



**Year 4 (2005-2006)**

**Annual Report**

### **Managing and Lead Principal Investigators:**

University of North Carolina

Russ Lea, Vice President for Research, UNC Office of the President (Managing S.I.)

Harvey Seim (Lead S.I. and Chief Operating Officer)

### **SEACOOS Members**

- Florida Center for Ocean Sciences Education Excellence (FL COSEE)
- Florida Sea Grant (FSG)
- North Carolina Sea Grant (NCSG)
- Southeast Center for Ocean Sciences Education Excellence (SECOSEE)
- Skidaway Institute of Oceanography (SkIO)
- South Carolina Dept. Natural Resources (SCDNR)
- South Carolina Sea Grant Consortium (SCSGC)
- University of Georgia Marine Extension
- University of Miami (UM)
- University of North Carolina at Chapel Hill (UNC-CH)
- University of South Carolina (USC)
- University of South Florida (USF)
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### **SEACOOS Affiliate Members**

- Beaufort TACTS/Naval Surface Warfare Center/USN
- Carolinas Coastal Ocean Observing and Prediction System (Caro-COOPS)
- Center for Operational Oceanographic Products and Services/NOS/NOAA
- Coastal Ocean Monitoring and Prediction System (CORMP)
- Fish and Wildlife Research Institute (FWRI)
- Florida Keys National Marine Sanctuary/NOS/NOAA (FKNMS)
- Marine Modeling and Analysis/EC/NCEP/NWS/NOAA
- Miami FL Weather Forecast Office/NWS/NOAA
- National Coastal Data Distribution Center/NESDIS/NOAA
- National Data Buoy Center/NWS/NOAA
- Southeast Fisheries Science Center/NMFS/NOAA (SEFSC)
- SeaKeys
- South Atlantic Fisheries Management Council (SAFMC)

### **SEACOOS Affiliate Member Nominees**

- Atlantic Oceanographic and Meteorological Laboratory/OAR/NOAA (AOML)
- Beaufort Marine Laboratory/NOS and NMFS/NOAA (BML)
- Camp LeJeune Integrated Observing Network/USMarines
- Coastal Services Center/NOS/NOAA
- Field Research Facility/US Army Corps of Engineers
- Florida Space Port

- Gray's Reef National Marine Sanctuary/NOS/NOAA (GRNMS)
- Jacksonville FL Weather Forecast Office/NWS/NOAA
- Naval Atlantic Meteorology and Oceanography Center/USN
- Naval Research Laboratory
- South Florida Ocean Measurement Center

## **SEACOOS YEAR 4 EXECUTIVE SUMMARY**

1. **BACKGROUND:** Year 4 (2005-2006) aggressively targeted developing solid relationships with scientifically-oriented “super-users” of environmental (observed and predicted) information. We built collaborative, applied research projects designed to enhance, supplement and develop user-defined applications using SEACOOS observations and model products. We extended the reach of our information to establish user bases and refined SEACOOS products for greater societal benefits, without inadvertently competing with the public and private sectors. We also continued to highlight SEACOOS activities through extension, education and public awareness efforts. Overall, with an 18% budget reduction, Year 4 was used to consolidate SEACOOS gains, focusing on analysis of observational and modeling results, planning and production of clear demonstrations of user applications, and designing and planning future efforts.
  
2. **DISCUSSION:** Each investigator for the Year 4 proposal developed Work Statements that described the anticipated activity in the coming year. Progress was tracked through the year in a mid-year progress report and a year-end annual report (this document). Investigators were asked to provide a percent complete estimate and brief report on accomplishments in support of the work statement. A summary of reports is given below, broken down by Working Group. Detailed information is available in the individual reports that follow. It should be noted that Year 5 will be used to document SEACOOS Lesson’s Learned and provide appropriate processes, procedures, and policy to the Southeast Regional Ocean Observing Regional Association so those lesson’s learned can be implemented in the Southeast Region.
  
3. **OBSERVING:** Includes a variety of in-situ observing platforms, HF Radar, and satellite remote sensing. Summarized here are the SEACOOS funded or partially supported elements.

On the west Florida shelf SEACOOS continued with 10 mooring sites, 6 with surface buoys for real-time telemetry and 4 subsurface without telemetry. After a recent recovery including data from all of the hurricanes in 2005 one subsurface mooring site (C18 NW of the Dry Tortugas) is presently vacant. As of this writing all surface moorings are reporting, except for C14 that recently experienced a telemetry power failure, that will soon be fixed. We continue to maintain the 11 COMPS coastal stations. HF-radar continues (3 sites, one in collaboration with Mote/Rutgers). Equipment was purchased (on a separate grant) for a fourth site at Cedar Keys. However, due to siting considerations and various equipment failures elsewhere, requiring spares, we have not deployed a fourth site. Our intention now is to maintain three sites, perhaps adding a fourth within the exiting footprint for redundancy to increase data return reliability. Presently the Venice site is down, having been damaged by lightening. Two new near shore stations were deployed

(Sarasota and Pass-a-Grille) as planned. These were recovered for repair and upgrade and will be redeployed. We are using a Coast Guard tower at Pass-a-Grille and a buoy at Sarasota. The Sarasota buoy remains deployed and we are collaborating with Mote Marine Lab on red-tide optical measurements. With separate funding we are engaging in BSOP deployments and we acquired a Webb electric glider.

On the east Florida shelf, there continues to be HF-radar coverage by WERA at two sites. A mini waves experiment was conducted in 2005 in collaboration with several SEACOOS institutions. Given budget modifications and shortfalls a wave-rider buoy was removed from budget and directional wave software was not procured. There was also a delay in the installation of the Ft. Lauderdale Site. Testing of the SWAMP system is continuing with HF radio data transmission. Two major problems with development of a fully operational system persist: (1) development of a functional Iridium telemetry capability, and (2) integration of "smart" data transfer between the APV and ADCP internal components. Progress on these issues has reached a standstill and according to our commercial partner (Oceansensors, Inc.) this will require significant board-level modifications to the APV system and the communications protocol between the AVP and ADCP to solve. Given the tight funding situation in SEACOOS it is not feasible to proceed with these developments at this time. Therefore our goal for the remainder of the current fiscal year was to fully test the physical performance of the system (winch functionality and durability, CTD operation, data telemetry in a range of surface conditions, etc.) via a long term test (~ 3 mo., April-June 2006).

In South Carolina two nearshore stations (Springmaid Pier and Folly Island) continue to be maintained. Springmaid station stopped operating on January 05, 2006. Operation was re-established on January 11<sup>th</sup>, 2006. Folly beach has been non-operational since August 12, 2005 due to burial in response to a beach nourishment project that took place in the vicinity of the station. Additionally, the Springmaid station has been updated with a Hydrolab Salinity/DO sensor in support of hypoxia studies by the SC Department of Natural Resources. The instrument and data transmission is using the SEACOOS established hardware/software backbone. As a result of the Hydrolab sensor, the stations has encountered disruptions in its operation. These are due to vulnerability of the Hydrolab to lighting.

In North Carolina there was mixed success; We revived SABSOON tower R4 installation in early August 2006, although Iridium communications are still poor. The Lookout Shoals buoy was rebuilt and re-deployed by July 2006 but had an odd failure in late July; the 2<sup>nd</sup> buoy is still not delivered as of August 26, 2006. The internally-recording deployment off Oregon Inlet was maintained. Plans are in place to finish build-up of second buoy once it arrives. Regarding the moving platforms, we saw some successes with the glider. The 5<sup>th</sup> attempted deployment in Onslow Bay went satisfactory for a week but was ended due to Iridium modem issues. The sixth deployment at R4 in August 2006 went very well, and we can now confirm the glider will work. We determined a remarkable signal of internal tides near the shelf break. Concerning the HF radar, ~~we made~~ considerable progress was made in documenting and understanding nature of errant velocities produced

by system. ~~We gave a~~ talk was given at Ocean Sciences in Hawaii discussing CODAR possible solutions. We have also been involved with MAB HF radar consortium on sharing of radials. The departure of L. Stearns was a setback but good overall progress with diagnosing the system accomplished this year. There has been no serious planning for Cape Lookout HF radar deployment. ~~Our moored buoy deployed in June 2005 functioned with data displayed at the NCCOOS web site, until early September 2005 when it was severely damaged by the passage of Hurricane Ophelia. The bottom tripod functioned through the hurricane and provided wave and current data on the conditions throughout the time period. The buoy utilized an Iridium communication system to transmit meteorological and other surface measured data to shore which functioned well. It also utilized a cell phone communication system to transmit data received via acoustic modem from the bottom tripod. The cell phone was not reliable from the deployment location and has since been replaced with a free wave radio system. The tripod was re-deployed in January 2006 without the buoy and recovered on March 31, 2006. The buoy has now been re-instrumented and further modifications to the mooring system have been made with the hope of reducing damage to the buoy instrument systems during extreme weather. The buoy and tripod are presently scheduled for re-deployment. In addition,~~ The Army Corps of Engineers provided funding for the deployment of a bottom mounted ADCP 2000 ft off the beach near the west end of Bogue Banks. This instrument was deployed in mid-March 2006 and a cable laid to shore. Real time data is currently being collected from this system and we are working to make it available in real time via the NCCOOS web site.

Satellite remote sensing activities are continuing. Within the Muller-Karger group algorithm development for SST derived data products from both MODIS and AVHRR. Additionally, ImaRs is currently providing ERGB, CRGB and Chlorophyll-a color data derived from MODIS daily to SEACOOS. However, SeaWifs data is not being provided due to the failure of NASA and OrbImage to reach an agreement on scientific use of high resolution SeaWifs data. The plan for delivery mechanism of relevant satellite data, including altimetry and scatterometer (sea surface height and winds, respectively) continues to proceed by using database access to the Jet Propulsion Lab and the SEACOOS web portal for prototype wind and sea surface height products. Given these satellite SST and color data Weisberg's group continues to produce daily cloud free SST and color products. Using SSH anomaly data from CLS combined with a mean field product Weisberg's group also produces maps of absolute SSH, geostrophic currents derived from SSH and Lagrangian trajectory simulations using these geostrophic currents. Products are available for both the SEACOOS region and the Caribbean.

4. **MODELING:** SEACOOS partners have continued to work on a wide variety of modeling efforts. The activity of implementing of baroclinic versions of the NFS will has progressed satisfactorily. This brings together the experience of the existing (barotropic) SEACOOS NFS, as well as the knowledge gained in exploring the above aspects. Regarding the coupling to HYCOM, the system is being tested in

full and giving satisfactory results. Details of determining the scheduling details that will lead to posting of all HYCOM files needed for nowcast/forecasts are still being worked.

EFSIS operation continues; one EFS-POM model vs STACS validation manuscript and one EFSIS documentation manuscript was published in 05; EFSIS vs ADCP current vertical profiles in SE Florida and NE Florida validation & verification manuscripts are in preparation. The open boundary conditions from Global NCOM have been implemented in EFSIS in an automated fashion with daily updates out to 84 hrs. Recently, a serious discrepancy was found in the gridded output made available. The technical issues were resolved and NRL & NAVO took remedial measures. The informal agreement to perform informal beta tester duty has been fulfilled, but it is now necessary to re-run EFSIS for the past two years. EFSIS vs WERA current maps validation & verification are being prepared.

West Florida Shelf modeling continues along two veins, one linking the shelf with the deep ocean by nesting a regional ROMS implementation in the 1/12<sup>th</sup> degree North Atlantic HYCOM, and the other linking the shelf with the estuaries using the FVCOM. Model products along with the satellite analysis products (cloud free SST and color and SSH-geoV, and Lagrangian trajectory simulations based on SSH-geoV are regularly posted to the web (<http://ocgweb.marine.usf.edu>). We continue to serve both the new baroclinic and the previous barotropic model products since the latter includes tides that are presently not in the former. We are similarly maintaining our surface wind analyses for driving the numerical model simulations (N/F and hindcast). A tool for accessing completed T/S climatologies is hampered by software deficiencies. With the goal of data assimilation implementation we have been assessing the correlation structure of the baroclinic N/F model and the relationship between the model and the HF-radar observed surface currents. Preliminary results on assimilating HF-radar radials are now available. When tested against an independent data set (ADCP velocity profiles) we demonstrate improvements across the entire water column. Along with N/F we continue with hindcast experiments. We were successful in accounting for the evolution of the 2005 red tide event and we demonstrated that the conveyance between the *K. brevis* cells initially observed offshore in winter 2005 and the near shore was the bottom Ekman layer.

Along the US South Atlantic Bight shelf, downscaling from HYCOM to Quoddy baroclinic models is proceeding almost routinely on a weekly basis. We are working out details of the timing of the HYCOM forecast postings with the HYCOM Consortium and anticipate a strategy to be in place by early 2007. Results of the HYCOM-Quoddy nowcast-forecast system are posted on the <http://www.nccoos.org/models> site. In addition to making system closer to quasi-operational, we have successfully used the model results in examining past events, such as the summer of 2003 cool event (Aretxabaleta et al. 2006 a,b) and in determining the retention and loss characteristics of the SAB shelf as related to drifters and populations of marine organisms (Edwards et al. 2006 a,b).

5. **INFORMATION MANAGEMENT:** SEACOOS partners have continued to implement processes for transferring real time data to the SEACOOS data bases, and significant progress has been made with new observing sites and the HF radars. A variety of information sources are accommodated, ranging from the instrumented towers at SABSOON, Explorer of the Seas, a variety of moorings at multiple partners, HF radars, and satellite data. Improvements have been made through hardware upgrades, which were particularly significant at SkIO. USC has continued to maintain commonly used infrastructure, which now includes two data base servers, one applications server, and one aggregations server. UNC has continued to maintain and enhance the SEACOOS website, while USC has maintained the SEACOOS twicki, bulletin board, and listserv. UNC has also begun to establish data base redundancy and back up infrastructure. Progress has been made in metadata documentation, which has been assisted for some partners through the development of Meta-Door. Improvements have been made in relational database design and application. Progress has been made in development of QA/QC procedures through extended discussions among the Data Management Coordinating Committee and interactions with broader community efforts, such as QARTODS and the Marine Metadata Initiative. Progress has been made in documentation of key developments, such as two SECOORA-supported white papers on Data Sharing & QA/QC Standards and Procedures. SEACOOS has also been well represented at community efforts to enhance the IOOS and RA data management capacities, such as through participation in the SECOORA Ocean Data Partnership. SEACOOS partners have been proactive in transferring developments to the broader community projects, such as OpenIOOS, NOAA NWS Carolinas Coast, NOAA NERRS SWMP, and the State of South Carolina hypoxia initiative.
6. **EXTENSION AND EDUCATION:** The extension and education working group (E&E WKG), formerly called outreach, pursued region-wide efforts and subregional programs. The overall mission is to increase connections between users and the emerging information from the science community, related to potential of coastal ocean observing system information. Activities were based on three agreed upon objectives: (1) increase public awareness of COOS; (2) increase interaction between E&E and the diverse audience of stakeholders; and, (3) initiate the transition to SECOORA.

Since 2003, the E&E WKG PIs represented Sea Grant programs in FL, SC, NC and initially in GA. Later the University of Georgia Marine Extension program replaced GA Sea Grant and provided the extension and education presence in Georgia. The education PIs represented the Centers for Ocean Sciences Education Excellence (COSEE) located in Florida based at USF and UF (COSEE Gulf of Mexico and COSEE Florida) and COSEE Southeast which serves Georgia, South Carolina and North Carolina. The University of Miami provided additional education and extension based on the cruise ship, *Explorer of the Seas*. SC DNR-MRRI provided educational outreach in piloting a web-based game using information from the undersea camera gathering fish information.

Initial tasks for extension and education included an analysis of stakeholders or

community profile of users and the development of a web-based introduction to SEACOOS via a SEACOOS 101 slideshow. A DVD produced and distributed by NC Sea Grant highlights the research and extension focus of SEACOOS.

Extension efforts through the Sea Grant programs and extension and education staff provided support for economic benefits analysis for the southeast; hosted an outreach workshop in collaboration with Ocean.US; and hired a regional outreach coordinator, based at University of South Florida and later an extension and education specialist, based at University of Georgia Marine Extension Marine Education Center and Aquarium. Other extension efforts focused on region-wide public awareness through displays at boat shows, fishing symposia, and public pier displays, which were not evaluated. Four touch screen kiosks have been developed for COOS introduction and information in Georgia and North Carolina, placed on public piers and in informal education centers. Four scaled down buoy models were distributed in the southeast region for display purposes.

Among the subregional efforts was activity on the cruise ship, *Explorer*, based through the University of Miami. The *Explorer* provides observations along its route in the Caribbean which is relayed to SEACOOS. In addition, there is a public awareness and education effort, which has included the hosting of a US Ambassador and a media cruise including CNN, resulting in a number of broadcast news pieces. The University of Miami award resulted in the development of an interactive Kiosk, located on the *Explorer*, which connects to COOS information and highlight some coastal ocean observing information. The University of Florida Sea Grant contracted with an evaluation to assess the educational efforts on the *Explorer*, which provided formative information for the PIs.

Education efforts were coordinated mainly through the COSEE programs. Funds from SEACOOS partially or fully supported professional development workshops of one to three days, introducing teachers in the four states to SEACOOS, lessons and use of coastal ocean observing information on the web. During Year 4, 3 SEPORTs (South East Portal to Ocean Research for Teachers) were held in Florida and 9 in SC, GA and NC. Funded. In Year 3, a collaboration with OCEAN.US, COSEE SE and NOAA CSC resulted in a national ocean educators workshop and Ocean.US publication. In Year 2, 3 and 4, three informational posters have been designed and distributed to educators. Each poster theme has been supported by a web-based Virtual Classroom. "Making Waves," "Forming Hurricanes," and "Flowing Ocean" were the basis of numerous scientific and educational conference presentations. In Year 4, COSEE FL and COSEE SE each produced a DVD for regional educators on coastal ocean observing technology and products. Also in Year 4, a regional, week long, summer residential workshop, Taking the Pulse of Our Coastal Ocean, was held in UGA MAREX-MECA in partnership with SkIO and COSEE MidAtlantic.

During Year 4, the E&E Working Group addressed the transition to SECOORA by supporting the Caro-COOPS outreach product, Carolina Coast; initiating a web revision for extension and education which could be transferred to SECOORA, and by engagement with the SECOORA Product Development and Market Committee. Reduced funding and the extension of Year 4 funds into Year 5 means that some of

Year 4 deliverables are still in process.

7. **ADMINISTRATION** – UNC Office of the President provided administrative oversight. UNC General Administration has conducted a review of audit reports for all subrecipients in accordance with OMB Circular A-133 guidance and is conducting a desk review of randomly selected invoices from each subrecipient. Results will be presented to the SEACOOS Board of Directors. The UNC General Administration provided financial support for the SEACOOS Workshop held in Columbia, SC November 15-16. The University of South Carolina served as the host and over 70 people participated. The SEACOOS Board of Directors met immediately following the fall workshop, November 17-18 and met again January 24-25 at the University of Miami. A joint SEACOOS/SECOORA workshop was held September 11, 2006 at Jacksonville Beach, FL. Approximately 21 SEACOOS investigators will participated, with UNC covering all meeting and travel costs. Through leveraged resources provided by SECOORA, via S.C. Sea Grant, the SEACOOS data management and communication group met with a broad group of data managers and public information stake holders November 14<sup>th</sup> in conjunction with the fall workshop and again March 9-10 in Chapel Hill. A select group of the data management workgroup including Sara Haines, Jesse Cleary, Chris Calloway, Jeremy Cothran, Monisha Kanoth, Jeff Donovan, Venbu Subramanian and Steven Brody convened in Chapel Hill in July to participate in a “Code Sprint” and complete the QA/QC and Data Management Cookbook documentation.

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**Work Statements and Budget Justifications**

**Observations**

*Observational subprogram – S.I. and Workgroup Chair Robert Weisberg (West Florida Shelf), co-S.I. Mark Luther (Coast and Tampa Bay), USF*

**WORK STATEMENTS**

<ul style="list-style-type: none"> <li>▪ <b>Moored array</b> - Maintain the SEACOOS/COMPS moored array, providing real time data to the general public, via the COMPS and SEACOOS Web sites, and to NCEP and private entities, via NDBC. Emphasis will be on improving real time data reliability.</li> </ul>	100%
<ul style="list-style-type: none"> <li>▪ <b>Coastal stations</b> – Maintain the SEACOOS/COMPS coastal array. Add (via other funding sources) sea level/met stations compatible with NOAA NOS standards.</li> </ul>	100%
<ul style="list-style-type: none"> <li>▪ <b>HF-radar</b> – Maintain the WFS long-range CODAR array that presently consists of three sites [Redington Beach, Venice, &amp; Naples]. The Venice site is presently operated in collaboration with the Mote Marine Laboratory and Rutgers University. Add (via existing or other funding sources) new sites at Cedar Key to the north and at Siesta Key (near Venice).</li> </ul>	100%
<ul style="list-style-type: none"> <li>▪ <b>Near-shore stations</b> – These will sample the near-shore region of estuarine influence that is not covered by HF-radar. Developed in Year 3, and expanded with other funding, two sites with surface met, ADCP, T/S, and waves are anticipated (in Pinellas and Sarasota Counties).</li> </ul>	60%
<ul style="list-style-type: none"> <li>▪ <b>Profilers and gliders</b> – Our BSOP profilers (developed under separate funding) and a glider (also under separate funding) will be used for T/S sampling (and possibly other biological and chemical measures).</li> </ul>	100%
<ul style="list-style-type: none"> <li>▪ <b>Data analyses</b> – Analyses are aimed at understanding the synoptic, seasonal, and inter-annual variations of WFS material properties, including the ocean circulation, the ocean-atmosphere interactions, and the ecological ramifications of these.</li> </ul>	100%
<ul style="list-style-type: none"> <li>▪ <b>Fields of variables for description and support of models</b> – Continue to develop products from all applicable observational sources for descriptive and modeling uses, such as data assimilation and quantitative assessments of model performance. The observational and modeling components at USF are linked and these joint activities are also aimed at improving our ability to monitor the coastal ocean based on understandings of coastal ocean dynamics, the interactions between the deep-ocean and the shelf and between the shelf and the estuaries.</li> </ul>	100%

*Budget Justification:* Salary support is for the S.I. (1 mo.), a computer analyst/data manger (7 months) three technicians (3, 6, and 4 months), engineering support (3 months) and a graduate student (12 months). Equipment is budgeted for meteorological station and telemetry system spares. Travel is for SEACOOS meetings and field support. Materials and supplies are largely for seagoing items and for computer related items. Other costs are for ship-time, tuition, Service ARGOS locations, computer maintenance, publication, and HF-radar telecommunications. USF fringe is @ 16.5%, plus \$590/month health insurance (1% on students), and indirect is @ 47%.

Narrative:

- 1) We continue with 10 mooring sites, 6 with surface buoys for real time telemetry and 4 subsurface without telemetry. One subsurface mooring site (C18 NW of the Dry Tortugas) is presently vacant. As of this writing all surface moorings are reporting, although the ADCP on C16 has a time synchronization problem that renders the data unavailable in real time. C16 has never been equipped with surface meteorological measurements, nor are there plans for this given present funding constraints.
- 2) We continue to maintain the COMPS coastal stations.
- 3) HF-radar continues (3 sites, one in collaboration with Mote/Rutgers). Equipment was purchased (on a separate grant) for a fourth site at Cedar Keys. However, due to siting considerations and various equipment failures elsewhere, requiring spares, we have not deployed a fourth site. Our intention now is to maintain three sites, perhaps adding a fourth within the existing footprint for redundancy to increase data return reliability. Presently the Venice site is down, having been damaged by lightning.
- 4) Two were deployed (Sarasota and Pass-a-Grille) as planned. These were recovered for repair and upgrade and will be redeployed. We are using a Coast Guard tower at Pass-a-Grille and a buoy at Sarasota. The Sarasota buoy remains deployed and we are collaborating with Mote Marine Lab on red-tide optical measurements. Both sites require servicing; hence the 60% designation.
- 5) With separate funding we are engaging in BSOP deployments and we acquired a Webb electric glider. Glider work is on hold pending due to funding.
- 6) Dr. Yonggang Liu successfully defended his PhD dissertation and graduated in May 2006. We maintain on our website (available to SEACOOS, but not yet incorporated into SEACOOS) several data analyses products including SSH-geo-V and surface drifter trajectories simulated from SSH-geoV for both the SEACOOS region and the Caribbean. For the period inclusive of fall 2005 to the present we published 10 articles in professional refereed journals, have 5 in press, and 3 submitted (some joint with other SEACOOS investigators). We gave 9 presentations at society meetings with published abstracts and numerous other presentations at workshops or public forums.

*Satellite Remote Sensing -- co-S.I. Frank Muller-Karger, USF (This is part of the Observational subprogram, but as a new addition in Year 3 it is being listed separately).*

- Produce high temporal and spatial resolution sea surface temperature fields from MODIS and AVHRR to be served by SEACOOS; 100%

*Status:* Algorithm development has been completed and algorithms are being tested. SST derived data products from both MODIS and AVHRR are being provided to SEACOOS on a routine basis. We are currently focusing on daily operational and quality control issues which are ongoing and will always need to be addressed.

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	% COMPLETE
<ul style="list-style-type: none"> <li>Produce ocean color data from MODIS and SeaWiFS (the latter one in a protected mode available to researchers and educators) in a format compatible for SEACOOS access and in a manner similar to that for the SST products;</li> </ul>	100%

*Status:* IMaRS is currently providing ERGB, CRGB and Chlorophyll-a ocean color data derived from MODIS daily to SEACOOS. We have added a chlorophyll fluorescence imagery data stream. We are currently focusing on daily operational and quality control issues which are ongoing and will always need to be addressed.

NASA and OrbImage failed to reach an agreement on the scientific use of high resolution SeaWiFS data. Even password protected near real-time data access is not currently an option, so we are unable to provide access to SeaWiFS data – this is completely out of our control as it is an arrangement between a Federal agency and a private company that owns the satellite.

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	% COMPLETE
<ul style="list-style-type: none"> <li>Plan for delivery mechanisms of other relevant satellite data including altimetry and scatterometer observations (sea surface height and winds, respectively)</li> </ul>	80%

*Status:* We continue to make progress in providing intellectual and scientific guidance to SEACOOS on how to import these data from national microwave satellite processing centers and scatterometer/altimeter databases located at the Jet Propulsion Lab. The SEACOOS portal continues to offer prototype wind and sea surface height products developed with our input.

**UNIVERSITY OF SOUTH CAROLINA**

SC Near shore Monitoring Stations – S.I. George Voulgaris, USC

- 
- **Near-shore Stations** - Continue to operate and maintain two established near-shore monitoring stations, providing real-time directional wave and current data to the general public via the SEACOOS internet site and the NOAA-NOS site (Springmaid Pier Station, SC). Emphasis is placed on improving robustness and reliability of the sites minimizing down time.

80%

The two nearshore stations (Springmaid Pier and Folly Island) continued to be maintained. Springmaid station stopped operating on January 05, 2006. Operation was re-established on January 11<sup>th</sup>, 2006. Folly beach has been non-operational since August 12, 2005 due to burial in response to a beach nourishment project that took place in the vicinity of the station. Attempt to recover the station in August 2005 failed due to low visibility and due to burial of the sensor. A recovery operation was re-attempted on April 3, 2006 using an hydraulic dredge but due to problems with the vessel (davit failure) the operations were abandoned. Finally, the Folly Beach station became operational on April 16<sup>th</sup>, 2006. It has been continuously operational since then assisting the mission of the Charleston NWS/WFO for nearshore hazard predictions.

Additionally, the Springmaid station has been updated with a Hydrolab Salinity / DO sensor in support of hypoxia studies by the SC Department of Natural Resources. The instrument and data transmission is using the SEACOOS established hardware/software backbone. As a result of the Hydrolab sensor, the stations has encountered disruptions in its operation. These are due to vulnerability of the Hydrolab to lightning. Lightning strikes have damaged the PC-104 equipment used on that site 3 times over the last year. It has been found that the problem is due to grounding conflicts. The last disruption occurred on August 8<sup>th</sup>, 2006 and since then the station has been no operational. Servicing of the station revealed that the ADCP unit is damaged and arrangements are currently underway to replace the ADCP sensor.

A high-resolution tilted head rotating sonar (2MHz) has been acquired and data-logging software was developed for its remote operation. The system is planned to be installed on the SABSOON towers to facilitate monitoring of sea bed morphology in an attempt of continuously monitoring benthic exchange fluxes as these might be affected by wave-induced ripples. A self-contained data logging system has been developed for the remote operation of the sensor at the site. The software is currently under bench-test for troubleshooting and robustness evaluation.

- 
- **Wave Modeling for the Vicinity of the Measurement Locations** – Initiate the development, calibration and utilization of a small region, high-resolution wave model to extrapolate the point measurements into various locations along the coastline.

65%

The computer hardware was purchased and has been installed. Most of the effort has focused on testing the systems and setting up a new Fortran compiler (Portland Group) for use with this activity. The SWAN model has been installed and trial runs have been performed to study speed and compatibility of computer systems. Furthermore, wave directional data from a parallel study funded by the US Geological Survey (Coastal Erosion Study) were collected at two additional locations north of the Springmaid station. These data are currently analyzed to be used to calibrate the model for its ability to accurately predict the spatial variability of the wave conditions along the coastline of Long Bay.



**HF Radar – P.I., Richard Styles, USC**

	<u>% COMPLETE</u>
▪ Deploy a long-range HF Radar (CODAR) system in coordination with SKIO partners in the central South Atlantic Bight.	95

*Status:* At present we have made the following progress toward completing our Year 4 goals.

- 1) We have installed 1 long-range WERA Radar system (operating at 8.35 MHz) on Pritchards Island, SC.
- 2) We have completed preliminary range testing. Results indicate reasonable temporal coverage out to 200 km.
- 3) We anticipate operational status by the end of the 2006 calendar year.

**Peer Reviewed publications arising from SEACOOS related research**

Torres, R. and **R. Styles**, Effects of topography on salt marsh currents, *J. Geophys. Res.*, (Revised and resubmitted).

Wargo, C. A. and **R. Styles**, Along channel flow and sediment dynamics at North Inlet, South Carolina. *Estuarine, Coastal and Shelf Science*, (Revised and resubmitted).

Traynum, S. and **R. Styles**, Flow, stress and sediment resuspension in a shallow tidal channel, *Estuaries* (Accepted).

**Styles, R.**, 2006: Application of a bottom boundary layer model in contrasting wave and current environments: Grays Harbor, Washington, *J. Waterway, Port, Coastal and Ocean Engineering*, 132, 5, doi: 10.1061/(ASCE)0733-950X, 379-387.

**Styles, R.**, 2006: Evaluation of a LISST in a stratified fluid. *Marine Geology*, 227, 151-162.

**Abstracts arising from SEACOOS related research**

Borgianini, S., J. Jurisa, **R. Styles** and R. Brodie, 2006: A Model Describing the Dispersal Capabilities of Red-Jointed Fiddler Crab (*Uca minax* LeConte) Postlarvae in a River-Dominated Estuary. Society of Integrative and Comparative Biology, Orlando, Conference Abstracts.

Jurisa, J., **R. Styles**, R. Brodie and S. Borgianini, 2006: Discharge, tidal propagation and currents near an upriver tidal boundary, *Eos Trans. AGU*, 87(36), Ocean Sci. Meet. Suppl., Abstract, OS35J-18.

Traynum, S., **R. Styles** and H. Bull, 2006: Exchange flow characteristics between North Inlet and Winyah Bay as a function of wind, discharge and sea-level, *Eos Trans. AGU*, 87(36), Ocean Sci. Meet. Suppl., Abstract, OS53O-06.

*OBSERVATIONS (CONT.)*

**SOUTH CAROLINA DEPARTMENT OF NATURAL RESOURCES**

*Fisheries Management Video Systems, Charles Barans and George Sedberry, co-S.I.s*

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% COMPLETE

- **SABSOON Microwave System** - Continue to maintain and upgrade the present (6 camera) fisheries video system and its microwave transmission capabilities.

95%

*Status:* Replaced complete main transmission cable and six-camera video system. Established protocols for transfer of live video and recent files to SCDNR server. Working on obtaining backlog of video files recorded at SABSOON tower, but not transmitted.

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% COMPLETE

- **Autonomous Video Systems** - Provide more complete regional fisheries information by continuing to deploy visual data loggers at an expanded number of sampling sites.

80%

*Status:* Collaborative efforts to deploy video data loggers in regional habitats have been continued with CORMP, GRNMS and NURC/UNCW-Aquarius. We have worked with collaborators and manufacturer to improve camera life and recording abilities. Additional cameras will be deployed this fall.

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% COMPLETE

- **Data Analyses** - Continue to obtain quantitative fisheries data from observations of video images at all research sites to correlate fishes with oceanographic conditions for application to future predictive models.

85%

*Status:* Published paper on methods used in primary system; working on second draft of manuscript on short-term variability in observation for “resident” reef fishes to be submitted to *Fishery Bulletin*.

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% COMPLETE

- **Automatic Annotation** - Improve the efficiency of the present video annotation process by incorporation of computerized automatic evaluation of each data set through technology transfer from MBARI.

70%

*Status:* We have continued to work with MBARI to evaluate video clips and have sent them additional normal and problematic clips for evaluation. An automated system for evaluating quality of clips is being developed.

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% COMPLETE

- **Outreach and Education** – Educational materials will continue to be enhanced for students, teachers and the general public at the Fish Watch internet web site to supplement the present searchable video data base and provide access to the results of video data analyses on fishes observed at the research site.

100%

*Status:* In collaboration with IT and graphics staff of the SC Aquarium, we have completed the Fish Fusion web site (<http://fishwatch.dnr.sc.gov/FishFusion/FishFusionWindow.html>), which links SEACOOS observation sites to instructional materials and games on reef fish communities. During the project period, we made presentations that included Fish Watch materials at the annual meeting of the SC Chapter of the American Fisheries Society (February 2006), SC Marine Educators Association (April 2006), and the at the annual meeting of the National Marine Educators Association (Brooklyn, July 2006). We presented an update of the database and data acquisition system at the SEACOORA/SEACOOS data workshop and at the SEACOOS PI meeting in November 2005. A presentation that included Fish Watch materials was also presented at the South Atlantic Fishery Management

Council Ecosystem Workshop in November 2005, and to marine biology clubs at Porter-Gaude, Wando and James Island High Schools (Charleston County) in Fall 2005 and Spring 2006. Presentations that included Fish Watch materials were made at workshops for teachers, sponsored by NOAA Ocean Exploration (Wilmington, May 2006) and the Center for Ocean Sciences Education Excellence-Southeast (Savannah, June 2006).

SKIDAWAY INSTITUTE OF OCEANOGRAPHY

*S.I. and Workgroup Co-Chair Jim Nelson, and P.I.s Rick Jahnke, Dana Savidge*

% COMPLETE

- **Offshore platforms** - Maintain the existing SABSOON observational system based at offshore Navy towers, and implement upgrades that target improved reliability of real time data acquisition (for power, communications and instrument package components) and facilitate maintenance and reduce operational costs.

60

*Status:* Given the reduced operational budget for SEACOOS in Year 4 and the forthcoming budget constraints for Year 5, expenses for SABSOON operations have been reduced where possible, particularly in the latter half of Year 4. We intend to use Year 4 carry-forward funds to maintain core observational components to the extent possible in Year 5. Plans for major systems upgrades that would entail considerable transportation expenditures have been shelved for the time being. Due to a significant rise in helicopter service charges (in terms of hourly rate, daily minimum and ferry time), SkIO use of helicopter transportation was curtailed in the latter half of Year 4. A possible contract with an alternative helicopter service provider is being pursued. Servicing trips since the beginning of 2006 have been conducted using vessels operated by the NOAA Gray's Reef NMS, through the cooperation of the GRNMS personnel. The major repair work has been replacement of ADCP units, with cables and instruments at the M2R6 and R8 towers in Feb. and April, 2006, respectively, and the instrument replaced at the R2 tower in June, 2006. Given the limitations of smaller vessel availability (scheduling conflicts, sea state dependence), the frequency of servicing of tower systems has been reduced. The impact on data collection is most noticeable for in-water packages (particularly for optical sensors), which are compromised by bio-fouling if not regularly serviced (preferably at 6-week intervals).

% COMPLETE

- **HF Radar deployment and operation** -- Continue the initial operation and validation of a long-range (150-200 km) HF Radar surface current mapping system in the central South Atlantic Bight. Coordinate this operation with USC partners.

100

*Status:* Final site preparations for the Georgia WERA installation at St. Catherine's Island were completed in winter 2006 (power to beach site, installation of a climate-controlled shed, establishing DSL communications, site selection for transmit and receive antennas), along with initial range and frequency tests with the WERA engineers. The St. Catherine's Island managers were very cooperative and provided considerable support for the installation (boat transport and vehicle transport for the shed, trenching for

power, brush clearing for cable runs). SkIO engineering personnel also assisted in some of the Pritchard Island, SC preparations. Final installation was delayed until March due to the need to extend the cable run for receive antennas on St. Catherine's Island, and scheduling conflicts for the WERA engineers (who came over from Germany for the installation). Installation was completed in mid-March, 2006 and the system operation commenced in mid-April, 2006. The daytime (maximum) range reaches beyond the Gulf Stream front, out to more than 200 km from shore. The site has been visited at roughly monthly intervals since installation for inspection and maintenance.

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% COMPLETE

- **HF Radar product validation** - Initial validation of surface current measurements will employ current meters in the SkIO/GIT partner inventory (internally recording, non-real time). If surface waves are a product option, planning for a wave product verification experiment in the SAB will be initiated, based on the analyses obtained from the Year 3 experiment in the WERA domain on the East Florida Shelf.

40

*Status:* Initial analyses of the WERA surface current data by Dana Savidge, Julie Amft and Colton Smith of SkIO have focused on generating mapped products and assessing variability in areal coverage and data quality over the coverage area (see also the SkIO IM work statement). A considerable day-night difference is evident in range, with daytime maxima in coverage typically reaching into the Gulf Stream (up to some 220 km from shore), and covering some 100 km of the Gulf Stream front. Initial WERA current validation is being pursued by comparison with time-series records from three tower-based ADCPs (cabled, real-time units). This will be supplemented with comparison with moored, internally recording instruments to provide validation data in various parts of the WERA coverage domain (e.g., a UNC unit is presently deployed in the GRNMS inshore of the R2 tower). The shelf signal is dominated by tidal currents. Analyses of sub-tidal currents derived from de-tided surface currents are planned and will be compared to *in situ* ADCP records (from both the real-time tower instruments and moored internally recording instruments, the latter including a UNC deployment near NDBC buoy 41008 (GRNMS)). Implementing quality control (QC) on a vector-by-vector basis is another target for ongoing work. Trouble-shooting strategies are also being developed during this initial operational period (e.g., recognition of the effects of malfunctions of individual antennas from the calculated current field).

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% COMPLETE

- **Documentation** - Continued documentation of mechanical and electrical systems will be emphasized, along with cost/personnel requirements for operation of various components of the observing system. This information will contribute to Regional Association planning and is of interest to SEACOOS Affiliates for IOOS planning purposes.

60

*Status:* The SkIO Engineering has expanded their "document tree" for mechanical and electrical systems. This will be expanded to include support systems for the HF Radar installation.

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% COMPLETE

- **Data analyses** - An area of emphasis in Year 4 will also be analyses of the existing time series on the sub-regional level, and in coordination with SEACOOS partners, on the regional scale.

*Status:* Collaboration with UNC for analysis of data from the 2003 "cold water event" (prolonged summer upwelling/intrusion) resulted in a paper (Aretxabaleta et al. 2006), which has been followed up by additional hindcast modeling and analysis (coordinated by A. Aretxabaleta, UNC). A manuscript for the latter work should be submitted soon. Preliminary analysis of offshore wind data has been pursued in collaboration with an academia/industry partnership that is exploring the potential for wind power generation on the Georgia continental shelf. Further analyses by J. Blanton and D. Savidge of SkIO are being supported by the wind power group. The time series observations are also being utilized in NSF and NASA supported projects.

A major focus of SkIO IM efforts (see IM section) has been developing the database structure and implementing visualization tools for display and analysis of the WERA HF Radar surface current estimates. As noted above, initial analyses have focused on characterization of system performance (especially spatial and temporal resolution).

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% COMPLETE

- **Logistical support for UNC and SC DNR operations** - SkIO will coordinate with UNC partners to support tower observations and autonomous vehicle (glider) deployments, and with our SC DNR partner to maintain the UW camera system deployed near one of the Navy towers.

*Status:* SkIO has provided ship-time and some logistic support for field trials of the UNC Webb glider and for servicing the UNC tower met package (deployed on the R8 platform). The glider was successfully deployed in early August 2006 and, after this initial mission, is scheduled for recovery in early September, during a cruise of SkIO colleague G.A. Paffenhöfer.

SkIO personnel replaced the SC DNR UW video camera and cable in June, 2006, and continue to have the primary role in servicing dives to clean camera lenses and replace anti-fouling rings. A revision of the video file transfer protocol to SC DNR and USC from SkIO is nearly complete which will better automate the process.

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% COMPLETE

- **Near-shore directional wave measurements** - SkIO personnel will coordinate with our GIT partner to maintain near-shore directional wave buoy off Tybee Island, Georgia (including ship, small boat and diving support).

*Status:* The GIT wave buoy broke free of its mooring in February, 2006. It did not report its position until after it had drifted across the shelf and was entrained into the Gulf Stream and lost into the North Atlantic. A replacement buoy was ordered (funds from the University of Georgia Risk Management program). A second buoy deployment was cut short when the mooring line was apparently cut. This buoy was reporting position at regular intervals and was secured with a temporary anchor from a small vessel and

later recovered by the *R/V Savannah*. It is targeted for redeployment in September, 2006. Given recent proposals at the State and Federal level for renewed beach nourishment operations at Tybee Beach, we feel it is important to continue to collect data to define the inshore wave climate off Tybee.

GIT partner, Paul Work, participated in the South Florida "mini-Waves Experiment" (multiple in situ wave measurements in the UM WERA domain) and is contributing to the analysis of that data. Analysis of data from an inter-comparison of wave parameters measured by the Triaxys wave buoy and a bottom-mounted ADCP at the Tybee site has also proceeded during Year 4. And as part of the Year 4 project, an experiment was conducted on the Georgia shelf to assess the feasibility of deriving wave and surface current information from digital video of the sea surface, recorded from the offshore platforms. Measurements were obtained at two towers during a SABSOON servicing cruise in May, 2006. Analysis of these records is ongoing and will be continued in Year 5.

*Real-Time Wave Measurements, Coastal Georgia, P.A. Work, S.I., School of Civil and Environmental Engineering, GIT, Savannah Campus. (See Nelson Update)*

**WORK STATEMENTS**

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- **Tybee Roads Directional Wave Buoy Measurements** - maintain the existing installation at Tybee Roads. This requires periodic diver inspections and replacement of the mooring system and buoy servicing at six-month intervals.

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- **Data distribution** - continue to enhance the presentation and accessibility of the data on the web. Data are now updated hourly and posted to the web; the next issues are to improve graphical displays and integrate into the SEACOOS data stream. We will also continue to notify potential users of the resource.

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- **Process data from two Year 3 experiments** - 1) side-by-side deployments of a bottom-mounted ADCP and the directional buoy, and 2) deployment of the buoy within a WERA array in South Florida.

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- Perform pilot study to investigate suitability of video techniques for measurement of directional wave energy spectra at SABSOON towers - Of the options considered, this appears to be one of the more intriguing, but the approach is not, to the author's knowledge, being used operationally anywhere in the world. This pilot study will utilize two data sources: 1) existing stereo video imagery collected within well-surveyed domain at Tybee Island, GA, 10/04, and 2) new imagery acquired from one of the SABSOON towers during SEACOOS Year 4.

*Budget Justification:* P. Work (1 month) will oversee all aspects of the project; R. Ablar (1 week) will assist with data dissemination; a graduate research assistant will be supported at a 1/2-time level for one year to assist with data collection, instrument deployment, servicing, and data processing. The remainder of the budget includes funds for supplies related for data collection. Travel funds have been included for SEACOOS-related meetings and for a conference. Standard Georgia Institute of Technology rates for fringe benefits (24.3%), graduate student tuition (\$444/month), and indirect costs (51.2%) have also been applied. Total budget of \$83,102 included in total for SkIO.

*OBSERVING (CONT.)*

*University of Miami, RSMAS Radar Test Bed for the East Florida Shelf (EFS) and Mini-Waves Experiment - S.I., Lynn K. Shay MPO, RSMAS*

## WORK STATEMENTS

▪ <b>Analyses</b> – Analyze radar-derived surface currents and waves by comparing data to moored ADCP, AWAC, and Tri-Axys data over the East Florida Shelf from the ~2-month deployment in March-April 2005 in collaboration with SEACOOS colleagues.	85%
▪ <b>RTB operations</b> - Maintain three surface current radar sites along the EFS, establishing a radar test-bed (RTB) in a regime with large gradients that occur over short-time scales. Compare the radar surface current estimates to available <i>in situ</i> velocity measurements.	65%
▪ <b>Real time data</b> - Provide hourly estimates of surface current maps and significant wave heights via the Web.	100%

*Budget Justification:* Salary support is requested for Drs. L.K. Shay (3 months) and B. Haus (3 months), Tom Cook (8 months), and Jorge Martinez (12 months). Shay will oversee and manage the project, lead the analysis of the surface and subsurface data. Haus will process wave data from the WERA data. Cook is responsible for processing the surface current data posting on the Web. He will assist Haus in the in situ wave data comparisons to the WERA-derived wave data. Martinez and Cook will also assist in the surface and subsurface current analysis, and maintain HF radar sites. All personnel will be involved in the day-to-day HF-radar operations on the EFS. Direct costs include permits, telephone lines and electricity at the sites, travel to and from the sites, expendable supplies; such as, disks/CDs to store data, computing services (i.e., Internet connections at the sites such as DSL, cell phone technology), and publications. Fringe benefits are approximately 26% and 30% for senior and support personnel. The UM indirect cost recovery is 51%. The budget includes \$4.5K for spare antennae coils and cables for the WERA.

### Comments:

**There was no wave-rider buoy (removed from budget), rather it was a mini-waves experiment in 05 in collaboration with several SEA-COOS institutions. We have not procured directional wave software given budget shortfalls, and have delayed the installation of the Ft. Lauderdale Site.**

**Tom Cook left in Oct (05) and was replaced by Jodi Brewster in Nov (05) and we are supporting a student (Brad Parks) involved in the analysis of the in situ ADCP mooring data and radar-derived surface currents as part of his MS Thesis.**

**New coils were delivered this summer and installed at the North Key Largo Site.**

*Real-time Oceanographic Profiling Stations Along the East Florida Shelf, S.I. Bill Johns, MPO/RSMAS*

**WORK STATEMENTS**

% complete

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- **Development and testing** - Continue development and testing of operational real-time oceanographic profiling systems within the HF Radar Domain on the East Florida Shelf. The systems, referred to as SWAMP (Shallow Water Autonomous Moored Profiler), contain an upward-looking ADCP and a buoyant CTD probe (APV) that is periodically released to the surface and winched back to the bottom. The entire unit is housed in an acoustically recoverable, trawl-resistant bottom platform. The purpose of these units is to provide a capability for acquiring and transmitting velocity and water property (e.g., temperature and salinity) profile data from shallow environments (<100 m) without the need for vulnerable and maintenance-intensive surface buoys.

90.00%

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  - **Deployments** - Conduct long-term SWAMP deployment (ca. 3 months) with real-time data delivery by Iridium.

0.00%

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  - **Operations** - Commence operational deployments of two SWAMP systems in the EFS HF-Radar Domain, nominally off Carysfort Reef in the Florida Keys and off the northern end of Elliott Key. Both units would be deployed in ~35 m depth. The data will be transmitted to RSMAS and incorporated into the EFS Radar Testbed, EFSIS evaluation, and the SEACOOS real-time data stream. In operational mode, we anticipate collecting hourly velocity (current) profiles and 4-hourly CTD profiles that are transmitted 6 times per day.

0.00%

**Status:** Testing of the SWAMP system is continuing in South Florida waters with HF radio data transmission. Two major problems with development of a fully operational system persist: (1) development of a functional Iridium telemetry capability, and (2) integration of “smart” data transfer between the APV and ADCP internal components. Progress on these issues has reached a standstill and according to our commercial partner (Oceansensors, Inc.) this will require significant board-level modifications to the APV system and the communications protocol between the AVP and ADCP to solve. Given the tight funding situation in SEA-COOS it is not feasible to proceed with these developments at this time. Therefore our goal for the remainder of the current fiscal year is to fully test the physical performance of the system (winch functionality and durability, CTD operation, data telemetry in a range of surface conditions, etc.) via a long term test (~ 3 mo., April-June 2006).

*Observations from Explorer of the Seas and Associated Data Systems, Edward Kearns, S.I., MPO/RSMAS*  
**Ship Onboard Activities**

**WORK STATEMENT**

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- **Real time data** - The Explorer of the Seas will continue to provide daily real-time data from the Straits of Florida and the northern Caribbean Sea. These observations include: 90%
  - ADCP,
  - bulk and skin SST,
  - sea surface chemistry,
  - standard meteorological measurements,
  - incoming radiation, aerosol characterizations,
  - upper air wind profiles,
  - radiosonde profiles, pCO<sub>2</sub>, and
  - manual water samples.

Status: All of the data above is available in real-time except the ADCP data and the manual water sample analysis. The real-time data are available at <http://oceanlab.rsmas.miami.edu>. The real-time data stream has been enhanced to include all raw real-time data from the laboratories which is uploaded via satellite every 15 minutes. QA/QC procedures for these data will be implemented shore-side. Real-time data continues to be made available to the SEACOOS commons data scout and the National Weather Service.

**WORK STATEMENT**

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- **Test bed activities** - The Explorer will continue to serve as a test bed for automated VOS technology and for instruments from both the oceanographic and meteorological communities. The focus for Year 4 will be on the proper establishment and refinement of the real-time ADCP data flow. 100%

Status: In addition to the ADCP data, efforts are underway to document the calibration and maintenance procedures for the flowing sea water systems. The real-time ADCP data has been reviewed and data acquisition challenges relative to ship speeds approaching 22 knots have been identified and a factory-supported adaptation has been applied to the ADCPs to address those challenges. The evaluation of the ADCP data will lead to a recommended standard real-time processing procedure which should be ready for implementation by year-end.

**WORK STATEMENT**

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- **Public outreach** - Personnel will continue to pursue public outreach opportunities to educate and inform passengers about oceanography in general and the SEACOOS program in particular. 100%

Status: The onboard public outreach, undergraduate training and teacher training proceeds on the Explorer of the Seas. The SEACOOS kiosk is completed. RCCL has ordered new touch screens which will make the interaction more responsive. The new SEACOOS kiosk computers will also enhance the interaction with more capabilities and the potential to show the SEACOOS DVD as a part of the kiosk program.

## UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL

*Observational subprogram for SABSOON and NC, Harvey Seim, SI and SEACOOS Chief Operating Officer*

WORK STATEMENTS	% complete
<ul style="list-style-type: none"> <li>▪ <i>Fixed platforms:</i> deploy/maintain/harden tower deployments off Oregon Inlet and at SABSOON. Support buoy electronics as needed. Focus on assessing if systems are viable. Build up additional systems as possible.</li> </ul>	75%
<ul style="list-style-type: none"> <li>▪ <i>Moving platforms:</i> focus significant effort on autonomous salinity and temperature mapping with glider.</li> </ul>	100%
<ul style="list-style-type: none"> <li>▪ <i>HF radar:</i> continue operation and evaluation of existing HF radar. Continue work on formatting, exchange of radials, and formation of total vectors along eastern seaboard. Continue planning for an additional HF radar to go near Cape Lookout.</li> </ul>	90%

*Fixed platforms:* Mixed success; revived SABSOON tower R4 installation in early August 2006 though Iridium communications still poor. Issue was with 485 bus. Lookout Shoals buoy rebuilt and re-deployed by July 2006 but odd failure in late July; 2<sup>nd</sup> buoy still not delivered as of 8/28/06. Internally-recording deployment off Oregon Inlet maintained. Plan to finish build-up of second buoy asap once it arrives.

*Moving platforms:* finally some success with the glider. The 5<sup>th</sup> attempted deployment in Onslow Bay went OK for a week but was ended due to Iridium modem issues. Sixth deployment at R4 in August 2006 has gone very well, can now confirm the glider CAN work. Remarkable signal of internal tides near the shelf break.

HF radar: considerable progress in documenting and understanding nature of errant velocities produced by system. Gave talk at Ocean Sciences in HI, continue to work with CODAR on solutions. Also involved with MAB HF radar consortium on sharing of radials. Departure of L. Stearns a setback but good overall progress with diagnosing the system this year. No serious planning for Cape Lookout deployment.

Lookout Shoals research buoy, R. Luettich, S.I.

#### WORK STATEMENTS

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- Lookout Shoals Research Buoy statement of work:

Assess sensor integration and improve data logging and transmission capabilities as appropriate.

Buoy maintenance to include:

6 - month buoy turn around and refurbishment

2-3 month turn around of associated bottom tripod and in water buoy

sensors

as needed sensor replacement

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- Demonstrate buoy configuration robustness as quantified by # of down sensor days
- 

- Initial analysis of data returning from buoy

*Budget justification:* includes salary support for Luettich (1 month) and Whipple (6 months). Other Charges include transportation support includes 12 days on the R/V Capricorn (\$9600) and 12 small vessel days (\$1800). Supplies charges of \$10,162 include electronics and shop charges, and computer supplies. Travel is budgeted at \$3,000.

*Status:* 2 buoys were ordered from GOMOOS in December 2003 and delivered in the summer of 2005. An uninstrumented buoy was deployed at the Lookout Shoales site in January of 2005. It broke from its mooring and was lost at sea approximately 1 month after deployment. A replacement buoy has been ordered from GOMOOS, although this has not yet been received. The mooring attachment was redesigned and a fully instrumented buoy was deployed in June of 2005 along with a companion bottom tripod containing an ADCP and CTD. This buoy functioned with data displayed at the NCCOOS web site, until early September 2005 when it was severely damaged by the passage of Hurricane Ophelia. The bottom tripod functioned through the hurricane and provided wave and current data on the conditions throughout the time period. The buoy utilized an Iridium communication system to transmit meteorological and other surface measured data to shore which functioned well. It also utilized a cell phone communication system to transmit data received via acoustic modem from the bottom tripod. The cell phone was not reliable from the deployment location and has since been replaced with a free wave radio system. The buoy and tripod were recovered in October 2006. The tripod was re-deployed in January 2006 without the buoy and recovered on March 31, 2006. The buoy has now been re-instrumented and further modifications to the mooring system have been made with the hope of reducing

damage to the buoy instrument systems during extreme weather. The buoy and tripod are presently scheduled for re-deployment at the end of April 2006.

In addition the Army Corps of Engineers has provided funding for the deployment of a bottom mounted ADCP 2000 ft off the beach near the west end of Bogue Banks. This instrument was deployed in mid-March 2006 and a cable laid to shore. Real time data is currently being collected from this system and we are working to make it available in real time via the NCCOOS web site.



**INFORMATION MANAGEMENT**

**INFORMATION MANAGEMENT AND COMMUNICATIONS – S.I. AND WORKGROUP CHAIR MADILYN FLETCHER, S.I.  
DWAYNE PORTER**

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WORK STATEMENTS

<ul style="list-style-type: none"> <li>Continued <b>development of web-based products</b>. These will include enhancements of current map-based, static tools, which have interactive features and aggregate real time data. Additional developments will incorporate web-based analytical tools that enable users to pull down data and information for distributed, in-house product development.</li> </ul>	<p>Ongoing; focus has been on web-based visualization</p>
<ul style="list-style-type: none"> <li>Continued <b>participation in standards development</b>. This will include enhancement and build-out of data dictionary in coordination with national IOOS standards development, as well as development of QA/QC standards.</li> </ul>	<p>Ongoing; includes QARTOD, MMI</p>
<ul style="list-style-type: none"> <li><b>Maintenance of commonly used computing infrastructure</b>. This includes the maintenance of two data base servers, one applications server, and one aggregation server, as well as hosting the SEACOOS twicki, bulletin board, and listserve. We will work with other SEACOOS institutions to identify redundancy needs and help address where possible.</li> </ul>	<p>Ongoing; established some redundancy at UNC-CH</p>
<ul style="list-style-type: none"> <li><b>Continued metadata documentation</b>. Assistance with program metadata documentation for a broad range of information will be provided through implementation of Meta-Door.</li> </ul>	<p>Ongoing; Meta-Door Vs2 completed.</p>
<ul style="list-style-type: none"> <li>Establishment, organization, and documentation of <b>SEACOOS archives</b>. This will include not only establishment of SEACOOS' own archival needs, but also continued and enhanced transfer of data to national archives.</li> </ul>	<p>Appropriate data archived at NDBC &amp; NODC</p>
<ul style="list-style-type: none"> <li>Provision of information and instruction on <b>information management processes and protocols to other regional and national IOOS systems</b>.</li> </ul>	<p>Ongoing; provided guidance to NOAA NERS on RDBS &amp; QA/QC</p>

*Budget Justification:* includes salary support for Fletcher (1 month), Porter (0.75 month), Purvis (12 months), and a programmer/developer (9 months). Travel is projected to be \$9000. Funds for supplies (\$10,000) include computers, computer peripherals, and computer supplies, while computer costs relate to USC computer support.

**SKIDAWAY INSTITUTE OF OCEANOGRAPHY INFORMATION MANAGEMENT**

**INFORMATION MANAGEMENT**

*S.I.s Jim Nelson, Rick Jahnke, Dana Savidge*

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%COMPLETE

- Provide **near real-time data from SABSOON and the GIT wave buoy** to the SEACOOS modeling group and to NDBC and NWS. Update and maintain web sites for public access to tabular and graphic data.

70

*Status:* Work on communications systems by Navy contractors resulted in several interruptions of the data flow from the offshore towers during Year 4, with an extended break in the summer of 2006 when an on-shore microwave towers was repaired and antennas were upgraded. Upgrades of SkIO IT hardware and data processing scripts have been implemented (nearly complete) which should enhance the reliability of web delivery of tabular data and graphics in the near real-time. Data from the offshore towers continues to be delivered to the NDBC and regional NWS office.

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%COMPLETE

- Implement a **remote accessibility structure for the SkIO network** to facilitate joint work on processing and display scripts with UNC and other partners and to facilitate flexible sharing of large data files and analysis products using http and secure shell.

70

*Status:* All main data and processing servers can now be remotely and securely accessed with SSH protocols for log-in and transfer of data to SEACOOS partners. Significant hardware upgrades have been implemented by SkIO IT that will enhance system reliability. Processing scripts have been migrated to a dual server (main and backup) system, providing backup for processing and delivery of near real-time data from the offshore towers. A Linux server for acquiring and processing the WERA HF radar data was installed.

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%COMPLETE

- **Update scripts** to parse data into a web accessible Postgres database for real time and historical data from SABSOON.

60

*Status:* The open source PostgreSQL relational database has been designed and fully implemented at SkIO for the historical and incoming SABSOON data. This was extended in the second half of Year 4 to

include WERA surface current data. Further work is underway to better link the tower database to maintenance records and a time series archive of regional ocean color satellite data. Open source GIS applications are also being installed for layered displays of various mapped data products (tower, HF radar, satellite). Incorporation of data quality flagging is planned in coordination with the DMCC as QA/QC procedures for various data types are defined. Development of tables for "cleaned" data is underway.

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%COMPLETE

- Coordinate with USC and other SEACOOS partners in the **processing and display of surface current information** from the joint SC/GA HF Radar deployments.

50

*Status:* Surface current observations from the GA-SC WERA system has been incorporated into a geospatially enabled database (GIS) which provides near real-time access to the data. Mapped displays are rendered (using the open source Mapserver tool) and overlays with satellite imagery can be generated. Tools for visualization and analysis are being developed to: 1) plot selected "transects" of surface currents (and associated errors) across the coverage domain; 2) facilitate comparison of HF Radar currents with time series of *in situ* ADCP measurements for various parts of the coverage area are being developed (e.g., across various depths; center to edge); 3) de-tide the surface current data for analysis/display of sub-tidal currents. An internet-based display system for the WERA data has been set up.

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%COMPLETE

- Follow up on the initial **prototype testing of the USC Meta-Door tool** at SkIO and implement metadata strategies developed by the SEACOOS DMCC.

30

*Status:* General FGDC-compliant records have been generated for the towers, but updates in the second half of Year 4 have been delayed to some extent by departure of one of our key service personnel who maintained the servicing/calibration records.

UNIVERSITY OF SOUTH FLORIDA

*SI Mark Luther*

WORK STATEMENTS	%complete
<ul style="list-style-type: none"> <li>▪ (1) continue to collaborate with SEACOOS DMCC personnel on all SEACOOS data management plans for Year 4</li> </ul>	99.9
<ul style="list-style-type: none"> <li>▪ (2) continue to provide/add COMPS/NDBC monitoring sites data to the SEACOOS web site</li> </ul>	80
<ul style="list-style-type: none"> <li>▪ (3) enhance our QA/QC control practices and coordinate with SEACOOS on the overall QA/QC efforts (QA/QC Standards and Procedures SEACOOS DMCC White Paper)</li> </ul>	65
<ul style="list-style-type: none"> <li>▪ (4) enhance our data management practices and metadata holdings; enhance USF COMPS web site to provide data in an Open Geospatial Consortium (OGC) compliant manner</li> </ul>	75
<ul style="list-style-type: none"> <li>▪ (5) add the USF HF Radar data stream on the USF OpeNDAP server and provide HF Radar radials data to the HF Radar National network</li> </ul>	75

Status on each work statements:

- (1) USF Data Management (USF-DM) team continues to participate with SEACOOS partners (USC, UNC, Skidaway and UM) DMCC colleagues in all SEACOOS data management efforts (Partner/NDBC/NOS sites data integration, Display and Data Sharing standards development, QA/QC standards and Procedures development).
- (2) USF continues to provide in-situ data from the West Florida Shelf COMPS sites and NOAA-NDBC monitoring sites in the SEACOOS region on the USF OpeNDAP server for the SEACOOS website ([http://seacoos.marine.usf.edu/cgi-bin/nph-dods/data/seacoos\\_rt\\_v2/](http://seacoos.marine.usf.edu/cgi-bin/nph-dods/data/seacoos_rt_v2/)).
- (3) Work has been completed on writing scripts to integrate the 25 Everglades Marine Monitoring Network (National Park Service) sites data into COMPS database (<http://compsweb.marine.usf.edu/>). Soon, these data will be made available on the USF OpeNDAP server for the SEACOOS web site.

- (4) Work is in progress with Florida Fish and Wildlife Commission (FWC) Fish and Wildlife Research Institute (FWRI) to integrate their MARVIN water quality monitoring sites (part of the red tide monitoring system) data into COMPS database. FWRI will work with USF DM team to provide MARVIN platform data to SEACOOS web site as part of their participation in SECOORA's Ocean Data Partnership Initiative.
- (5) Work is in progress on enhancing and implementing QA/QC procedures for COMPS sites data. We are working with SEACOOS partners on the same and will implement the QC flagging schemes agreed upon by all SEACOOS partner institutions. USF DM team represented SEACOOS/SECOORA and participated in QARTOD-IV held at WHOI (June 21-23, 2006). USF DM team has participated in an intensive QA/QC workshop held at UNC, Chapel Hill (July 10-14, 2006) to write DMCC white papers on Recommended Data Sharing Practices and QA/QC standards and Procedures. Work is in progress on implementation of QC procedures and creation of QC flags to package the data in netCDF format and upload the same on USF OpenDAP server.
- (6) We have enhanced COMPS DM practices by redesigning the site to a database driven site (<http://compsweb.marine.usf.edu/>). We have upgraded our data display and data retrieval of COMPS data. The site's front end work is under progress. Presently all our COMPS sites data are accessible in an Open Geospatial Consortium (OGC) compliant manner (Web Mapping Service – WMS and Web Feature Service-WFS) via SEACOOS website. We have implemented Web Mapping Application Chameleon which is built on Map Server. Work has been completed on providing KML files for viewing COMPS sites data via Google Earth.
- (7) We have solved all the communication, data return and data quality related issues of our HF Radar sites. Work is in progress to package the data in netCDF format as agreed by SEACOOS DMCC. We have provided access to our HF Radar sites to the National HF Radar Network for integration of our data into HF Radar National network (<http://cordc.ucsd.edu/projects/mapping/> and <http://cordc.ucsd.edu/projects/mapping/stats/?sta=NAPL>). Work has been completed on including our sites radials data in the national network and the site is under evaluation and will be released soon.
- (8) USF DM team has actively participated in SECOORA's Ocean Data Partnership (ODP) Initiative. We attended the ODP related meetings and participated in the creation of ODP MOU. USF signed the MOU at the SECOORA workshop held in Jacksonville, FL, and will be an active participant in the initiative.

*Budget Justification:* Salary and benefits are budgeted for V. Subramanian (2 months), J. Donovan (8 months), and P. Smith (6 months). Subramanian is on a 9-month state-funded appointment. A new Dell Xeon server was purchased under Capital Equipment. Other costs are for SEACOOS DMG travel, computer maintenance, computer related supplies (tapes, CD/DVDs, etc. required for back-up of critical data), and publication. USF fringe is @ 16.5%, plus 590/month health insurance, and indirect is @ 47%.

*INFORMATION MANAGEMENT (CONT.)*

**UNIVERSITY OF MIAMI**

Observations from Explorer of the Seas and Associated Data Systems, Rod Zika, P.I., MAC/RSMAS  
**Data Management**

**WORK STATEMENT**

- 
- Continue to provide daily real-time data from the Explorer of the Seas. 100%

Status: The Explorer of the Seas continues to provide real-time data to the SEACOOS commons and on a OpenDAP/DODS server.

WORK STATEMENT

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- **Refinement of the realtime ADCP data and estimation/minimization of the associated current velocity errors** through new processing techniques and improved navigational error analysis

90%

Status: All of the historical ADCP data to present is in the process of evaluation with software tools that have been recently developed for that purpose. The OS38kHz has been evaluated with this tool. Single-ping ensemble editing software is in development for this data set. Heading calibrations will be recalculated with the additional bottom tracking data available. Heading corrections which will be done for each ensemble will be incorporated into the new data processing utilizing the data from the installed 3-D GPS system onboard. The initial processing, minus the more accurate heading correction, has been completed.

WORK STATEMENT

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- archival-quality database efforts will continue to develop, adopt and implement:
  - new SEACOOS and IOOS standards for data formats
  - QA/QC methodology (QARTOD I and II results)
  - accompanying metadata (e.g. MMI products)

70%

Status: The QA/QC methodology has not yet been applied to the data processing. Software is in development, and is 50% completed to process the surface marine data (winds, salinity, water temperature). The current QA/QC will be implemented simultaneously with the processing software development for that data set. Metadata has been produced for an intermediate step towards a completed metadata database.

WORK STATEMENT

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- The **infrastructure** that supports the shore-side data management system will continue to support the data streams from other Miami SEACOOS investigators.

100%

Status: both the University of Miami WERA and EFSIS data streams continue to be served up by our OpenDAP/DODS server.

WORK STATEMENT

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- Support will be provided for SEACOOS-related remote sensing activities of the USF and RSMAS Remote Sensing\*\* (RS) laboratories (Terra-& Aqua-MODIS ocean color and SST, AVHRR SST, etc.) through new product development, operational redundancy, or data dissemination.

25%



Central web site maintenance, S.I. Harvey Seim, UNC-CH

<p>Support of <a href="http://www.seacoos.org">www.seacoos.org</a> will include maintenance of the server suite (4 ) and regular backups and system monitoring.</p>	100%
<ul style="list-style-type: none"> <li>▪ <b>Ongoing changes to functionality and content of <a href="http://www.seacoos.org">www.seacoos.org</a>.</b> UNC-CH will control content structure and contribute to content. Principle responsibility for new content will rest with partners use of the Content Management System, which allows for distributed content additions and revisions.</li> </ul>	100%
<ul style="list-style-type: none"> <li>▪ <b>Programming &amp; technical inquiry</b> will be provided by staff to enhance existing and research developing technologies in support of the SEACOOS website.</li> </ul>	100%
<ul style="list-style-type: none"> <li>▪ <b>GIS support and development</b> to continue expansion of the website visualization suite.</li> </ul>	100%
<p>Part 2: NCCOOS data management, P.I. Harvey Seim, UNC-CH</p>	
<ul style="list-style-type: none"> <li>▪ <b>Continued Data Integration:</b> Collaboration with SEACOOS data management personnel to implement processes to aggregate internal and external data streams for modeling and outreach products.</li> </ul>	100%
<ul style="list-style-type: none"> <li>▪ <b>Data Quality and Control:</b> We will implement QA/QC practices as identified by SEACOOS partners. This includes procedures for near, real-time observational data, as well as, after-the-fact.</li> </ul>	100%
<ul style="list-style-type: none"> <li>▪ <b>Establish metadata and data structure for NC observations:</b> We will assist in identifying SEACOOS minimums for data structure and metadata needs for HF radar and in-situ measurements. These will be made available in a manner that are consistent with those throughout SEACOOS.</li> </ul>	75%
<ul style="list-style-type: none"> <li>▪ <b>Operational data streams:</b> Maintain and update scripts and programs to automate the processes of converting, calibrating, and aggregating data as they are received from remote sites and pushed to data servers for Internet access. Work to incorporate need to access information about changes in calibrations and maintenance.</li> </ul>	75%
<ul style="list-style-type: none"> <li>▪ <b>Design relational equipment database:</b> Continue development of a relational database to hold information about field equipment and sensors, history of maintenance, calibration data and threshold standards. This database will be updated by field personnel and used by operational scripts and programs—a crucial step towards operational function.</li> </ul>	90%

*Part 2* – the NCCOOS testbed for development continues to expand. Excellent progress developing QA/QC implementation during summer workshop, expect testable mock-ups this fall. Good progress in planning for revised data management structure and operational streams but implementation delayed. Relational equipment database planning well underway, should begin implementation this fall as part of SECOORA equipment inventory development project.

## MODELING

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### UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL

*S.I. and Modeling Working Group Chair, Francisco Werner, UNC-CH*

#### ASSESSMENT OF ACCOMPLISHMENTS BASED ON WORK STATEMENTS

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- **Coupling with HYCOM.** To include bathymetry matching, examine accuracy/compatibility of mass field and momentum fluxes, and exploration of techniques for merging fields. This includes using basin-scale estimates of offshore sea level as open-water boundary conditions for the regional NFS models. Initialization of both hindcast and forecast simulations will be pursued. 85%

**Present state:** this system is now being tested in full and has given quite satisfactory results. We are still trying to work out scheduling details for the posting of all HYCOM files needed for the nowcast/forecasts.

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- **Data assimilation.** Explore implementation of techniques developed under SABLAM for assimilation of ADCP and sea level observations, testing of wind-convolution approaches, and examine methods for HR radar data assimilation. 20%

**Present state:** the methods themselves have not been changed in the past year. As more data becomes available we will be able to construct new test-beds for their quasi-operational implementation.

- 
- **Baroclinic forecasting.** Implementation of baroclinic versions of the NFS will commence. This brings together the experience of the existing (barotropic) SEACOOS NFS, as well as the knowledge gained in exploring the above aspects. 70%

**Present state:** related to the coupling with HYCOM (above) this activity has progressed satisfactorily, and the process has been streamlined.

- 
- **Quantitative assessment of generated fields & skill assessment.** Continued work on quantitative skill assessment measures of the existing NFS will include velocity measurements. As a baroclinic version of the NFS emerges, this will involve additional ocean measurements such as remotely sensed SST as well as in situ 3D velocity, temperature, and salinity. 30%

**Present state:** preliminary comparison with hindcast fields has shown generally good agreement of the general solutions. This serves as a test of the input fields from HYCOM as well as the shelf-scale model's ability to evolve the signal.

- 
- **Quantification of transport (along- and cross-shelf).** To include Lagrangian characterization of SAB, fisheries/MPA applications, and biogeochemical flux considerations. 80%

**Present state:** results from applications to fisheries dispersal/retention questions have been presented at national meetings and have been accepted for publication in peer-reviewed journals.

- 
- **Write papers on the above for scientific publication.** Peer-reviewed publications will be written and will provide an objective measure of the quality of our findings. 85%

**Present state:** two papers authored by K. Edwards et al. and one by A. Aretxabaleta et al. have been accepted for publication. One paper is in revision for re-submittal – 75% success.

- 
- **Ensemble SEACOOS domain modeling** – explore the use of SEACOOS wide domain models with USF and UM, including the development of quantitative model ensemble forecasts/hindcasts N/A

**Present state:** the model domains are not yet spatially overlapping to allow for ensemble approaches.

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**Publications:**

Aretxabaleta, A., B.O. Blanton, F.E. Werner, E.P. Chassignet, H.E. Seim, and J.R. Nelson (2006a) Cold Event in the South Atlantic Bight During Summer of 2003: Model Simulations and Implications. *J. Geophysical Research*, accepted.

Aretxabaleta A., J. R. Nelson, J. O. Blanton, H. E. Seim, F. E. Werner, J. M. Bane, R. Weisberg (2006b), Cold event in the South Atlantic Bight during summer of 2003: Anomalous hydrographic and atmospheric conditions, *J. Geophys. Res.*, 111, C06007, doi:10.1029/2005JC003105.

Edwards, K.P., J.A. Hare, F.E. Werner and B.O. Blanton (2006a) Lagrangian circulation on the Southeast U.S. Continental Shelf: implications for larval dispersal and retention. *Cont. Shelf. Res.* Vols. 12-13, 1375-1394.

Edwards, K.P., F.E. Werner and B.O. Blanton (2006b) Comparison of observed and modeled drifters in coastal regions: an improvement through adjustments for observed drifter slip and errors in wind fields. *J. Atmos. Ocean. Tech.*, Vol. 23, pp. 1614-1620.

**University of Miami**

*RSMAS East Florida Shelf Information System (EFSIS), S.I. Christopher N. K. Mooers, OPEL/RSMAS/UM.*

**WORK STATEMENTS**

<ul style="list-style-type: none"><li>▪ <b>Continue operating and testing the baroclinic EFSIS within the nowcast/forecast system</b></li></ul>	80%
<ul style="list-style-type: none"><li>▪ <i>Status:</i> EFSIS operation continues; one EFS-POM model vs STACS validation ms and one EFSIS documentation ms published in 05; EFSIS vs ADCP current vertical profiles in SE Florida and NE Florida validation &amp; verification ms in preparation</li></ul>	
<ul style="list-style-type: none"><li>▪ <b>Utilize Global-NCOM fields from NAVOCEANO via NCDDC</b> as lateral open boundary conditions, and possibly as initial conditions., for the EFSIS nowcast/forecast system</li></ul>	100%
<ul style="list-style-type: none"><li>▪ <i>Status:</i> open boundary conditions from Global NCOM have been implemented in EFSIS in an automated fashion with daily updates out to 84 hrs; recently, a serious discrepancy was found in the gridded output made available; the technical issues were resolved and remedial measures are being taken by NRL &amp; NAVO; the informal agreement to perform informal beta tester duty has been fulfilled, but it will now be necessary to re-run EFSIS for the past two years</li></ul>	
<ul style="list-style-type: none"><li>▪ <b>Contribute with baroclinic EFSIS</b> to a MODPROD Working Group publication on a collective baroclinic product</li></ul>	0%
<ul style="list-style-type: none"><li>▪ <i>Status:</i> no explicit progress while awaiting resolution of the fate of the rejected ms for the barotropic product</li></ul>	
<ul style="list-style-type: none"><li>▪ Based on a high-resolution, nested subdomain model corresponding to the WERA testbed, <b>conduct model validation studies with WERA data</b>, and explore data assimilation there</li></ul>	80%
<ul style="list-style-type: none"><li>▪ <i>Status:</i> EFSIS vs WERA current maps validation &amp; verification ms in preparation</li></ul>	

<ul style="list-style-type: none"> <li>▪ <b>Complete a study of the sensitivity of EFSIS</b> response to wind-forcing of varying attributes</li> <li>▪ <i>Status:</i> have used monthly and synoptic wind-forcing; have preliminarily compared synoptic (NCEP NAM-eta) winds to NDBC buoy and C-MAN winds with encouraging results</li> </ul>	25%
<ul style="list-style-type: none"> <li>▪ <b>Initiate a daily synoptic surface product in support of EFS</b> interests in fisheries oceanography and emergency management (spills, SAR, etc.)</li> <li>▪ <i>Status:</i> too undermanned/underfunded to take on this activity without additional or alternative support; however, a rather promising Lagrangian prediction experiment was conducted in association with the USCG R&amp;D Center's three deployments of several drifters off Key West; unless funding is found, this analysis will advance rather slowly</li> </ul>	0%
<ul style="list-style-type: none"> <li>▪ <b>Nest a higher resolution "coastal strip"</b> (actually, covering the shelf and a few lagoons) in EFSIS</li> <li>▪ <i>Status:</i> as a test case, this has been done for Biscayne Bay; Indian River Lagoon will be another priority locale</li> </ul>	25%
<ul style="list-style-type: none"> <li>▪ <b>Participate in CODAE</b>, especially downscaling and observing system design</li> <li>▪ <i>Status:</i> CODAE proposal was disqualified for funding because it was submitted ca.15 min late; however, planning discussions about Observing System Simulation Experiments (OSSEs) are underway with new AOML Director and others</li> </ul>	10%
<ul style="list-style-type: none"> <li>▪ Further develop plans for <b>coupling EFSIS with wave and sediment transport models</b></li> <li>▪ <i>Status:</i> a specialized sediment transport model was developed and applied to Bear Cut (a tidal inlet between Key Biscayne and Virginia Key) in a process study; ms in press; wave model options are still being weighed, but it is likely that the new Mellor-Donelan directional wave model coupled with POM will be used</li> </ul>	20%
<ul style="list-style-type: none"> <li>▪ <b>Conduct a study of Coastally Trapped Waves</b> in the SEACOOS domain to further delineate Lateral Open Boundary Condition issues</li> <li>▪ <i>Status:</i> a disclosure ms was published in 05 to illustrate the CTW response of the Straits of Florida/Florida Current to atmospheric cold front passages; a major ms that covers a full year is in preparation</li> </ul>	80%

70%

- **Continue studies with the NPZD model**, the Key Largo and Occulina Bank nested subdomains, and Lagrangian simulation studies, including the development of Lagrangian statistics to be validated versus drifters.
- *Status*: the Key Largo studies are progressing by leveraging other projects; a major ms utilizing the NPZD model for the EFS domain over the course of a year is under revision; the potential for operationalizing it in EFSIS is recognized.

**UNIVERSITY OF SOUTH FLORIDA, CMS**

*West Florida Shelf Modeling Subprogram- S.I. Robert Weisberg, CMS/USF*

WORK STATEMENTS

<ul style="list-style-type: none"> <li>▪ <b>Data fields in support of modeling</b> - Continue OI SST, Color, and SSH/geostrophic currents fields from year 3; compile historical and real time river inflow data; improve on surface winds and heat fluxes using available data; develop surface CODAR current fields for Eulerian and Lagrangian applications; use T/S data from all sources, including BSOP and potentially a glider, plus climatology for 3-D fields T/S fields. Further comparisons between observations and models.</li> </ul>	100%
<ul style="list-style-type: none"> <li>▪ <b>Nowcast/forecast</b> - work toward transitioning the barotropic N/F model using POM to a baroclinic N/F using ROMS, which entails several steps.</li> </ul>	90%
<ul style="list-style-type: none"> <li>▪ <b>Nesting the regional WFS with the global HYCOM</b> – continue joint NOPP work with NRL and RSMAS colleagues in linking deep-ocean and coastal models using appropriately designed model domains that may include our present WFS domain, our SEACOOS domain, or some variant thereof.</li> </ul>	100%
<ul style="list-style-type: none"> <li>▪ <b>Data assimilation</b> – experiment with sequential estimation and adjoint inverse techniques in data assimilative hindcasts with ROMS.</li> </ul>	60%
<ul style="list-style-type: none"> <li>▪ <b>Ecological modeling</b> –collaborate with J. Walsh and colleagues on primary productivity modeling; seek expanded collaborations on fisheries matters.</li> </ul>	100%
<ul style="list-style-type: none"> <li>▪ <b>Hindcast reanalyses</b> – with or without data assimilation, baroclinic hindcasts are important steps toward establishing model credibility and utility in addressing coastal ocean science questions. The 2001 red-tide may be a good case in point.</li> </ul>	60%
<ul style="list-style-type: none"> <li>▪ <b>Linking the estuaries with the shelf</b> – continue baroclinic hindcast applications of FVCOM for linking the Tampa Bay and Charlotte Harbor estuaries with the WFS, including 3-D Lagrangian particle trajectory experiments with fisheries, red-tide, SAR, and other societal applications. Also consider nested ROMS applications.</li> </ul>	100%
<ul style="list-style-type: none"> <li>▪ <b>Hurricane storm surge</b> – finish manuscripts on H. Charley simulation with USGS collaboration, consider H. Ivan, and write up completed Tampa Bay scenarios. Using FVCOM, consider a framework by which high resolution nests can be applied to any subregion for more general surge simulations.</li> </ul>	100%
<ul style="list-style-type: none"> <li>▪ <b>Estuarine modeling</b> – continue applications of model frameworks (ECOM3d-si and FVCOM, presently) to the estuarine physical oceanography of Tampa Bay, Charlotte Harbor, and other Florida estuaries as societal applications may suggest.</li> </ul>	100%

*Budget Justification.* Four PhD associates are presently engaged: Drs. Ruoying He (Assist. Scientist, WHOI), Lianyuan Zheng, Alexander Barth and Aida Azcarate (doctoral associates, USF). Three months are budgeted for R. He (subcontract); six months for L. Zheng; and three months each for A. Barth and A. Azcarate. Other salary support includes one month for the SI and one month for a computer manager.

Other costs are for travel, maintenance, supplies, and publication. USF fringe is @ 16.5%, plus 590/month health insurance, and indirect is @ 47%.

Narratives:

- 1) Regularly posted to the web (<http://ocgweb.marine.usf.edu>) are analyses of SST, color, SSH-geoV, and most recently Lagrangian trajectory simulations based on SSH-geoV. We are similarly maintaining our surface wind analyses for driving the numerical model simulations (N/F and hindcast). A tool for accessing completed T/S climatologies is hampered by software deficiencies.
- 2) A baroclinic N/F model is operating and on the web (<http://ocgweb.marine.usf.edu>). This includes a Lagrangian tracking tool for selected locations. The model consists of a regional WFS ROMS nested in the 1/12<sup>th</sup> degree North Atlantic HYCOM. Tides remain to be added; hence the 90% rating.
- 3) As given in 2) above this is presently operating for the WFS. We are also experimenting with a larger SEACOOS domain ROMS nested in HYCOM.
- 4) Preliminary work has been performed on correlation matrices for model output and on comparing model results with CODAR (and in-situ ADCPs).
- 5) We contributed to a manuscript in press on WFS red tides.
- 6) Hindcasts were made for the 2005 red tide event using two approaches: the regional ROMS nested in HYCOM and the WFS FVCOM linking the estuaries with the coastal ocean, and a delivery to the coast via the bottom Ekman layer was demonstrated for winter 2005. A 2001 hindcast is underway.
- 7) This is in parallel with 6) above. We also developed a new higher resolution grid that will facilitate additional studies farther south. This grid has been tested for tides.
- 8) A paper on the H. Charlie simulation for the Charlotte Harbor estuary is published and another on the Tampa Bay simulations is in press. The what if scenario for H. Ivan hitting the Tampa Bay region is complete and on the website; we are working with USGS colleagues to add waves atop the surge.
- 9) A Tampa Bay paper was published, and we now have support for a Rookery Bay application.
- 10) Papers and presentations are lumped together under the OWG end of year report.

## SC SEA GRANT

*South Carolina Sea Grant Outreach – S.I. and Workgroup Chair, Robert Bacon, SCSGC*

### **S.C. Sea Grant SEACOOS Year 4 – Mid-Year Progress Report**

*NOTE: In late December 2005, Sandy Bernard-Eslinger left her position as the South Carolina Sea Grant coastal hazards specialist (supported by SEACOOS/SECOORA) for a position at the NOAA Coastal Services Center. Because of the uncertainty of funding for SEACOOS Yr-5, the need to stretch Yr-4 funding into Yr-5, and the limited time remaining in Yr-4 (given the time needed to recruit, hire and bring a replacement up to speed), the position has not been re-hired.*

1. Working with SEACOOS partners, affiliates, and collaborators, complete an inventory of existing and planned ocean observing and monitoring assets, variables, models, and forecasting products. Develop a geo-searchable database and distributed web-interface update capabilities.

*Progress – As discussed by Sandy and Jesse Cleary, prior to Sandy's departure this work task and its funding, should be transferred to Cleary at UNC for completion in SEACOOS project year 5. To date, Chris Simoniello has been gathering inventory items. 35% complete.*

2. Facilitate the development of a region-wide Ocean Hazards Observatory. Working with SEACOOS partners, affiliates, collaborators, and key targeted super users including local offices of National Weather Service and emergency management organizations, develop a joint weather/ocean conditions product. The product should be developed with the potential to add specific use-focused applications such as a hurricane tracker, rip currents tracker, oil spill tracker, etc.

*Progress: Due to the similarity of purpose, this work item has been merged into the joint Gulf and South Atlantic coastal inundation workshop planning process. No date has been set for this workshop, although it is expected to take place by late 2006 in SEACOOS project year 5. 10% complete.*

3. Facilitate the development of a region-wide Ecosystem Indicators Atlas. Working with SEACOOS partners, affiliates, collaborators, and key targeted super-users including the South Atlantic Fisheries Management Council, NMFS Fisheries Science Center, and South Carolina Department of Natural Resources, develop a joint fisheries habitat/ocean conditions product to demonstrate the connections between ocean observations and resource management issues. The product should be developed with the

potential to add specific use-focused applications such as Harmful Algal Bloom (HAB) and Hypoxia applications, shellfish management, and aquaculture.

*Progress: This item has been revised slightly from an atlas to an “Ocean Observing Market Analysis”, a compendium of needs assessment documents, including potential components for the integrated maritime information system, and extensive tables of industry user applications and needs. This work was performed jointly with SECOORA and is cumulative in nature. 75% complete.*

4. Engage private sector partner to develop demonstration user-focused decision-support products using regional ocean observing data. These products will include 1) a port-focused hazards/weather product, and 2) an energy and insurance sector focused climatology product.

*Progress: Resources for this work item will be shifted to the expansion of the “Carolina’s Coast” SEACOOS/NWS WFO public sector collaboration throughout the SEACOOS domain and stretched into SEACOOS project year 5. 20% complete.*

Education Activities from COSEE SouthEast

Submitted by PI: Lundie Spence, Ph.D., Director COSEE SouthEast.

SEACOS Year 4 award expenditure and Carry Over Request

Table 1: Yr 4 Budget, expenditures, August Balance, Carry over Funds to complete tasks and Surplus

Item	Yr 4 Budget	Yr 4 Expenditures	Balance	Yr4 Completed Amt	Est surplus
supplies	2000	286.05	1713.95		1713.95
travel	10000	2441.82	7558.18		7558.18
Poster	15000	0	15000	11200	3800
SEPORT	13000	10970	2030		2030
TPOCO	20000	4580	15420	6290	9130
	60000	18277.87	<b>41722.13</b>	17490	<b>24232.13</b>

Table 2: Carry over request: Unspent Yr 4 reallocated to complete tasks and generate new tasks

Item	Yr 4 Tasks	New allocations
supplies		1041.13
travel		3700
Poster	11200	12430
SEPORT		2030
TPOCO	6290	3000
Stipends		2031
	17490	<b>24232.13</b>

41722.13

Deliverables:

1. Taking the Pulse of the Coastal Ocean, June 19-25 professional development workshop for middle school 13 participants. Researchers included Jim Nelson, Laura Murray (U.MD Horne Pt Lab), Deidre Gibson (HamptonUniversity) (see attached sheet)

2. Small scale, exploratory SEACOOS workshops have been conducted since September 2006. a. UGA MECA, coordinated by Venetia Butler with assistance from Al Hanke and Katie Greganti plus Jim Nelson and Margaret Olsen, instructed 15 teachers who learned about SEACOOS observing parameters, web access, and how to make simple observation instruments such as barometers and wind speed calculators. B. A distributed workshop from NCSU, coordinated by Carrie Thomas, developed sample lessons which applied SEACOOS information. C. USC, coordinated by Bob Feller, director of the Science Education Center, coordinated 3 teachers to develop COOS related web-based lessons.

3. Conference Presentations:

Marine Technology Society Conference presentation on technology transfer. September, DC (Spence)

AGU/ TOS/ASLO Conference Poster session Feb, HI (Spence, Rogers)

AMS, Atlanta (Greganti)

SEACOOS Education was attended IOOS sessions.

E.A.R.T.H. workshop sponsored by MBARI and hosted at Rutgers University, July 9-13, 2006: Elizabeth Rogers and Katie Greganti r This is a national workshop focusing on observational data, funded by MBARI.

NMEA, July 15-21 on Long Island, NY.(B. Toliver)

SCMEA, March 2006 Spring meeting Provided SEACOOS posters and information on Ocean Literacy.

Twelve SEPORTs, partially supported by SEACOOS funding, were completed in SC, NC and GA.

4. Publications

a. Spence, L, B. Schaeffer, C. Thomas, T Kirby-Hathaway, M. Olsen. (Winter 2005/2006), Coastal Ocean Observing Technology Transfer to Educators. Marine Technology Society Journal. Vol. 39 (4): 78-82.

b. SEACOOS Poster: Moving with the Flow. (3<sup>rd</sup> in series of educational posters) No funds spend yet.

Carry over funds are requested for completion of existing deliverables and to develop 3 new products.

No indirect costs were requested in this proposal as it is administered through South Carolina Sea Grant Consortium



**FL SEA GRANT**

*Florida Sea Grant Outreach – S.I.s Mike Spranger Florida Sea Grant Outreach – S.I.s Mike Spranger*

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- **SEACOOS Regional Outreach Coordinator** – A full-time (12 month) coordinator (C. Simoniello), based in Florida will: 1) assist the development, implementation and evaluation of SEACOOS extension programs in GA, FL, SC, and NC, 2) build educational capacity of the individual Sea Grant Program extension in delivery of SEACOOS programs, and 3) identify regional constituents for new products and services. 100% (on-going)
- 1) Major activity has been redesigning the SEACOOS Community and Classroom web pages. Project involves creating entirely new site maps for each component of the site. Beta sites are being developed. Both Education and Extension site maps are 100% complete. Content is now being developed for each. (Simoniello)
  - 2) Assist in development of posters and related virtual classroom activities, brochures and flyers for such programs as Gulf of Mexico COSEE online course, American Meteorological Society Conference, Institute of Marine Remote Sensing teacher workshops, COSEE and SEPORT workshops, Extension Professional Association of Florida annual conference, Florida Bay and Adjacent marine Systems Conference. (Simoniello, Spranger)
    - a. Coordinated and led effort to draft SEACOOS/COSEE Hurricane Poster 'Brewing Storms' More than 10,000 have been distributed through NOAA and Sea Grant offices. Also created initial draft/content of next poster in the series focusing on ocean circulation. Advisor to virtual classroom activity development found under the Community and Classroom section of the [www.seacoos.org](http://www.seacoos.org) website.
    - b. Virtual Classroom lecture provided to Gulf of Mexico COSEE for an online course through the University of Mississippi: C. Simoniello and M. Spranger. Coastal Ocean Observing Systems, July/August, 2005.
    - c. Extension Professional Association of Florida: C. Simoniello and M. Spranger. Southeast Atlantic Coastal Ocean Observing System: An Example of Regional Cooperation and Collaboration, Sarasota, FL. September, 2005
    - d. Marine Technology Society. Oceans US 2005. M. Spranger. Lessons Learned: Developing a Coastal Ocean Observing System Education and Outreach Program. Washington DC. September 2005
    - e. University of South Florida Remote Sensing Workshop. C. Simoniello. How to Customize Maps Using SEACOOS Data. Oral presentation. St, Petersburg, FL October 2005.
    - f. Florida Bay and Adjacent Marine Systems Conference: C. Simoniello and M. Spranger. Coastal Ocean Observing Systems: SEACOOS Facilitating Marine Systems Science in Florida. Orlando, FL December, 2005.
    - g. American Meteorological Society Conference: M. Greganti, J. Nelson, C. Simoniello. Using Ocean Observing System Data to Promote Ocean Science Literacy in the Southeast U.S. January, 2006.
    - h. U.S. Global Coastal Ocean Observing System Steering Committee. M. Spranger. Developing Education and Outreach Programs for Regional Associations. Charleston, SC. February 2006.
    - i. Gulf of Mexico Center for Ocean Science Education Excellence Summer Teacher Institute. Ocean Observing Systems: Data and Resources for the Classroom. Cedar Key, FL June, 2006.

- 
- **(Recreational Boater Project** - Increase awareness and use of SEACOOS products and services to Florida’s marina industry, and fee-for-service recreational boating industry (i.e. charter boat operators). Secondary audience is recreational boaters. Tasks: 1) Presentations at marine industry association meetings. 2) Development of materials on “SEACOOS and recreational boating.” 3) Participation at major Florida boat shows (Miami, Ft. Lauderdale, Jacksonville) to present information and survey audience. 100%

- 1) Attended quarterly meetings of the Clean Boating Partnership, providing updates on SEACOOS and implications to marine industries and recreational boating. (Spranger, Jackson)
- 2) Coordinated meeting between FSG and University of Miami researchers to develop fact sheets that explain the utility of using WERA (HF Radar) products for recreational boaters. Fact sheets and demonstration to be available at recreational boat shows. (Spranger, Jackson, Crane, Behringer)
- 3) Attended and presented at the Miami Boat Show, featuring SEACOOS objectives and “WERA” for boaters (200 quality contacts, 8,000 casual contacts). January 2006 (Jackson, Simoniello)
- 4) Produced a poster-size exhibit and fact sheets that will be used in future boat shows. (Jackson, Simoniello)
- 5) Due to projected funding shortfall in year 5, project was curtailed in early 2006, with cost-savings to be used as carry-over for regional coordinator activities in year 5 (2006-2007)

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- **SEPORT** (South East Portal to Ocean Research for Teachers) – South East Portal to Ocean Research for Teachers Project tasks are 1) Provide SEPORT materials and programs to formal educators and other youth educators, with special concentration on 4H Youth agents, and 2) Adapt materials so they are relevant to Florida coastal setting. 100%

- 1) Discussed implementation of workshops with Florida Sea Grant faculty at annual planning meeting. Gainesville, FL October 2006 (Spranger)
- 2) Provided SEACOOS materials for teachers at Florida Marine Science Educator Conference. Crystal River, FL. April 2006. (Spranger)
- 3) Conducted SEPORT workshops in Milton, FL . April 2006, and Miami July 2006 in Miami. (Crane, Verlinde)
- 4) Provided session on ocean observing systems Gulf of Mexico COSEE summer teacher institute. Cedar Key, FL. June 2006. (Spranger)

*Extension on the Explorer of the Seas, S.I. Marella Crane*

**Marella. Bradway and Elizabeth Williams**

9-05-06

Extension for Explorer of the Seas

Oceans Awareness Workshop for Teachers

1. Forty-one teachers attended an Oceans Awareness Workshop held on July 12, 2006. From the evaluation results, 36 out of 41 participants were satisfied with the workshop, 34 said they had learned something new about hurricanes and ocean observations. Pre-posts tests indicated a 38% gain in knowledge. In addition, 37 teachers plan to use the information they learned to potentially reach 5,127 students annually. Teachers received SEACOOS posters and other SEACOOS related handouts for use in the classroom.

*2. Developed Search and Rescue Ocean Exercise to help understand ocean current measurements and ocean observation technology.*

## **FL COSEE**

### *Florida Sea Grant Education – Barbara Spector (USF)*

Several formats, time frames, and styles of interviews were tested during 2005 to determine the most effective interview protocol for eliciting information from SEACOOS scientists and engineers usable for constructing meaningful case studies consistent with the National Science Education Standards.

Interviews have varied from half an hour to an hour and a half. An interview protocol will be part of the template developed.

Research completed on case studies and their use in science teacher education combined with data accumulated from the test interviews suggest the template should include at least two distinct stories and related questions for each case scientist or engineer interviewed. At least one follow up contact with each respondent appears to be necessary to collect appropriate artifacts and clarify information. We anticipate pilot testing case studies based on the template developed with teachers during the fall of 2006. The test will include print case studies and multimedia case studies.

One SEACOOS presentation was made at the International Association for Science Technology Society in February 2006

Two SEPORTS were conducted in Florida in 2005 this far

### **Phase I**

6 Video Interviews completed (100%)

4 Related Case Studies developed. (100%)

### **Phase II**

Interview script in development (10% completed)

Interview format developed (90% completed)

Template development - Total ( 20% completed)

## **Georgia Marine Extension Service**

*Georgia Extension and Education – S.I. Randy Walker*

### **Marine Extension Service**

### **University of Georgia**

### **SEACOOS Education and Extension**

### **2005-2006 Annual Report**

- 1. Public awareness through talks with potential user groups and exhibits at the Marine Extension Service (MAREX) facilities, the Georgia Aquarium, and the Gwinnett Center.**
  - Ms Katie Greganti worked with Stagefront Productions (Savannah, GA) to develop four touch-screen kiosks which work with any DVD and can be updated easily. Kiosks are currently in place at UGA Marine Education Center and Aquarium (MECA) in Savannah and at UGA Marine Advisory Center at the Brunswick, GA Station. Currently working with Georgia Aquarium and Gwinnett Center representatives to place kiosks in their facilities when the space is ready for the exhibit. One kiosk plus a sea buoy has been delivered to the Gwinnett Environmental and Heritage Center and will be on display at its opening on October 1, 2006.
  
- 2. Formal education by Ms Greganti (workshops)**
  - Worked with COSEE Mid-Atlantic and COSEE to plan schedule and material acquisition list for “Taking the Pulse of our Coastal Ocean” workshop for June 2006 at UGA MECA. She led and facilitated 2006 “Taking the Pulse of our Coastal Ocean” workshop in Savannah, GA. Workshop was a five-day, intensive workshop attended by 14 6-12<sup>th</sup> grade educators from NC, SC, GA, and FL schools, both public and private. Educators learned how to bring real-time coastal ocean observing data to their classrooms and how SEACOOS could be used in multiple subjects at the K-12 level. Each educator has developed a unit plan using coastal ocean observations and oceanography topics learned at the workshop for their classrooms, to be carried out in the 2006-2007 school year. She has developed original classroom activities and demonstrations using real-time coastal ocean data from SEACOOS.org, NOAA’s National Data Buoy Center, and NOAA’s Coastal Services Center websites; advertised workshops through contacts/outlets in North Carolina, South Carolina, Georgia, and Florida; worked with scheduling coordinator at MECA to acquire the needed MECA space & resources for daily workshop activities; prepared paperwork to get 3 course credits for teachers from South Carolina and Georgia; worked with oceanographers, coastal engineers, biologists, and educators to bring guest lectures to “Taking the Pulse of our Coastal Ocean” workshop in Savannah, GA; and

developed a template for COOS Ocean Awareness Day for 2006 “Ocean Sciences Leadership Institute” in Beaufort, NC.

### **3. Education section of SEACOOS.org**

- Ms Greganti created site map for Education section of SEACOOS.org and worked with Chris Calloway at UNC CH to add content to SEACOOS.org Virtual Hurricane Classroom. She has explored websites to be linked on SEACOOS.org education section and created Hurricane Bingo game (for SEACOOS.org) with Margaret Olsen

### **4. Communication (conferences, meetings)**

- Ms. Greganti presented at 86<sup>th</sup> Annual American Meteorological Society conference in Atlanta, GA. Session “Tools to Enhance Weather and Climate Data Use in the Classroom.” Introduced SEACOOS.org virtual classrooms and real time data offered on the website with ideas on how to incorporate the data into classroom units. Distributed Ocean Literacy brochures, step-by-step guides to using the site, and “Forming Hurricanes” posters.

### **5. Informing the Public (ownership through understanding)**

- Ms. Greganti worked with Dr. Jim Nelson (Skidaway Institute of Oceanography (Skio)), SABSOON) and Dr. Dana Savidge (Skio, SABSOON) to develop signage to be posted at two new High-Frequency Radar sites (St. Catherine’s in Georgia and Pritchard’s Islands in South Carolina). (IN PROGRESS)

## **EXTENSION OBJECTIVES:**

### **1. SEACOOS-sponsored posters: development and dispersal**

- Ms Greganti provided initial input for the design and content development of new Circulation-themed poster and provided content for the “Ocean Motion” circulation poster (in progress).

### **2. Outreach through presenting to outside interests**

- Ms Greganti attended 2006 Bass Pro Shops Spring Fishing Classic with SEACOOS information for Georgia's Recreational Fishermen. Distributed information including SEACOOS brochure and a fishermen's step-by-step guide to using SEACOOS.org to gather real time coastal ocean data. In addition Ms Greganti worked with MAREX Brunswick faculty and staff to set up guest speaking appearances at GAMBA (Georgia Marine Business Association) meetings June-December 2006 to inform that organization about the importance of SEACOOS.

### **3. Regional coordination**

- Ms Greganti worked with educators and other SEACOOS education & extension specialists in NC, SC, GA, and FL for SEACOOS education and extension projects.

### **4. Communication by Ms Greganti (conferences, meetings)**

- Ms Greganti has represented SEACOOS or attended SEACOOS functions at the following meetings: South Carolina Science Council, November 2005, Myrtle Beach SC; SEACOOS fall meeting, October 2005, Columbia SC; American Meteorological Society Conference: Tools to Enhance Weather & Climate Data Use in the Classroom, January 2006; Monterey Bay Aquarium Research Institute Workshop: Education and Research- Testing Hypotheses (EARTH), July 2006; and HTML training with Chris Calloway (UNC) for content management on SEACOOS.org (October 2005)

*OUTREACH & EDUCATION (CONT.)*

NC SEA GRANT

**SEACOOS Year 4 – Mid-year report**

**Extension and Education**

## North Carolina Sea Grant

### Work Statement

<p><i>Explain SEA-COOS capabilities to potential NC users.</i> Establish a rapport with coastal resource management groups, emergency management agencies, recreational boating associations, ports and harbors, recreational and commercial fishing associations, commercial shipping and barge operators. Attend scheduled meetings of probable user groups and present information about the system and its capabilities.</p>	On-going
<p><i>Determine Local Needs for CODAR information and products:</i> As HF radar system situated on the northern Outer Banks come on-line, work with local commercial fishermen and recreational boaters to identify useful products and methods of delivery.</p>	On-going
<p><i>Evaluate information delivery scheme for Cape Lookout buoy measurement system:</i> determine the information needs and delivery methods of a real-time wind and wave monitoring system that would improve the safety for recreational boaters, anglers, commercial fishermen, commercial and recreational underwater divers, and wind powered sailors in the central NC coastal region. Establish user preference for combinations of web-based, radio and telephone delivery methods.</p>	On-going
<p><i>Develop web-based information display:</i> Jesse Cleary, UNC-CH, will provide web development support for ocean weather/NC observing system displays. In particular he will work with staff at CSI on the Jennette's Pier project, and work to improve the display of information for NE NC (HF radar and sea surface temperature) and central NC (buoy-based observations) on the NCCOOS and SEACOOS website. He will interact with CSI and NCSG staff to identify the best method for displays but will likely use GIS-based mapped fields for a significant portion of the work. Funds for Mr. Cleary will be managed directly from UNC-CH.</p>	50 percent completed

*Budget Justification:* This budget includes 1 month salary support for Brian Efland, NC Sea Grant coastal business specialist, to assist with extension project for Lookout Shoals Buoy ocean weather information. Also in includes 2 months salary support for Sara Mirabilio, NC Sea Grant fisheries specialist to support extension product development for Jennette's pier observing system and ocean information products for

fisheries managers. Travel funds total \$15,500 and will be used to gather information from user groups, work with other SEA-COOS partners and to present findings at regional and national observing systems meetings. Supplies and materials in the amount of \$2,573 will be purchased for ocean weather displays at public meetings.

## MANAGEMENT

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### UNIVERSITY OF NORTH CAROLINA SYSTEM

*UNC Office of the President, Dr. Russ Lea, Managing SI*

*Grants Manager, Sarah Smith*

#### WORK STATEMENT

<b>Financial and Administrative Oversight</b> – UNC will provide financial and administrative oversight for the project including compliance monitoring, budget management, and project coordination for governance. UNC will work closely with Dr. Seim and the SEACOOS Board of Directors on development of the budget along programmatic lines as well as the annual review of carry over funds. The Contracts and Grants Manager will implement an audit plan for subrecipient invoices in Year 4.	100%
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<b>Biannual SEACOOS PI Conference</b> - UNC will coordinate SEACOOS support for the Biannual SEACOOS PI Conferences. As host sites are identified, UNC will provide supplementary funding for these activities. Locations will be determined by the SEACOOS Executive Committee and the SEACOOS Board of Directors.	90%
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<b>SEACOOS Board of Directors Support</b> – UNC will fund travel and meeting expenses for the SEACOOS Board of Directors, which meets biannually. Meeting locations are determined by the Board and UNC coordinates logistical support with the host site.	100%
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- UNC General Administration has conducted a review of audit reports for all subrecipients in accordance with OMB Circular A-133 guidance and is conducting a desk review of randomly

selected invoices from each subrecipient. Results will be presented to the SEACOOS Board of Directors.

- UNC General Administration provided financial support for the SEACOOS Workshop held in Columbia, SC November 15-16. The University of South Carolina served as the host and over 70 people participated. The SEACOOS Board of Directors met immediately following the fall workshop, November 17-18 and met again January 24-25 at the University of Miami. A joint SEACOOS/SECOORA workshop is scheduled for September 11-13, 2006 at Jacksonville Beach, FL. Approximately 21 SEACOOS investigators will participate, with UNC covering all meeting and travel costs. UNC is working closely with SECOORA personnel on logistics.
- Through leveraged resources provided by SECOORA, via S.C. Sea Grant, the SEACOOS data management and communication group met with a broad group of data managers and public information stakeholders November 14<sup>th</sup> in conjunction with the fall workshop and again March 9-10 in Chapel Hill. A select group of the data management workgroup including Sara Haines, Jesse Cleary, Chris Calloway, Jeremy Cothran, Monisha Kanoth, Jeff Donovan, Venbu Subramanian and Steven Brody convened in Chapel Hill in July to participate in a “Code Sprint” and complete the QA/QC and Data Management Cookbook documentation.

*Budget Justification:* Dr. Lea and the Contracts and Grants Manager will each commit 15% annual FTE to SEACOOS (\$39,951). Fringe benefits are calculated at 23% of total salaries/wages (\$9,189). Travel funds support the Biannual SEACOOS PI Conferences, SEACOOS Board Travel and travel for project personnel (\$31,844). Materials and supplies are budgeted at (\$200), and other direct costs to support SEACOOS operations including communication and printing costs are budgeted at (\$6,960). Funds have been budgeted at the central level to cover the annual usage charge for iridium communication cards (\$30,000). F&A is calculated at 13.5% of salaries and fringe benefits (\$6,634).



(Management Cont.)

UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL

*Project Office Management - SI and C.O.O., Harvey Seim*

WORK STATEMENTS	
<ul style="list-style-type: none"><li>Chief Operating Officer: provides oversight for the program; duties include coordinating Executive Committee activities; communications with the Board of Directors; handling day-to-day management of SEACOOS; representing the program at regional and national functions; and managing the project website.</li></ul>	100%
<ul style="list-style-type: none"><li>Scientific Project Manager: duties include expediting project-level goals and specific tasks; handling day-to-day management details for the SEACOOS COO; represent SEACOOS at regional and national functions as needed.</li></ul>	75%
<ul style="list-style-type: none"><li>Project associate: coordinate conferences and meetings; facilitating partner communications; gathering information and creating status reports; and managing day-to-day office tasks (filing, answering/making calls, etc.).</li></ul>	n/a

Seim continues in role as COO; this year proved challenging due to funding situation. New project manager, Capt. Parker Lumpkin, brought onboard Dec 1, 2005. Parker has come up to speed quickly on the project and is contributing significantly to improved communications; however, Sandy Bernard's departure from SECOORA has meant that Capt. Lumpkin's time to work on SEACOOS issues is limited. Attempts to hire a project associate have been stymied by rapid turnover at UNC-CH; 2 different hires (Jeremy Heuts, Allison Blaire) were very effective but short-lived. Did not hire a PA due to funding issues.