radar system, which was funded by the state of NC through the UNC Coastal Studies Ocean Energy Program.

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:** 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 websites**: Ongoing.

    ii. **Estimates of significant wave heights from the HFR 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 their site performance metrics.

    iv. **Provide the radial currents to the National Servers (SIO/Rutgers) for the National HFR network:** 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. Support was allocated to University of Delaware Ocean Acidification field data collection in Year 4.

E. **HFR Waves Project:** In April 2014, University of Miami (UM) Rosenstiel School of Marine and Atmospheric Science deployed a subsurface mooring in the Straits of Florida. The mooring was equipped with a NortekUSA AWAC instrument. AWAC profiler was located in the UM maintained HFR footprint (between Dania Beach and Virginia Keys stations) and collected waves and currents data for three months. The AWAC (NortekUSA) mooring was recovered in August 2014. These raw data have been provided to NWS (current and wave data), and are now being carefully being analyzed.

F. **Asset inventory and provide performance metrics activities update:** Registered SECOORA assets web services in National Geophysical Data Center (NGDC) and IOOS Catalogs. SECOORA HF Radar operators use the National HFR 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	University of South Florida (USF) COMPS three surface and two subsurface moorings, along with one near shore tower installation are maintained for real-time and delayed mode observations (surface meteorology and water column currents and temperature/salinity (T/S) on surface moorings, water column velocity (V) and bottom T/S on subsurface moorings, and surface meteorology, water column currents and waves on the near shore tower). New data logger/telemetry systems were deployed on three surface moorings, which led to improved data returns from the moorings.
University of South Florida (Merz) Support in-shore tidal meteorological stations	Support is continued for USF COMPS coastal stations that collect physical and meteorological data in real-time. USF has added the Clam Bayou station, located on Boca Ciega Bay in St. Petersburg, FL, to the COMPS coastal stations network. A new radar-based water level sensor on a NOAA designed mounting frame with bubbler back-up was added to this site on October 29, 2014. In addition to water level and meteorological data, the Clam Bayou site measures salinity, dissolved oxygen, pH, water temperature, turbidity, chlorophyll, blue green algae, fluorescent dissolved organic matter. Water quality and water level sensors were supplied by YSI/Xylem. Consolidation of the COMPS Egmont Key and Anna Maria sites into a single nearby site is in the planning stages. It is expected that USF will maintain 6 coastal stations (Shell Point, Aripeka, Fred Howard Park, Big Carlos Pass, Clam Bayou and the consolidated Egmont/Anna Maria site). The real-time data collected by the moorings and coastal stations are delivered to SECOORA and NDBC, and are made available via Global Telecommunication System (GTS).
University of North Carolina - Wilmington (Leonard) Support CORMP observing network	University of North Carolina Wilmington (UNCW) continued to operate and maintain 7 nearshore real-time moorings and 1 coastal pier station. These stations collect and provide hourly reports of the following variables: wind velocity, barometric pressure, sea surface temperature, atmospheric temperature, solar radiation, sea level, in‐water velocity, salinity, and waves. During this reporting period, UNCW's CORMP successfully redesigned the communications/telemetry systems. Currently, 5 of the nearshore moorings (≤ 5 nm from shore) use Verizon cell modems, replacing the Iridium satellite communications service. One more mooring will be converted to cell modem within the next reporting period, and another mooring will continue to use Iridium since it is 27 miles from shore and cell phone coverage does not extend that far offshore. All data collected are provided to SECOORA and NDBC and are made available via GTS.
University of Georgia (Noakes) – Support to NOAA's Ocean Acidification Program NDBC Gray's Reef National Marine Sanctuary (GRNMS) buoy	University of Georgia continues to operate and maintain the NOAA's Ocean Acidification Program NDBC GRNMS buoy (41008). The GRNMS pCO2 system has been transmitting water and air pCO2 measurements and pH without incident during the reporting period. The batteries on the Sea-Bird failed in September so the water quality parameters are currently not being transmitted. On October 24, all the pCO2 systems mounted on the buoy deck were replaced. This also included mounting a new GPS integrated iridium antenna on the buoy mast. The SAMI-pH and Sea-Bird mounted under the buoy could not be replaced at this time due to sea conditions. Seas were moving the buoy considerably and did not allow for safe diving under the buoy. UGA and GRNMS are currently watching the sea conditions for an opportune window to head back offshore to replace the two sensors. The

Institution/Activities	Progress
Sustain an Observing System for the SE: Sustain Moored and Coastal Stations; Maintain Priority Radars	
	waters off the shore of Georgia are currently undergoing their annual shift from being a CO2 source to becoming a CO2 sink. During this reporting period, surface water pCO2 has shifted from the mid 500 µatm to the mid 300 µatm. Atmospheric pCO2 at GRNMS is currently around 400 µatm. Also at GRNMS, pH is slowly increasing during this period from approximately 8 to 8.1. These seasonal changes are primarily temperature driven and expected annually, however overall the pCO2 at GRNMS has been increasing at a rate of 2.7% per year for seawater and 0.78% per year for atmospheric pCO2. Continued monitoring at the site will help to determine if this rate is an ongoing event. During this reporting period, the estuarine and coastal water offshore of Georgia were surveyed extensively (April, May, July, July, September) by partner institution University of Delaware for the following purposes: a) provide a ground-truthing for the mooring pCO2 and pH at the Gray's Reef, b) build a robust total alkalinity (TAlk) and salinity relationship; thus high frequency mooring salinity data can be translated into TAlk and, using TAlk and high frequency pCO2, we can calculate high frequency dissolved inorganic carbon (DIC), pH, and carbonate saturation state and c) understand coastal carbon cycling and relevant biogeochemistry such that they can be incorporated into building a predictive model for pCO2, pH and saturation state at the mooring site and in the region. During these cruises, scientists measured pCO2, pH, and took water samples for dissolved inorganic carbon (DIC) and total alkalinity (TAlk) analysis. During each survey, in addition to an underway (pumping seawater through an instrument when the ship is sailing) survey of pCO2 and O2, they also took about 100 water samples to measure DIC and TAlk back at the lab. Two manuscripts are nearly ready for submission. The first one examines the drivers, i,e variables (DIC, Talk, Temperature and Salinity etc.), that control the pCO2 at the mooring site. The second paper will examine the secular trend over the 7 years since observations started at the mooring for pCO2 in 2006.
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 HFR in mapping currents were performed. The data from the stations are provided in near real-time to SECOORA and the U.S. National HFR network maintained by the Scripps Institution. The performance metrics (temporal and average spatial range) of the CODAR systems indicate operation for 99.7% and 169km, 85.4% and 165km and 88.1% and 179km, for the period 1 June 2014 to 6 December 2014 for the Reddington Shore, Venice and Naples, respectively. The performance metrics of the WERA systems indicate operation for 97.8% and 126km and 93.0% and 126km for the period 1 June 2014 to 6 December 2014 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 HFRs on St. Catherine's Island and Jekyll Island, GA for this reporting period. The data are being continuously provided to SECOORA and the U.S. National HFR Network archive in near-real time. Estimates of wave and wind parameters are also made as experimental products. Operational uptime and average spatial range statistics for the period from 1 June 2014 to 6 December 2014 of St. Catherine's Island and Jekyll Island HF Radar sites are: 99.7%, 182km, 99.3%, 198km.

Institution/Activities	Progress
Sustain an Observing System for the SE: Sustain Moored and Coastal Stations; Maintain Priority Radars	
University of Miami (Shay) Support three WERA radar arrays at Crandon, Virginia Key and Dania Beach HF Radar Waves Project	The University of Miami operates WERA HFR installations on Key Biscayne (Crandon), Virginia Key and Dania Beach. Dania Beach and Virginia Key transmit at 12 MHz; Crandon Park site is now transmitting again at 16 MHz. Crandon Park site was not operational from the summer of 2013 to the summer of 2014 due to a cable being severed by city park and recreation maintenance crew. 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 U.S. National HFR network archive. Discussions are underway with Ocean Reef Club, Key Largo to establish the fourth WERA site at Key Largo, FL. Operational uptime and average spatial range statistics for the period from 1 June 2014 through 6 December 2014 of Virginia Key and Dania Beach HFR sites are: 94.7%, 110km and 86.8%, 118km. University of Miami was awarded funds to carry out an applied research project during this reporting period to evaluate the feasibility of delivering accurate wave estimates from HFR for broad use by stakeholders. The objective of this project is to deploy an Acoustic Wave and Current Profiler (AWAC) in the HF Radar footprint in the FL Straits to obtain wave measurements, which can be compared to the WERA HF derived significant wave height measurements. The work will also include a careful assessment of the errors in wave extraction algorithms. In April 2014, UM Rosenstiel School of Marine and Atmospheric Science deployed a subsurface mooring in the Straits of Florida. The mooring was equipped with a NortekUSA AWAC instrument. AWAC profiler was located at 25.93N and 79.88W in the UM maintained HFR footprint (between Dania Beach and Virginia Keys stations) and collected waves and currents data for three months. The AWAC (Nortek) mooring was recovered in August 2014. Data recovery is 100% based on preliminary analysis. These raw data have been provided to NWS (current and wave data), and are now being carefully analyzed relative to HFR measurements for currents and waves.
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 HFR installations on the Outer Banks of North Carolina. A new station at Core Banks, NC has been added (March 2014). Funding for this additional site comes from the state of NC through the UNC Coastal Studies Ocean Energy Program. Operations and maintenance are being partially supported by SECOORA. Other progress and accomplishments during this reporting period are: (i) continued collaboration with Johns Hopkins University to develop ship-tracking capabilities using the DUCK 5 MHz CODAR site located at the Army Corps Field Research Facility in Duck, NC. Improvements to the site from this collaboration include: additional transmit antenna and high power transmitter added (fall 2013), new model receive antenna replaced the 10 year old existing antenna, a new antenna calibration was completed 11/07/14; and (ii) continue to develop Gulf Stream landward edge tracking capabilities with the NC radars, and compare them with existing data products. The investigators have also begun seeking optimal reprocessing parameters for the NC radars to improve radar surface current quality at the radial short, or 30 minute averaged radial, level. Hourly data from the systems are delivered to SECOORA and the U.S. National HFR network archive. Operational uptime and average spatial range statistics for the period from 1 June 2014 through 6 December 2014 of Core Banks, Cape Hatteras and Duck HF Radar sites are: 90.8%, 192km, 99.9%, 185km, 99.6%, 235km.
University of South Carolina (Voulgaris) Support two WERA arrays on Fort	The University of South Carolina currently maintains, operates and delivers data from two priority radar sites (Fort Caswell, NC and Georgetown, SC) covering Long

Institution/Activities	Progress
Sustain an Observing System for the SE: Sustain Moored and Coastal Stations; Maintain Priority Radars	
Caswell, NC and Georgetown, SC	Bay, SC. The operation of the two systems was continued without major interruptions during the reporting period, despite a number of issues developed with the Georgetown site due to coastal erosion (storm activity) that made the antennas of this site vulnerable to damage. 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. Operational uptime and average spatial range statistics for the period from 1 June 2014 through 6 December 2014 for Fort Caswell, NC and Georgetown, SC HFR sites are: 99.7%, 179km, 98.8%, 228km. The data from each station are provided in near real-time to SECOORA and the US National HFR 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
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 three-dimensional (3D) regional ocean predictions. The model provides daily 72 hour nowcast/forecast, and model output (sea level, temperature, salinity and 3D currents) are made available via the SECOORA website and the NCSU PI's website. SABGOM model has been coupled with a biogeochemical prediction model, and testing of data assimilation (DA) schemes within the SABGOM modeling system using 3D-variable and 4D-variable data assimilation schemes is ongoing. The DA system, once fully implemented, will be able to assimilate observations including satellite sea surface temperature, sea surface height, HFR surface currents, and glider observed hydrography to improve SECOORA regional ocean circulation predictions. Using SABGOM model predictions, the PI and his team supported USF and NOAA in a 30-day glider survey of the Gulf Stream, which was conducted in March 2014. The resulting high-resolution hydrographic data are being used to test SABGOM's data assimilation system. 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.

Institution/Activities	Progress
University of Florida (Sheng) and North Carolina State University (Xie) Provide real-time forecasting of inundation and storm surge.	The North Carolina State University Coastal Marine and Atmospheric Environment Prediction System (CMAEPS) maintained the near-real-time CMAEPS forecast system that 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. Specific progress and accomplishments during this period include: (1) Maintaining the near-real-time CMAEPS forecast system on the NCSU IBM Blade Center Linux Cluster (henry2) and providing real-time atmospheric, sea surface wave, and storm surge forecasts for the SECOORA region, and high-resolution storm surge forecasts for the Florida Coast domain; 2) Providing the atmospheric WRF model forecasts and sea surface wave forecasts through the web and data server; and 3) Starting to summarize their previous research and application works for the past three-year period and to draft the final progress report. The University of Florida has completed a 3D forecasting system coupled with a SWAN wave model for the entire Florida coast that provides a two to three day forecast depending on the forecast wind fields. Specific progress and accomplishments during this period include: (1) Maintaining the near-real-time 3D forecasting system; (2) Serving 3D model data via SECOORA THREDDS server as well as PI's website and (3) Starting to summarize their previous research and application works for the past three-year period and to draft the final progress report.
ROFFS (Roffer), University of Miami CIMAS (Muhling), and SAFMC (Pugliese) Develop data products derived from satellite and in situ observations for fisheries stock assessment.	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 habitat models for enhancing fish stock assessments. Engagement by regional stakeholders in the stock assessment process has increased substantially during this reporting period. A scientific paper ("Habitat models for Gray Triggerfish collected in fishery independent trap surveys off the Southeastern United States") was prepared and presented to the members of the SouthEast Data, Assessment and Review (SEDAR) at the Charleston, SC (Aug. 04-08, 2014) SEDAR #41 Workshop. It is important to note that this scientific paper resulted in substantive discussions during the Assessment Index Working Group at this meeting. Walt Ingram (NOAA, NMFS, Pascagoula Laboratory), Barbara Muhling (Co-PI) and Joey Ballenger are presently engaged in discussions related to refining, evaluating, and hopefully implementing the use of the habitat model into the grey triggerfish stock assessment. It was felt at the SEDAR meeting 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. The idea of using habitat modeling was further advanced by Roger Pugliese (SAFMC) within the South Atlantic Fishery Management Council during their June (Ponte Vedra Beach, FL) and September (Charleston, SC) meetings. The ongoing work by the project team with NOAA NMFS Southeast Fisheries Science Center (Miami, FL) with highly migratory species also continues to serve the advancement of the use of habitat modeling for stock assessment. Roffer is also working on habitat modeling with Aaron Adams (Bonefish Tarpon Trust) and Jon Shenker (Florida Institute of Technology) on items related to bonefish, tarpon, and permits within and outside of the SECOORA footprint. Discussions relative to the sharing and utilization of the physical data collected by the MARMAP fisheries independent monitoring program to the SECOORA community have been initiated. The project team is also engaged in working with other

Institution/Activities	Progress
	SECOORA PIs as well as with other researchers at the Florida Wildlife Research Institute to identify and develop products that could be served on SECOORA's website to assist the South Atlantic Fishery Management Council and others involved with fish stock assessment in the SECOORA region.
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 maintain 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 website (Beach Swimming Advisory Portlet). During this reporting period, the PI and his team are working to evaluate / demonstrate geographical transferability of their modeling approach. They are focusing on swimming beaches in FL identified as areas of concern by state of Florida Beach Managers / public health officials. Initial stakeholder interactions and discussions yielded recommendations for the study area to be within the Sarasota County, FL beach area. Data gathering efforts and model setup (historical and real-time bacterial, water quality and meteorological) are in progress.
SECOORA Model Skill Assessment	Filipe Pires Alvarenga Fernandes, Oceanographer, Brazil, was awarded the SECOORA Model Skill Assessment project contract. Richard Signell, Scientist, United States Geological Survey (USGS), U.S. IOOS Modeling Test Bed Steering Committee member will be a collaborator and act in an advisory role on this project. The contract was established in May 2014, and the work is in progress to develop an on-line tool for SECOORA numerical model skill assessment. A SECOORA model skill assessment project website has been set up to post the results and progress of the ongoing work. The workflow and model skill assessment version controlled software code base are hosted at the github website. Identification and access to SECOORA observations (in-situ, HFR and Glider) and numerical models (SABGOM, USF FVCOM, etc.) via SECOORA and IOOS developed catalog endpoints (Sensor Observation Service and THREDDS) have been completed. Work has also been completed on the development of software for the comparison and estimation of error metrics of water level observations with model data, and an interactive map of the results of the comparison and bias estimates can be accessed via this website. Work is in progress to compare salinity, temperature and currents (in-situ and HFR) observations with model data.

Goal 4: Enhance the DMAC Subsystem

Milestones: In Year 4, the University of South Carolina (D. Porter) is the primary partner who will maintain and support the SECOORA DMAC subsystem and the University of North Carolina at Chapel Hill (H. Seim) was 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) • 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	The University of South Carolina (USC) hosts and maintains the hardware and software related to SECOORA's Data and Maps section of the website. Significant effort has focused on redefining the look and feel of the Data Portal to mimic the technological approach of the GSAA Data Portal. The GSAA Data Portal project is now in maintenance mode, and updates to data endpoints and server software are being performed.

Institution	Progress
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) • Support IOOS Parameter Vocabulary Efforts. • SECOORA Climatology Product	SECOORA RCOOS Manager (V. Subramanian) and USC Data Management team continued to participate in IOOS Data Management monthly conference calls and provide input and contributions towards IOOS PO and RAs common data management topics and discussions such as Sensor Observation Service (SOS), IOOS Catalog and QARTOD etc. We have implemented the netCDF version (ncSOS) and have registered our SOS, THREDDS and ERDDAP services on the IOOS catalog registry. SECOORA RCOOS Manager worked with USF technical personnel to demonstrate the implementation of quality control tests outlined in the IOOS Manual for Real-Time Quality Control of In-Situ Current Measurements for buoys on the West Florida Shelf at the May 2014 IOOS DMAC webinar. We have started to archive our near real-time in-situ observations at National Oceanographic Data Center (NODC). 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. We also started contributing to the IOOS established documentation and code sharing [github](#) site. We worked with data providers and PIs on: THREDDS data server installation and making model and observations available via the same; added Florida Atlantic University LOBO and Florida Institute of Technology (FIT) Sebastian Inlet station data; and glider deployment track posting on SECOORA website in coordination with IOOS Glider Data Assembly Center (DAC) and SECOORA glider operators. Added Northeast Fisheries Science Center (NEFSC) drifter program latest drifter tracks to SECOORA map interface. USC has been working closely with NCSU/Ruoying He as they are developing larger footprint US East Coast model products including salinity, water temperature, and circulation. We are developing Catalog Service for the Web (CSW) compliant catalog to host a more dynamic and up-to-date listing of SECOORA assets. Towards accomplishing the objectives of SECOORA product development project, created daily/monthly summary average/minimum/maximum/variance files from NCSU SABGOM model data, provided data query and netCDF format support with USF and UNCW observations and NCSU (SABGOM) model data, and performed the upgrade of THREDDS server to better support performance and improved uptime. IOOS Parameter Vocabulary work was continued during this reporting period. UNC personnel built and deployed a demonstration utility to visualize mappings of IOOS Parameter Name Vocabulary. The visual demonstration shows general relationships between various terms returned by querying Marine Metadata Interoperability (MMI) Ontology Registry and Repository (ORR). The graphic user interface (GUI) allows a user to dynamically select terms and see detailed display of mapped terms from general to more specific utilizing relationships and terms registered and mapped in the MMI ORR (http://www.unc.edu/usr-bin/haines/orrviz.py). A review of the current IOOS parameter vocabulary to Climate and Forecast (CF) standard name map was performed. There have been several updates to the CF standard name table, which required new mappings. Ten new mappings as a consequence of 358 new terms were added. The new IOOS parameter to CF standard name map can be found [here](#). Documented

Institution	Progress
	vocabulary search use-cases for the IOOS Catalog are located at the IOOS github website. With the help of the SECOORA product committee members, the data providers and mangers at UNC Wilmington and USF, the Ocean Observing and Modeling Group at NCSU, and the USC SECOORA DMAC team, Second Creek Consulting, LLC developed and released the SECOORA Climatology product. This product allows users to visualize, interact and download historical surface temperature and salinity data from select SECOORA buoys and historical nowcast/forecast South Atlantic Bight Gulf of Mexico (SABGOM) model data from 2011 - 2014. Work is in progress to add visualization of seasonal climatologies of NCSU model generated salinity and temperature.

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 4.

Education and Outreach Activities
SECOORA continued to engage in outreach activities via e-newsletter, e-mails, social media and website. SECOORA sent e-newsletters, referring and increasing traffic sessions to our website during this reporting period. We sent emails outlining staff activities to the Board. Stories highlighting Members work, SECOORA newsletters and more were published on our website. We continue to engage in outreach and education events as well as provide materials to RCOOS PI and Board members, who attend science meetings, provide information to governmental representatives, etc. SECOORA staff and Members engaged in many in-person outreach events, including meeting with Congressional Staff. During this reporting period, we developed the SECOORA Annual Report, new outreach rack cards and one-pagers for each state, which can be accessed via our website.
SECOORA In-person Outreach: SECOORA staff constantly engaged in either delivering a talk at institutions or visiting institutions and attending meetings to promote the need for the implementation of Regional Coastal Ocean Observing Systems to address coastal zone issues. The following are some outreach activities that occurred during this reporting period: NOAA Ecological Forecasting webinar and meeting; Weather Ready Nation events; Weather Forecast Office visits: Tampa, Miami and Charleston; Wilmington Sector USCG; North Carolina Sea Grant; North Carolina Member institutes as well as potential new member organizations; Ocean Acidification office in Charleston; GSAA meetings; Our Global Estuary meeting; Congressional offices; North Carolina Coastal Management and Sentinel Site Programs; South Carolina Maritime Association; GCOOS-RA Annual Meeting; Integrated Tracking of Aquatic Animals in the Gulf of Mexico (iTAG) workshop; SURA Coastal and Environmental Research Committee (CERC) Spring 2014; Fleet Weather Center, Norfolk, VA; Florida Gulf Coast University; West Central Florida American Meteorological Society Meetings; International Radio Oceanography Working Group meeting; 2014 St. Petersburg Science Festival; Undergraduate Environmental Science Lab Tours USF Clam Bayou Water Quality Monitoring Station; Guy Harvey Fisheries Symposium, St. Petersburg, FL (November 13-15, 2014); Researching Plastic Marine Debris Canterbury School of Florida, St. Petersburg Oceanography Class; and 2014 World GIS Day, University of South Florida, St. Petersburg, FL (November 18, 2014).
During this reporting period we conducted our SECOORA Board meeting in Charleston, SC (December 4-5, 2013).

Scope of Work

In Year 4, SECOORA committed: (1) $600,000 towards supporting priority High Frequency Radars (2) $108,008 to NOAA's Ocean Acidification Program ($69,907 to Univ. of Delaware); $38,101 to Univ. of Georgia, and (3) $20,000 to the UNC-Chapel Hill for one time operation and maintenance support for the HFR located at Core Banks, NC. We will be adding the following new tasks in Year 4 that further address the integration of our ongoing projects and user needs: (1) ocean variable

experiment; (2) rip current model validation and forecasting, and (3) enhance and strengthen data management infrastructure.

Personnel and Organizational Structure

No major changes in SECOORA personnel or organizational structure were made during this reporting period. A current list of SECOORA Members and Board is available on our [website](). SECOORA's Board elected new officers during this reporting period (Chair- Conrad Lautenbacher, GeoOptics; Vice Chair - Rick DeVoe, SC Sea Grant Consortium; Treasurer – Peter Hamilton, Leidos Corporation; Secretary – Jim Nelson, SKIO, UGA; At Large: Richard Dodge, Nova Southeastern University).

Budget Analysis

The FY14 SECOORA A-133 audit was conducted by the firm Elliott Davis, LLC and was finalized on September 22, 2014. There were no negative findings. SECOORA's October 31, 2014 financial report shows a budget balance remaining of $579K (Year 3 funds) and a budget balance remaining of $2.3M (Year 4 funds). We are within budget and on track with spending. IOOS Year 1 & 2 sub-awards have been closed. There were thirteen no cost extensions granted to Year 3 sub-awardees ranging from four months to one year. We started to draw IOOS Year 4 funds in September 2014. SECOORA continues to receive invoices regularly from our sub-awardees and we process them at one of two bi-monthly administration 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 sub-awardee invoices.

Publications and Presentations

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Zhu, J., R.H. Weisberg, R.H., L. Zheng, and S. Han (2014). On the flushing of Tampa Bay. Estuaries and Coasts, in press, doi: 10.1007/s12237-014-9793-6.

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Bert, T.M., W.S. Arnold, A.E. Wilbur, S. Seyoum, A.L. McMillen-Jackson, S.P. Stephenson, R.H. Weisberg and L.A. Yarbro (2014), Florida Gulf Bay Scallop (Argopecten Irradians Concentricus) Population Genetic Structure: Form, Variation, and Influential Factors, J. Shellfish Res., 33, 99-136, DOI: http://dx.doi.org/10.2983/035.033.0112.

Liu, Y., R.H. Weisberg, S. Vignudelli, and G.T. Mitchum (2014), Evaluation of altimetry-derived surface current products using Lagrangian drifter trajectories in the eastern Gulf of Mexico, J. Geophys. Res., 119, 2827-2842, doi:10.1002/2013JC009710.

Weisberg, R.H., L. Zheng and E. Peebles (2014), Gag grouper larvae pathways on the West Florida Shelf, Cont. Shelf Res., Doi.10.1016/j.csr.2014.06.003

Liu, Y., R.H. Weisberg, and C. Lembke, (2014), Thermal lag correction of glider salinity data across a sharp thermocline, J. Atmos. Oceanic Technol., (in preparation).

Merz, C., R.H. Weisberg and L. K. Shay, Florida's HF Radar Needs. GCOOS-RA webinar on "A Primer on a High Frequency Radar Network for the Gulf of Mexico, October 27, 2014.

Merz, C., Y. Liu, and R.H. Weisberg, Initial Surface Current Measurements on the West Florida Shelf Using WERA HF Ocean Radar with Multiple Input Multiple Output (MIMO) Synthetic Aperture. Oceans/MTS2014.

Dzvonkovskaya, A., Helzel, T., Petersen, L., Merz, C. R., Liu, Y., and Weisberg, R. H., Initial Results of Ship Detection and Tracking Using WERA HF Ocean Radar with MIMO Configuration. Radar Symposium, pp. 1-3, doi:10.1109/IRS.2014.6869265, June 2014.

Merz, C.R., Liu, Y., Gurgel, K-W., Petersen, L., and Weisberg, R. H., Effect of Radio Frequency Interference (RFI) Noise Energy on WERA Performance Using the "Listen Before Talk" Adaptive Noise Procedure. Coastal Ocean Observing Systems: Advances and Syntheses, Elsevier Publisher, in press.

Garner, T., Muglia, M.: HF RADAR IN THE SOUTHERN MID-ATLANTIC, Mid Atlantic Bight Physical Oceanography and Meteorology Meeting, Gloucester, Va. Oct 30, 2014.

Castelao, R. and R. He (2013), Mesoscale eddies in the South Atlantic Bight, Journal of Geophysical Research: Oceans, 118, 5720–5731, doi:10.1002/jgrc.20415.

Gong, Y., R. He, G. G. Gawarkiewicz, and D. K. Savidge (2014), Numerical investigation of coastal circulation dynamics near Cape Hatteras, North Carolina in January 2005, Ocean Dynamics, in press.

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Matthew J. Neet, R. Heath Kelsey, Dwayne E. Porter, Dan W. Ramage, Adrian B. Jones, Model Performance Results in Myrtle Beach, SC Using Virtual Beach and R Regression Software, Proceedings of the 2014 South Carolina Water Resources Conference, held October 15-16, 2014 at the Columbia, SC Metropolitan Convention Center.

Porter, D.E. 2014,The role of environmental monitoring and data management in supporting science to inform decision making: a case study. Organization of Biological Field Stations / National Association of Marine Laboratories Joint Meeting 2014. Woods Hole, MA. September 2014. Invited presentation.

Archer, M, L. K. Shay, B. Jaimes and J. Martinez-Pedraja, In press. Observing frontal Instabilities of the Florida Current Using HF radar. Chapter in Coastal Ocean Observing Systems. Y. Liu, H. Kerkering and R. Weisberg (eds.). Elsevier Press.

Shay, L.K and J. Martinez-Pedraja, Coastal Ocean Current and Wave Response to Hurricane Jeanne Using High Frequency Radar: Implications for Surge Modeling. Accepted for presentation at the World Meteorological Organization's International Workshop on Tropical Cyclones Landfall Processes-3 in Jeju South Korea on 9 December 2014.

Shay, L.K, M. Archer, B. Jaimes and J. Martinez-Pedraja, Observations of Cyclone and Anticyclones in the Florida Current: Implications of Near-Inertial Wave Propagation in Geostrophic Shear. Asian Oceanic and Geoscience Society conference in Sapporo, Japan (28 July-1 Aug, 2014).

Liu, B., and L. Xie, 2014, A Marine Weather Forecasting System for the South East U.S. Coastal Region. 2014 Southeast Coastal Ocean Observing Regional Association (SECOORA) Annual Meeting, 13-15 May, 2014, Savannah, GA.

Raymond, N., M. Friedrichs, and Cai, Wei-Jun (2014), An update on the North American Coastal CARbon Synthesis (CCARS) East Coast Region. CCARS workshop, Woods Hole Oceanographic Institution, MA, August 19-21, 2014 (Oral Presentation at the workshop)

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.

Outreach Activities and Materials

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

University of South Carolina, Columbia, SC, George Voulgaris

South Carolina Beach Community Kick-off Meeting (Aug 12-13, 2014), a coastal communities / municipalities effort to organize and influence activities for the preservation of beaches.

Working Session meeting (July 2014) organized by the Southeastern Coastal Wind Coalition in Charlotte, NC.

University of North Carolina – Wilmington, NC, CW Lynn Leonard

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

UNCW CORMP hosted Patrick McCarty, Doctoral candidate at the UNCW Watson School of Education and Principal at Murray Middle School (New Hanover County, NC), as an ocean observing intern during summer 2014. Mr. McCarty

participated on buoy maintenance trips, assisted CORMP mooring technicians with sensor testing and evaluation, and learned about the Basic Observation Buoy (BOB) for classroom applications. Mr. McCarty plans on using his experience with CORMP to implement BOB in science classrooms at Murray Middle School.

UNCW participated in the NC Coastal Atlas Steering Committee call on September 11, 2014 as the SECOORA representative.

UNCW, in partnership with SECOORA, hosted a Congressional Day event at UNCW's Center for Marine Science on August 5, 2014. Invitations for the event were sent to the offices North Carolina Congressmen, SECOORA members, and SECOORA stakeholders. This event provided SECOORA with the opportunity for community education on ocean observing activities within the state.

University of South Florida, St. Petersburg, Mark Luther
Clam Bayou Water Quality monitoring teacher training activities - Undergraduate Environmental Science Lab Tours Water Quality Monitoring Station (October 2014).

University of South Florida, St. Petersburg, Robert Weisberg
Partnered with SECOORA/IOOS/Florida Gulf Coastal University (FGCU) to host NOAA EPP intern for the summer of 2014.
Partnered with SECOORA/GCOOS-RA/IOOS on 2014 St. Petersburg Science Festival.
USF/Sea Education Association/SECOORA Canterbury School of Florida, St. Petersburg, Marine Debris Research Project.

University of North Carolina, Chapel Hill, Harvey Seim
UNC HF Radar Data sharing with Cape Hatteras and Cape Lookout National Park Service groups.

ROFFS Inc. Mitch Roffer
Steering Committee of the Climate and Fisheries Workshop.
SEDAR Stock Assessment Meeting, Charleston, SC, August 4 – 8, 2014.

University of South Carolina, Columbia, SC, Dwayne Porter
Florida Department of Health, Mote Marine Laboratory, Sarasota and Pinellas County, Florida Wildlife Research Institute (FWRI) - Beach Water Quality Modeling Geographic transferability to a beach location in Florida.

University of Georgia, Athens, GA, Scott Noakes
NOAA Ocean Acidification Education and Outreach Lecture (October 22, 2014) - Ocean Acidification: The Other CO_2 Problem.

UM, Nick Shay
National HFR Technical Steering Team Annual Meetings.

NCSU, Ruoying He
Engaging National Weather Service on nearshore circulation and wave predictions (Newport/Morehead City, NC Weather Forecast Office)
Supporting NOAA fishery science and service on fish/turtle migration and sampling study (NOAA fishery- Beaufort Lab, Southeast Fishery Science Center and FWRI/FWC)
Assisting in a NC state funded Ocean Energy project by providing SABGOM simulated Gulf Stream results (Coastal Studies Institute, UNC-CH).

GeoOptics Conrad C. Lautenbacher, Jr., PhD., SECOORA Board Chair
Chair of the US IOOS Advisory Committee, US IOOS Advisory Committee Meetings (http://www.ioos.noaa.gov/advisorycommittee/welcome.html).

Surface Current Monitoring for the US Gulf of Mexico and Southeastern coasts using High Frequency Radar (HF Radar): What we have and What we need
A joint GCOOS-RA and SECOORA call for funding article

SECOORA Congressional Outreach Documents - FL, GA, SC and NC One Pagers.

SECOORA 2013 Annual Report

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, HFR 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.

Marine Weather Portal

The Marine Weather Portal product continues to be used by Wilmington, NC (http://www.erh.noaa.gov/ilm/marine/) Corpus Christy, 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) portal is being maintained.

SECOORA Climatology Product

Second Creek Consulting, LLC developed and released the SECOORA Climatology product. This product allows users to visualize, interact and download historical surface temperature and salinity data from select SECOORA buoys and historical nowcast/forecast SABGOM model data from 2011 - 2014. Work is in progress to add visualization of seasonal climatologies of NCSU model generated salinity and temperature.

Data Management

Standards based DMAC and Participation in IOOS Data Management Activities

University of South Carolina maintains and supports the SECOORA DMAC subsystem. The University of North Carolina at Chapel Hill supports IOOS Vocabulary efforts. We have implemented the netCDF version of Sensor Observations Service (ncSOS) and have registered our SOS, THREDDS and ERDDAP services on National Geophysical Data Center (NGDC) and IOOS Catalog registries. SECOORA RCOOS Manager worked with USF technical personnel to demonstrate the implementation of quality control tests outlined in the IOOS Manual for Real-Time Quality Control of In-Situ Current Measurements for buoys on the West Florida Shelf at the May 2014 IOOS DMAC webinar. We have started to archive our near real-time in-situ observations at National Oceanographic Data Center (NODC). 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 GTSSECOORA 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. We worked with data providers and PIs on: THREDDS data server installation and making model and observations available via the same; added Florida Atlantic University LOBO and Florida Institute of Technology (FIT) Sebastian Inlet station data; and glider deployment track posting on SECOORA website in coordination with IOOS Glider Data Assembly Center (DAC) and SECOORA glider operators. Added Northeast Fisheries Science Center (NEFSC) drifter program latest drifter tracks to SECOORA map

interface. USC has been working closely with NC State University/Ruoying He as they are developing larger footprint US East Coast model products including salinity, water temperature, and circulation.

Data Storage and Archive

We have started to archive our near real-time in-situ observations at National Oceanographic Data Center (NODC). SECOORA will also work with IOOS and other RAs on archiving HF Radar observations and Glider mission observations.

Observing Assets

Asset Inventory

Registered SECOORA assets web services in National Geophysical Data Center (NGDC) and IOOS Catalogs.

HFR Waves Project

The objective of this project is to deploy an Acoustic Wave and Current Profiler (AWAC) in the HF Radar footprint in the FL Straits to obtain wave measurements, which can be compared to the WERA HF Radar derived significant wave height measurements. The work will also include a careful assessment of the errors in wave extraction algorithms. In April 2014, University of Miami (UM) Rosenstiel School of Marine and Atmospheric Science deployed a subsurface mooring in the Straits of Florida. The mooring was equipped with a NortekUSA AWAC instrument. AWAC profiler was located at 25.93N and 79.88W in the UM maintained High Frequency Radar footprint (between Dania Beach and Virginia Keys stations) and collected waves and currents data for three months. The AWAC (NortekUSA) mooring was recovered in August 2014. Data recovery is 100% based on preliminary analysis. These raw data have been provided to NWS (current and wave data), and is now carefully being analyzed relative to HF Radar measurements for currents and waves.

Modeling

SECOORA Model Skill Assessment

A SECOORA model skill assessment project website has been set up to post the results and progress of the ongoing work. The workflow and model skill assessment version controlled software code base are hosted at the github site. Identification and access to SECOORA observations (in-situ, HF Radar and Glider) and numerical models (SABGOM, USF FVCOM, etc.) via SECOORA and IOOS developed catalog endpoints (Sensor Observation Service and THREDDS) have been completed. Work has also been completed on the development of software for the comparison and estimation of error metrics of water level observations with model data, and an interactive map of the results of the comparison and bias estimates can be accessed via this website.   Work is in progress to compare salinity, temperature and currents (in-situ and HF Radar) observations with model data.