



## SEACOOS Year 2 Mid-Year Progress Report

March 11, 2004

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Implementation – Progress Report

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## Observing

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### University of South Florida

Observational subprogram – Workgroup Co-Chair and P.I. Robert Weisberg (WFS), and P.I. Mark Luther (Coastal stations and Tampa Bay), USF

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| <ul style="list-style-type: none"><li>For year 2 we will continue to maintain the offshore array, assisted by SEACOOS, providing all real-time data to the general public via the COMPS and SEACOOS Internet sites as well as providing these data to NCEP via the NDBC Internet site and the GTS. Together with the offshore moorings COMPS will also maintain a set of coastal observations (<a href="http://comps.marine.usf.edu">http://comps.marine.usf.edu</a>).</li></ul> | 50%       |

**Status:** Maintaining 10 moorings in various states of operations. Real time data, along with mooring locations, are available at <http://comps.marine.usf.edu>

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| <ul style="list-style-type: none"><li>HF Radar: 3 Long Range Seasonde (CODAR) antennas (including 1 from Rutgers Univ.) will be deployed, and we will engage in a HF radar test (WERA and CODAR) with SEACOOS colleagues this summer over the array of moored buoys. For year 2 we will continue to maintain the CODAR measurements providing data in near real time.</li></ul> | 40%       |

**Status:** Redington shores site operational. Negotiations ongoing with Naples. Radial currents served on the web.

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| <ul style="list-style-type: none"><li>Profilers: Along with the moorings, our BSOP (profiler) developments are progressing under separate funding, and we anticipate limited operational deployments beginning this summer.</li></ul> | 10%       |

**Status:** Short-term field testing underway. Additional units being built.

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- Data analyses: Analyses will be aimed at understanding the synoptic, seasonal and interannual variations on the WFS, both for the ocean circulation and ocean-atmosphere interactions and for the biological ramifications of these. New analyses will derive from the joint HF radar experiments and from the continuation of the operational CODAR\ measurements. 50%

**Status:** Analyses ongoing on synoptic, seasonal, and inter-annual variability on the West Florida Shelf. CODAR radial currents being evaluated against in situ measurements.

Observations (cont.)

### Skidaway Institute of Oceanography

Maintenance and upgrades of SABSOON – Workgroup Co-Chair and P.I. Jim Nelson, P.I. Rick Jahnke

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- Maintenance of existing SABSOON/SEACOOS offshore systems at R2, M2 and R8 platforms. %complete 50%

**Status:** Structural refurbishment of the R2 and M2R6 towers by a Navy contractor during the summer of 2003 (sand-blasting and painting) required removal of much of the exterior SABSOON equipment (instruments, cabling, antennas, etc.). The major focus of SkIO effort since the start of Year 2 has been directed toward getting these systems reinstalled and back on-line. Other unanticipated repairs have also been required for various instruments or components. Cables linking bottom-mounted ADCPs to the towers were damaged at both R2 and M2R6 platforms (apparently not as a result of the refurbishment, but from other causes) and will have to be replaced. Other repairs or exchanges have been effected for wind sensors, pressure/wave sensor and in-water package components. Replacement of the anchor system for in-water packages at the M2R6 tower is also planned. Personnel roles for routine maintenance have transitioned. Our recent hire, Don Wagner, is now familiar with the offshore systems and is assuming the primary role in routine maintenance, basic trouble-shooting and maintaining service records.

- 
- Upgrade components of instrument, power and communications systems. %complete 40%

**Status:** The water depth at the R8 platform (44 m) exceeds the range allowed for SkIO research divers. Thus an ADCP frame incorporating an acoustic release/pop-up buoy system for retrieval has been designed by SkIO Engineering, and is presently being

fabricated. Deployment is targeted for April-May, 2003, depending on ship availability and the replacement schedule for the damaged ADCP cables. To reduce the dependence on divers for recovery/servicing operations, it is planned to deploy the pop-up systems at the shallower towers as well.

Other system upgrades that are underway include programming for a new data acquisition system (DAS) for in-water packages, further work on the R8 power system (installation of a wind turbine and components of a power monitoring system), and installation of a back-up power system for the R2 tower has been initiated, and construction of a meteorological package for deployment at the M2R6 tower.

	%complete
<ul style="list-style-type: none"> <li>Coordinate data management with SEACOOS Data Management Working Group.</li> </ul>	50%

Status: A DODS server has been set up at SkIO and is updated hourly with data in the SEACOOS netCDF convention. Data is shared with the SEACOOS main website (as well as posted locally at SkIO) and is incorporated into hourly updated information products. Meteorological and oceanographic data from the DODS server are converted each hour to CMAN and FM64 data messages and transferred by automated ftp to the National Data Buoy Center (NDBC, NOAA) for dissemination and display on the NDBC web site (with designations of SPAG1 for the R2 tower and TYBG1 for the R8 tower). Data QA/QC and documentation efforts are ongoing in coordination with SEACOOS partners. An upgrade scheme for the SABSOON data processing/web display scripts has been formulated through collaboration with UNC partners.

	%complete
<ul style="list-style-type: none"> <li>Coordinate Georgia Outreach/Education efforts with Outreach Working Group.</li> </ul>	20%

Status: Georgia State Climatologist David Stooksbury recently assumed the lead role in SEACOOS Outreach for Georgia. Stooksbury and Nelson attended the February, 2004 planning meeting for SEACOOS Outreach in which Year 3 goals were defined. Nelson has also been engaged in activities of the SE COSEE program (which emphasizes building education-research links), hosting several teachers on research cruises in Year 2 of SEACOOS and participating in planning for a SE COSEE conference for middle school teachers to be held in late June, 2004.

	%complete
<ul style="list-style-type: none"> <li>Analyses of existing SABSOON data in coordination with SAB modeling.</li> </ul>	40%

Status: Results of analyses of SABSOON data by UNC colleagues were presented at the recent ASLO/TOS Ocean Sciences meeting (Honolulu, HI). Data analyses at SkIO have focused on the winter-spring of 2003, a period of high river discharge followed by

formation of a low salinity surface layer across the Georgia shelf, and the summer of 2003, when unusually cool bottom water penetrated shoreward from the shelf break. This work is combining analysis of ocean color imagery, the SABSOON record (up to June, 2003, when systems went off-line due to tower refurbishment), and a fairly extensive set of cross-shelf ship surveys. Modeling studies for this period have been initiated at UNC. Two abstracts summarizing studies of the summer cold water event have been submitted for the summer ASLO meeting (Savannah, GA).

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| <ul style="list-style-type: none"> <li>• Target installations at M1 (southern Master) and R4 (SE remote).</li> </ul> | 15%       |

**Status:** UNC partners are bench-testing a “self-contained” system for deployment at the R4 platform. Further survey work on the tower and some infrastructure upgrades to support this system is targeted for later in Year 2.

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| <ul style="list-style-type: none"> <li>• Upgrade UW camera system (cameras, data acquisition, data processing) and consider a deeper deployment site.</li> </ul> | 50%       |

**Status:** SkIO Engineering replaced the controlling computer on the R2 tower for the UW camera system and SkIO divers recently cleaned the camera lenses. While the basic camera system is working, sustained operation has been problematic. It may be necessary to replace the controlling computer and upgrade the software to ensure more reliable operation.

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| <ul style="list-style-type: none"> <li>• Develop near-shore directional wave/current measurement and wireless communications system off Tybee Beach, GA (with partner Paul Work, GIT, Savannah campus).</li> </ul> | 20%       |

**Status:** A wave-rider buoy system has been ordered by Paul Work and should be delivered soon. An Iridium SIMM card providing satellite communications for the buoy has been provided by Harvey Seim (UNC). Several deployment options are being evaluated. An initial inter-comparison of the buoy and ADCP directional wave information is being planned.

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| <ul style="list-style-type: none"> <li>• Prepare for HF radar installations in Georgia (site surveys, initiate permitting).</li> </ul> | 5%        |

**Status:** Planning for HF Radar in Georgia and South Carolina is in its initial phase. Dana Savidge, a recent addition to the SkIO faculty, will be assisting in this effort, and has conducted initial studies of radial coverage patterns for various site options. Further HF Radar planning will be coordinated with USC colleagues.

## University of North Carolina at Chapel Hill

Fixed platform – P.I. Harvey Seim, UNC-CH

	%complete
<ul style="list-style-type: none"><li>• Complete instrumentation of towers off GA and NC and maintain system. It is likely that instrumentation of the NC tower will occur in year 2 due to development and legal delays. The two systems (at SABSOON and off NC) will be maintained and assessed for reliability and servicing needs.</li></ul>	15%

Status: An internally recording ADCP and microcat CTD were deployed on a bottom tripod with pop-up buoy at NC tower 23 in late January 2004. The SBC-based data acquisition and Iridium transmission development continues; there have been many engineering problems and associated delays. Current plan is testing in March 2004 at UNC prior to deployment of the revised met-only system at SABSOON tower R4 in April 2004. Discussions continue with SKIO about installation over the summer of a pull-tube at R4 to permit cabling to a bottom-mounted package enabling in-situ ocean measurements. Once the SBC system at R4 demonstrates 3 months of adequate performance we will pursue deployment of a similar package at NC tower 23 or 21.

An initial analysis of temperature, salinity and current climatology for the Georgia Bight was reported on at ALSO in a poster (Edwards, Haines, Seim, Nelson and Moore). Catherine Edwards is a graduate student at UNC with Seim who started in Fall 2003.

Initial testing with the REMTECH SODAR system (a Doppler-based wind profiler that produces estimates vertical profiles of wind speed and direction) has been disappointing. The roof of Venable Hall at UNC proved too noisy an environment for the instrument to operate ( $\Rightarrow$  65 dB, over the audible range the instrument works in; it runs but produces no valid measurements). We are now testing at the Duke University Forest FACE site (who we thank for their hospitality). The system regularly locks-up, typically after 2-3 days of operation, unacceptable for unattended operation. The manufacturer has promised delivery of upgraded software. The data collected have reasonably consistent coverage up to 500 m (at 10 m vertical resolution and 15 minute intervals valid data are created roughly half-time or greater), with occasional coverage up to 800m. Testing continues.

	%complete
<ul style="list-style-type: none"><li>• <i>Develop and deploy a buoy/mooring-based in-situ measurement system off Cape Lookout.</i> To be done in collaboration with Fort Macon, NC Coast Guard station.</li></ul>	20%

Instrumentation will include a full meteorological suite, surface and bottom water temperature and salinity sensors, and a current profiler with directional wave capability. Primary responsibility for the mooring will lie with Dr. Rick Luettich of the Institute of Marine Sciences, UNC-CH in Morehead City, NC.

*Status:* 2 buoys were ordered from GOMOOS in December 2003 and delivery is expected in late March 2004. Rick Luettich visited the University of Maine at Orono in late January 2004 to discuss buoy design considerations with Mr. John Wallinga and to initiate preparatory efforts at IMS. John Wallinga will visit IMS in mid-March to assess the capabilities of vessels that are available for buoy deployment and recovery and to finalize buoy delivery details. A tripod system like that deployed at NC tower 23 will be tested at IMS and off Cape Lookout starting in April 2004. The tripod will be instrumented with an ADCP, CTD, EdgeTech pop-up buoy system and LinkQuest WM100 acoustic modem and will serve as a near-bottom measurement platform to operate in tandem with the buoy. A met package and surface and mid-depth CT packages will be deployed on the buoy and utilize inductive modems and a version of the SBC data acquisition and Iridium transmission system. Cell phone communications are also being tested for use on the buoy for backup and redundancy with the Iridium system.

Technique development (HF radar, telemetry, glider) – P.I. Harvey Seim, UNC-CH

	%complete
<ul style="list-style-type: none"> <li>• <i>Maintain and assess NC radar system.</i> We will evaluate the reliability of the HF radar system as an operational system in year 2. This will include assessment of downtime, variations in range, variations in beam pattern, and limited calibration tests (against in-situ observations).</li> </ul>	50%

*Status:* An initial evaluation of the HF radar system was presented as a poster at the 2004 ALSO meeting in Hawaii (Stearns, Muglia, Seim, Bane, and Blanton). This included coverage maps, formation of tidal ellipse maps, monthly means and AVHRR-vector overlays. Tidal ellipses were compared with Lentz, 2001 and with predictions of ADCIRC (unpublished, Blanton) and show good accuracy in phase, orientation and ellipticity but a spatially-varying underestimate of current amplitude. A technical report is being drafted. The effort has led to the development of a preliminary HF radar database (see below).

Analysis of coverage and beam patterns by SeaSonde has identified a severe distortion of the transmit beam pattern at Buxton. Surveys suggest the distortion is caused by large amounts of subsurface metal associated with the relic construction and sewage field the antennae are mounted above. We have petitioned the National Park Service to move our antennae onto the primary dune along the Cape Hatteras shoreline directly seaward of the Coast Guard station; we note that this is the procedure requested by the

NPS (testing over the sewage field prior to requesting a presence on the dune). We await a definitive response.

The system has been down since Jan 20, 2004 due to soil remediation efforts in the sewage field at the Buxton Coast Guard station that required we remove the receive antenna. We expect to re-deploy in the first week of March.

	%complete
<ul style="list-style-type: none"><li>• <i>Telemetry Testing.</i> Continue software development and testing of Iridium satellite communication technology.</li></ul>	75%

**Status:** A dedicated programmer was hired Dec 2003-March 2004 to develop a c-based library to support Iridium communications. This was necessitated by un-controllable system lock-ups during file transfer when using a ppp connection in prior testing. We have identified a number of issues associated with use of the Iridium modem within a windows environment. Subsequent work suggests recent software developments may resolve some issues, and influence DAQ platform-type selection in the future.

	%complete
<ul style="list-style-type: none"><li>• <i>Purchase and test a Slocum coastal glider for use in the SAB.</i> Initial testing will occur at SABSOON and be coordinated with survey cruises of the R/V Savannah. Coordinated mapping exercises will be used to test the capabilities of the instrument.</li></ul>	15%

**Status:** A purchase request for a coastal Slocum glider to Webb Technologies was initiated in November 2003. We await delivery.

### Publications and Presentations

Edwards, C. R.; Haines, S. M.; Seim, H. E.; Nelson, J. R.; Moore, T.; Seasonal and Interannual Variability in the Georgia Bight, ASLO/TOS Ocean Research 2004 Conference, Honolulu, Hawaii

Stearns, L.; Muglia, M.; Seim, H.E.; Bane, J.; Surface Currents Off the Outer Banks of North Carolina, ASLO/TOS Ocean Research 2004 Conference, Honolulu, Hawaii

University of South Carolina

SC Nearshore Monitoring Stations - P.I. George Voulgaris, USC

This task was a new one that was initiated in year 2 of the SEACOOS program. Therefore the report submitted describes the progress during year 1 of this task.

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<ul style="list-style-type: none"> <li>• Deploy and maintain nearshore circulation and wave direction monitoring sites at two locations along the inner-shelf of South Carolina, representing an arcuate strand (Long Bay) and barrier island (Folly Island) type coastline, respectively.</li> </ul>	30%

Status: Site locations for real-time data collection were chosen at Springmaid Pier, SC, and Folly Beach Pier, SC. The former site is a privately owned pier associated with Springmaid Beach Resort Hotel while Folly Beach Pier is owned and operated by Charleston County Park and Recreation Commission.

The project was initiated with the hiring of a full-time technician (Ms. Stephanie Obley). She was hired in October 2003 and immediately started organizing the instrument assemblage and integration.

	%complete
<ul style="list-style-type: none"> <li>• Springmaid Pier</li> </ul>	40%

Status: This has been selected to be the first site to be developed by USC. NOAA's National Ocean Service maintains a water level station (CO-OPS Site 8661070) at the pier, and as a result USC and NOAA have agreed to enter into a collaborative agreement for facilities and data sharing.

A meteorological package consisting of two marine model RM Young anemometers and a Setra barometric pressure sensor were purchased by USC as part of this project and installed by NOS technicians on the Pier in November 2003. The met data are already operational and currently transmitting through the NOS homepage.

A meeting was conducted in November 2003 with Springmaid Pier manager Toby Beckham, resulting in permission to install all instruments and data transmission equipment on the pier. Mr. Beckham expressed the resort's willingness to support the SEACOOS effort in any way possible.

Most of the necessary equipment has been received, including a 1200 kHz Acoustic Doppler Current Profiler (ADCP) with waves option to be installed 1000 to 1500 feet offshore of the pier, a serial-to-Ethernet converter for data transmission, and a

Rochester self-burying armored cable. Additional equipment has been ordered and is expected to arrive within the next two months, including a Seabird microcat Conductivity Temperature and Depth sensor (CTD) to be installed near the NOS station and a diver-accessible trawl resistant bottom mount (TRBM). To facilitate ease of servicing, the TRBM is being modified from the manufacturer's original design and an underwater-mateable plug will be used.

Two dedicated static IP addresses for ADCP and CTD data transmission are currently being ordered for the pier office. Initially, a wireless Ethernet connection was envisioned and purchased for this site. However, due to security concerns on the part of the resort, the computer consulting firm ConXit in Myrtle Beach will install a fiber optic cable from the pier office to the NOS building. The data transmission system has been tested in the lab and is awaiting field testing. Once the setup has been field-tested and the TRBM has arrived, arrangements will be made for diver-assisted deployment.

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	%complete
• Folly Beach Pier	15%

Status: USC is cooperating with NOAA's National Data Buoy Center, who is planning the installation of a CTD at this site by the end of calendar year 2004. NDBC representatives have received permission to install the CTD and are now in the discussion phase with park officials. USC and NDBC will likely share infrastructure facilities at the pier.

As a result of our negotiations with the Charleston County Park and Recreation Commission Director, a written request for permission for the USC system was recently submitted for installation of an ADCP 1000 to 1500 feet offshore of the pier and data transmission equipment on the pier. The request is now in the review process and a decision is expected by the end of March 2004. If approved, the next step is an on-site meeting and presentation of installation plans to the park officials and most likely a public hearing.

An existing NDBC meteorological station (C-MAN Site FBIS1) is in place approximately 2 km from Folly Beach Pier on Folly Island. This site currently provides wind direction, speed and gust, atmospheric pressure, air temperature, and dew points via the NDBC website.

Some of the necessary equipment for this site has been received or ordered, including the ADCP and TRBM. It may be necessary to install high-speed Internet if it is not available in the pier office. After this is accomplished and the setup at Springmaid Pier tested, the remaining equipment will be purchased and deployed.

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| <ul style="list-style-type: none"> <li>• Provide hourly wave height, direction, period, water temperature, wind speed and direction, surface, mid-depth and bottom current through via Web.</li> </ul> | 25%       |

**Status:** Hourly wind speed, direction and gust, and barometric pressure have been available for the Springmaid Pier site since November 2003 via the NOS data website for CO-OPS Station No. 8661070. The CO-OPS station also provides water level and temperature data. Once our own data transmission line is installed the data will be broadcasted through the SEACOOS homepage.

At Folly Beach Pier, an existing NDBC meteorological station (C-MAN site FBIS1) is in place approximately 2 km from Folly Beach Pier on Folly Island. This site currently provides wind direction, speed and gust, atmospheric pressure, air temperature, and dew points via the NDBC website.

Efforts are ongoing to install ADCPs and CTDs at Springmaid Pier and Folly Beach Pier for data transmission via the Web.

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| <ul style="list-style-type: none"> <li>• Process and analyze incoming data and establish joint wave, wind and current climate for each location.</li> </ul> | 0%        |

**Status:** No progress to be reported on this objective since it requires the completion of the instrument deployment and data collection. However, the PI and his associates have been involved in the collection of directional wave data in the vicinity of Long Bay, SC as part of a USGS research program that will be used toward this objective. Data collection as part of this program was initiated in October 2003 and will end in April 2004. Some 6 stations will be used for this objective.

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| <ul style="list-style-type: none"> <li>• Evaluate validity of Wave Information System (WIS) data with actual monitored data and suggest modifications for use by coastal managers and engineers.</li> </ul> | 0%        |

**Status:** No progress to be reported on this objective to date due to lack of data. Some of the data collected by the PI as part of the USGS-funded research program will be used to initiate this part of the study, until more reliable and long-term data become available through the SEACOOS operations described above.

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| <ul style="list-style-type: none"> <li>• Study the relationship between nearshore hydrodynamics and coastline response at a regional level.</li> </ul> | 80%       |

**Status:** The SWAN wave refraction wave is currently set-up for operation in both

deployment sites. The model is currently under calibration and tune-up and verification is expected to occur in the nearfuture.

Observations (cont.)

## South Carolina Department of Natural Resources

Fisheries Management Observations – P.I Charles Barans

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| <ul style="list-style-type: none"><li>Continue to maintain and upgrade the hardware and software of the present underwater/microwave video system.</li></ul> | 30%       |

**Status:** The primary video system, which is an integral part of the SABSOON sampling plan, has been inoperable during this period. The transmission cable and video cameras appear to be functioning correctly. All possible efforts continue to be focused on reinstallation of the tower computer.

Data from approximately 6,500 video clips recorded between 1999-2000 were annotated into an Access data-base. Preliminary analyses of the fisheries data were conducted. The education section of the Fish Watch web site has been made available to the SEACOOS Education Coordinator (Christina Simoniello) and the South East COSEE Director (Lundie Spence) for their use and/or further expansion. A paper describing some of the research results to date has been drafted.

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| <ul style="list-style-type: none"><li>Evaluate several fisheries video data logger prototypes for long-term deployments with oceanographic buoy systems.</li></ul> | 70%       |

**Status:** Laboratory testing began on two types of autonomous visual data loggers. Construction was initiated on four camera support structures for deployment of the data loggers offshore at key fisheries research locations. The National Undersea Research Center has approved a request to share support of a NITROX dive team to position camera supports in early summer.

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| <ul style="list-style-type: none"><li><i>Investigate modification of the MBRI Video Information System</i> for application to the acquisition of large data sets from all project video systems.</li></ul> | 5%        |

**Status:** Contacts at MBRI have related that the automatic annotation software is not fully developed and ready for scientific application at the present time. They hope that the system will be available within the year.

## Publications and Presentations:

Barans, C., D. Schmidt, and T. Moore. Fisheries video assessment or can you see me now? Joint meeting of the American Fisheries Society, South Carolina Chapter and the South Carolina Fisheries Workers Association. Feb. 2-3, 2004. Georgetown, SC.

Observations (cont.)

## University of Miami, RSMAS

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

	%complete
<ul style="list-style-type: none"><li>Begin deployments of in-situ, real-time oceanographic profiling systems within the HF Radar Testbed on the East Florida Shelf. The systems, referred to as SWAMP (Shallow Water Autonomous Moored Profiler) systems, have been developed independently from SEA-COOS with ONR DURIP and ONR program funding. These systems contain an upward-looking ADCP and a buoyant CTD probe 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 (&lt;100 m) without the need for vulnerable and maintenance-intensive surface buoys.</li></ul>	30%

**Status:** A prototype system was tested in November 2003 in South Florida waters with two-way radio communications to an antenna mounted at RSMAS. Several trial missions were completed with successful data transmission and new mission uploads. A problem was identified with the winch mechanism for the CTD probe which requires a redesign of the bearing system to provide a more robust system for long-term deployments. This is presently being done and a new winch system will be installed for testing in April 2004.

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<ul style="list-style-type: none"><li>Data will be telemetered, presently by short-range radio mode but a change to Iridium or some other cell communication system is planned.</li></ul>	30%

**Status:** An Iridium handset has been purchased and is being incorporated into the

surface probe. The system will be set up so that both radio and Iridium telemetry can be activated with swap-out of modular telemetry components. This upgrade should also be available for testing in April 2004.

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<ul style="list-style-type: none"> <li>Two SWAMP systems will be deployed early 2004 in the EFS HF-Radar Testbed, 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 SEA-COOS real-time data stream. In operational mode, we anticipate collecting hourly velocity (current) profiles and 6-hourly CTD profiles that are transmitted once per day.</li> </ul>	0%

*Status:* Operational deployments of the SWAMP systems are still planned for the same two sites in the EFS HF-Radar domain but due to the redesign issues noted above these are now anticipated to begin in summer (~June) 2004 rather than spring.

Observations (cont.)

Observations from the Explorer of the Seas and Associated Data Systems - P.I., Edward Kearns, MPO/RSMAS

	%complete
<ul style="list-style-type: none"> <li>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 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 wave height estimates.</li> </ul>	ongoing

*Status:* During Year 2, the Explorer of the Seas has again reliably provided hourly real-time winds, sea-surface temperature, surface salinity, air temperature, dewpoint and atmospheric pressure which have been adopted to a standard SEACOOS standard netCDF format. These more user-friendly netCDF files have been available operationally since summer 2003 on an OPeNDAP/DODS server at oceanlab.rsmas.miami.edu, and have played the desired role in the SEACOOS data aggregation and display exercises. Explorer project personnel have also devoted time to the development of the SEACOOS community data/metadata storage and transmission schemes.

- 
- The Explorer also serves as a testbed for instruments from both the oceanographic and meteorological communities, including a SeaKeepers automated sea surface and meteorological measurement system.

*Status:* In August 2003, a Microwave Radiometer was installed on the Explorer of the Seas. The instrument operates at two frequencies which allows simultaneous determination of columnar water vapor and liquid (precipitable) water burdens along a selected path. From February 2003 to February 2004 the Explorer of the Seas has been used for a long-term manual biological/chemical water sampling program which will be used as a basis for planning future automated water sampling. The samples were analyzed for stable oxygen, nitrogen and carbon isotopes as well as salinity, and also minor and trace elements (ie- Sr, Mg, Fe, etc.). The dissolved organic carbon (DOC) and dissolved inorganic carbon (DIC) of each sample are also analyzed in the same process. This represents the first time that data of this type have been obtained over the Inter-American Seas over an entire annual cycle.

Extensive testing was performed on the SeaKeepers module onboard to determine the source of observed salinity differences between the Explorer flow-thru systems in July 2003 and has helped characterize the SeaKeepers' Idronaut CTD packages. SeaKeepers realtime data from all Caribbean ships since October 2003 have also been successfully integrated into the realtime OpenDAP data stream that feeds the SEACOOS aggregation servers. An analysis of the week-long flow rate tests on board done in conjunction with Explorer and SeaKeepers technicians has produced valuable results for the planning of future systems.

Explorer personnel have aided in the specification and development of remotely sensed data products to the SEACOOS data aggregation servers and visualization portal(s). The past year's focus has been on the delivery of several SST and wind products produced at USF and elsewhere.

All instruments are presently in a calibration cycle. Thus far the bow weatherpak, Mast Eppley radiometers, and PRP have all been calibrated since September 2003. Regular cleaning and maintenance are performed during each weekly cruise on both the meteorological instrumentation and the sensors in the flow through system. Independent salinity measurements are performed on water samples collected in the labs via an Autosol system and compared each week with the installed instrumentation in the flow thru system.

- 
- The Explorer also provides a significant public outreach opportunity to educate and inform passengers about oceanography in general and the SEACOOS program in particular.

*Status:* An undergraduate class from UMiami used the Explorer data set and facilities as

the core of an upperclass-level course in Spring 2003. Students analyzed historical datasets and participated in a week-long cruise during which they engaged in water sampling and analysis and presented their findings to public audiences on board. In summer 2003 RDI also used the Explorer ocean lab and conference facilities to hold an ADCP workshop, with representatives from the academic, government, and private sectors.

The Explorer of the Seas program is partnering with Royal Caribbean and GLOBE in a White Water to Blue Water (WW2BW) partnership to bring science education to children in the cruise ship's youth program. The GLOBE program on the ship will be the first implementation of shipboard protocols for secondary education in scientific measurement techniques.

Efforts continued to expand awareness of the Explorer program and SEACOOS to interested Caribbean government agencies and academic institutions. In November 2003, the US Ambassador to Jamaica, Sue Cobb, along with representatives from government and private environmental groups in Jamaica visited the Explorer of the Seas at her port stop in Ocho Rios, Jamaica. A presentation was given which included the role of the Explorer Program in SEACOOS and IOOS to the Captain and the Ambassador's group.

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- The Explorer's shore-side real-time data stream and the high-resolution archival data system will integrate the data streams from other Miami SEACOOS investigators (Mooers-EFSIS, Shay-WERA, Johns-profilers) and the RSMAS Remote Sensing Laboratory (Terra- & Aqua-MODIS ocean color and SST, AVHRR SST). The goal is to both conserve computer and personnel resources and to provide seamless Internet access to the available real-time and archival observations, model products, and satellite observations from the East Florida Shelf.

**Status:** The Explorer of the Seas group continues to provide local archival and real-time data storage and delivery capabilities for other Miami SEACOOS investigators (Mooers-EFSIS, Shay-WERA and Johns – profilers).

- 
- The comprehensive East Florida Shelf data distribution system will also better facilitate the production of a variety of blended and derived products for the SEACOOS domain, including validation of WERA current velocities and advective nutrient/chlorophyll fluxes from ocean color data. It will thus be a key element of the SEACOOS distributed data network.

**Status:** Data from the first two years of the program have been processed with

experimental QA/QC protocols developed at UMiami and through community involvement through SEACOOS DMCC and QARTOD-I. Techniques have been developed for the conversion of the original flat ASCII Explorer historical data files to standard SEACOOS netCDF formats complete with supporting metadata. These data include standard meteorological station measurements, rain gauge, total sky imager, wind profiler, SST, salinity, oxygen, and many other measurements still not available in the real-time SEACOOS netCDF files. Initial investigations into the accuracy of the RDI OS ADCP data have shown promising results, as have initial real-time transport of ADCP vectors from the ship. Radiosonde measurements of atmospheric temperature and water vapor profiles have also been successfully delivered in near-real time. Merging of all the newly formatted data into a searchable RDB to complement the OpenDAP server abilities – and thus promote more widespread use of the Explorer data -- is underway.

Observations (cont.)

Technique development (HF radar) – P.I. Lynn (Nick) Shay, RSMAS-UM

	%complete
<ul style="list-style-type: none"> <li>Process and analyze radar-derived surface currents and compare these data to moored ADCP data over the West Florida Shelf from the 2-month deployment in July/August 03</li> </ul>	40 %

**Status:** Initial evaluation of the WERA system from over a month of measurements has revealed very high correlations (~0.83) to ADCP data at 3-m that included the passage of Tropical Storm Henri as shown in Figure 1. RMS differences are 5.6 to 6 cm s<sup>-1</sup> in the u and v-components, respectively at the 25-m mooring site. The analysis will be expanded to the two other ADCP moorings (Courtesy of Bob Weisberg) to understand the projection of the surface currents to the subsurface structure in the cross-shelf direction. As part of this effort, we are comparing surface currents based on only 12 antennae to those acquired from 16 antennae to assess statistical differences in the velocity measurements. In addition, surface velocities are being analyzed for tidal content as well as the wind-driven flows driven by Henri to examine the surface current response under storm conditions. A technical report and manuscript will be drafted over the next nine months.

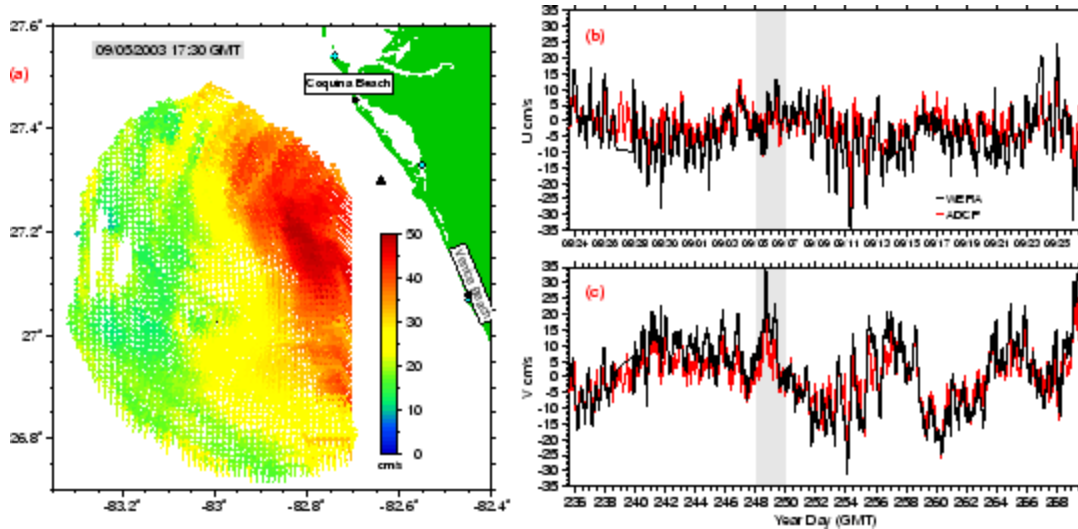


Figure 1: a) Surface current map from the deployment of WERA over the WFS in 2003 during the passage of Tropical Cyclone Henri. The location of the array is at 27.16°N, 82.95°W (black dot) where the 3-m ADCP currents (red) are compared to the surface current from WERA (black) for b) u-component and c) v-component ( $\text{cm s}^{-1}$ ). The gray shading indicates the period of Tropical Storm Henri passage.

%complete

- Deploy and maintain surface current radar sites along the EFS in establishing a radar testbed (RTB) in a regime with large gradients that occur over short-time scale (compare to ADCP transect data from the Explorer of the Seas)

55%

**Status:** In 2004, we have established two HF-radar sites along the EFS. One is located on Key Biscayne and the other on Key Largo. Both sites have required electrical contractors to install electricity for the continuous operation of the radar as well as telephone lines for Internet access of the data streams. Permit has been received from the State of Florida to use the land and the electrical contractor work has been completed in Key Largo. The WERA (and trailer) has been deployed and is now undergoing testing to determine the optimal distance between receiver array and the transmitter. We have been granted approval to use Crandon Park site that has the advantage of being located closer to RSMAS in March. The electrical contractor has completed the line installation, and the building inspector has approved it. We expect the flow of electricity in the near future, and the phased array is now being deployed.

%complete

- 
- Provide hourly estimates of surface current maps via the Web 0%

Status:

This part of the work statement will begin to occur when both sites have been up and running (~1 month) so we can test and debug any problems in the data system. In other words we want to do a careful quality control before any data goes out on the WEB.

%complete

- 
- Add a third radar station along the EFS (probably in the vicinity of Port Everglades) in support of RTB 20%

Status:

We are in the process of working on a third WERA site in Ft. Lauderdale at the southern end of John U. Lloyd State Park. The previous deployment site close to the US Navy Test Facility Site cannot be used because of the 8-foot chain-link fence, which may interfere with signals from the lower frequency radar of 16 MHz. The equipment for the third station is scheduled for delivery in June and will be deployed by summer 04.

%complete

- 
- Analysis of previous EFS measurements 75%

Status: We are completing the analysis of previous experimental data sets over the EFS that have resulted in submitted and published journal articles as well as data reports that included Ocean Surface Current Radar (OSCR) data from 99-01. These high-resolution data have provided insights into the small-scale vortices and eddies that the WERA will sense along the EFS.

References and Presentations:

Cook, T. M., L. K. Shay, and W. Drennan, 2003: Coastal surface current response to cold front passage. EOS Trans of the American Geophysical Union, 84(32), Ocean Science Meeting Suppl., Abstract OS-51D-22, 26-30 January 2004, Portland, Oregon.

Martinez-Pedraja, J. , L. K. Shay, T. M. Cook, and B. K. Haus, 2004: Very high frequency radar measurements of surface currents along the inshore boundary of the Florida Current during NRL2001: Rosenstiel School of Marine and Atmospheric Science, University of Miami, RSMAS 2004-03, 32 pp (Smoothed

Draft).

Martinez-Pedraja, J. , L. K. Shay, T. M. Cook, and B. K. Haus, 2004: Multiple-scale vortices detected along the inshore boundary of the Florida Current. Geophys. Res. Letters (In Preparation)

Shay, L. K., 2004: Ocean surface current variability using high frequency radar technology. ONR Regional Progress Review, USF, St. Petersburg, 10-13 May 2004.

Shay, L. K., T. M. Cook, and P. An, 2003: Submesoscale coastal ocean flows detected by very high frequency radar and autonomous underwater vehicles. J. Atmos. Oceanogr. Tech., 20, 1583-1599.

Shay, L. K., T. M. Cook, B. K. Haus, J. Martinez-Pedraja, T. Helzel, K-W. Gurgel, and R. Weisberg, 2004: Surface velocity measurements from a Wellen Radar. J. Atmos. And Oceanogr. Tech., (In Preparation).

Observations (cont.)

## Commons

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### University of North Carolina at Chapel Hill

Website maintenance and development, subcontract to OASIS, UNC-CH

	%complete
<ul style="list-style-type: none"><li>• <i>Dynamic web portal development:</i> Application development services in support of the design, implementation, support and on-going extension of a dynamic web-based portal to meet the data dissemination needs of the SEACOOS project will be provided.</li></ul>	75%

**Status:** The new Zope/Plone based seacoos.org website went live in late October 2003. The site hosts the Map-Server/PostGIS information portal operated by AIG at USC. Revisions to the site wait recommendations of the content committee and product interface committees, expected in March 2004.

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%complete

- integrate data from distributed partner collection sites; and explore and implement additional dynamic capabilities such as GIS and related technologies. 50%

**Status:** Several merged products are currently hosted on the production site: winds, and merged model output. SST has been on the development site since mid-December 2003 and is pending approval and developer time for deployment to production site.

A part-time employee, Jesse Cleary, a doctoral student in geography at UNC, has been hired since January 2004 to assist in GIS-based layer development (supported out of UNC-SEACOOS budget). He is currently working with the observing technical group to present platform metadata.

Plans also exist to migrate the site to a higher performance platform and to coordinate dynamic product display tailored to end-user needs in coordination with USC.

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%complete

- *Ongoing Celoxis project management/design training.* OASIS will continue to manage Celoxis-based project management services and training for SEACOOS users. These services include: task tracking; reporting; email notifications; document sharing; document versioning (check-in, check-out); user and group security; client platform neutrality (Netscape/Linux must be supported). 50%

**Status:** Celoxis has proved a challenge to maintain. The existing computing platform, a uniprocessor tower designed for desktop use, is inadequate for current usage and needs to be upgraded. There have also been issues with system upgrades; trying to operate current and new applications on the same hardware platform has proved problematic. Usage of the system is largely restricted to the storage of documents and forum communications.

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%complete

- *Web portal maintenance and content update.* OASIS will continue to maintain the SEACOOS portal's application infrastructure. 50%

**Status:** Chris Calloway was hired by OASIS in October, 2003 to assist in portal development. He led the effort to develop the zope/plone site. Over December 2003-Feb 2004 he worked on the SBC implementation of the Iridium communications. He will return to website development in March 2004.

%complete

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- *Software consulting services:* OASIS will continue to provide data integration, systems analysis, and consulting to Marine Sciences in support of this project. These services would include: technology investigation; process consulting; SEACOOS partner communications; conference attendance. 90%

**Status:** This has included work on the SBC DAQ system, and implementation of an encoder kit based on observations available on DODs server. It accommodates transmission of multiple platforms and now 2 format types. Version 1 was developed in fall 2003 and was used successfully by Skidaway to transfer SABSOON data as FM13 messages to NDBC. Version 2 was developed in early winter 2004 and enables transmission of FM64 messages, which enables transmission of previously unsupported ocean variables, and as requested by the NCEP MMS group. It has been operating since mid-February 2004 and we await the final word from NDBC on its functionality.

## Modeling

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### University of North Carolina at Chapel Hill

SAB Modeling – P.I. Francisco Werner, UNC-CH

%complete

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- *Analysis of merged model fields:* Using the DODS server and in collaboration with the Data Management Team, in year 1 we will have completed the steps required to merge the present near-real-time barotropic nowcast/forecast fields (e.g., bottom topography, coastlines, sea surface height and depth-averaged currents, etc.) from UNC, USF, and UM. The product will be available on the [www.seacoos.org](http://www.seacoos.org) website. In this coming year we will quantify the difference fields in overlap zones and correct/adjust/enhance as needed. 80%

**Status:** Brian Blanton at UNC-CH is the head of the MPCC and has recently begun addressing these issues. The year 2 goals also include the reliable execution of daily model runs by each domain. The required support methods have been implemented by each group. This support includes scripts to retrieve meteorological model files, manage the execution of the hydrodynamic models, post-process the output, and make available the output files (in a standardized netCDF formatted file) via local DODS servers. Details of the implementation are available in “Implementation of the SEACOOS Nowcast/Forecast Model System”

%complete

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- *Barotropic skill:* using sea-level gauges, ADCP velocity data and drifters, we will develop a quantitative measure of model skill of barotropic (no density) mode. 50%

**Status:** The skill analysis will include both tidal and sub-tidal (weather-band) assessments. The coastal water level will be the most immediate and useful skill metric, as the data sources available for comparison span the entire SEACOOS coastal region. Velocity observations are comparatively less available, but will yield important guidance on the need to enhance the SNFS with additional physics. We expect that tidal skill among the 3 model sub-regions will be good. Sub-tidal skill will vary by sub-region, as the processes that affect this frequency band vary substantially throughout the SEACOOS region and are not generally restricted to barotropic mechanisms.

%complete

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- *Inclusion of baroclinic structure:* we will study the response of imposing heat fluxes and river discharge on the nowcast/forecast system. Data quality and model response will be assessed. This will allow the study of the formation of tidal fronts during summer, the cooling of nearshore waters and associated water-mass subduction during cold-air outbreaks, as well as the formation of low salinity fronts during wet seasons. 30%

**Status:** Initial progress on the inclusion of density components to the nowcast/forecast system will be restricted to river discharge and atmospheric heat fluxes obtained from the NCEP operational model analysis and forecast fields (the same source of the momentum fluxes currently being used by all three models). The background density fields, onto which these baroclinic forcings will be imposed, will initially be limited to climatological initial conditions of temperature and salinity. The availability of basin-scale ocean model forecasts of temperature and salinity structure will provide more realistic estimations for the SAB sub-region (see below).

%complete

- *Data assimilation:* we will examine the possibility of routine data assimilation into the SEACOOS modeling sub-regions in collaboration with colleagues from UM and USF. We will build on experiences gained in the SABLAM project. We anticipate that sea level and ADCP data may be available regionally for assimilation during the coming year, and we will also consider assimilation of surface current data from HF radar. The latter is an open research topic requiring development of formal methods and forms part of a community-wide effort. 25%

**Status:** Techniques for the assimilating coastal tide gauge water levels have been developed (Lynch et al, [full citation not available]) and used recently in the SAB. This observation source proved to be critical for improving tidal skill in the SAB (Lynch et al, 2004, Blanton 2003).

%complete

- *Deep Ocean Model Products:* over the next years, GODAE anticipates providing basin-scale model products. We have formally established a collaboration with the HYCOM/GODAE team led by Prof. Eric Chassignet (UM) and will test their forecast products to force our limited area models. Initial forcing will include initially the open boundary sea surface elevation. Based on recent findings on the seasonality of the variations on Gulf Stream transport and its effect on the sea level on the continental shelf, inclusion of offshore forced solutions should improve our forecasts. 15%

**Status:** In collaboration with the HYCOM Consortium, we are currently acquiring the 1/12 deg operational HYCOM/GODAE North Atlantic model output and developing methods to map these model products into the SAB sub-region model domain. The frequency of availability of this basic scale product is 1 week. This product will provide best available estimates of the regional hydrography as well as offshore barotropic elevations due to the proximity of the western boundary current to the SEACOOS region continental shelf.

	%complete
<ul style="list-style-type: none"> <li>• Applications: we will collaborate with Dr. Jon Hare of the National Marine Fisheries Service to study and quantify the transport of larvae (of selected species) on the SAB shelf. This effort has already begun and results of this study will be assessed in relation to their impact on the design of Marine Protected Areas (MPAs). A second application we anticipate is that of sediment transport. In this coming year we will explore availability (and capabilities) of models of high-frequency waves. Inclusion of these models may enable a better forecast of bottom stress and thus a more quantitative statement on sediment transport processes.</li> </ul>	25%

**Status:**

	%complete
<ul style="list-style-type: none"> <li>• <i>Publications:</i> we expect to submit three papers for publication in the peer reviewed literature on: (i) operational regional models, (ii) barotropic skill including data assimilation, and (iii) applications related to larval transport/MPAs.</li> </ul>	20%

**Status:** A draft technical document on the implementation of the modeling sub-regions is available. This document describes details of the SNFS system, and will form the basis for a journal article for the SEACOOS modeling system.

Publications and Presentations

Lynch, D., Smith, K., Blanton, B., Werner, F., and Luettich, R., Forecasting the coastal ocean: Resolution, tide and operational data in the South Atlantic Bight, Journal of Oceanic and Atmospheric Technology, 2004, In Press

Blanton, B.O., A. Aretxabaleta, F.E. Werner, and H.E. Seim, Monthly climatology of the continental shelf waters of the South Atlantic Bight, J. Geophys. Res., 108(C8), 3264, doi:10.1029/2002JC001609, 2003

## University of Miami, RSMAS

East Florida Shelf Information System (EFSIS), P.I. Christopher N.K. Mooers, AMP/RSMAS

	%complete
<ul style="list-style-type: none"> <li>Sensitivity, process, and validation studies will be continued with EFS-POM (East Florida Shelf –Princeton Ocean Model).</li> </ul>	20%

**Status:** Studies are being conducted for barotropic and baroclinic versions of EFS-POM. Sensitivity issues include resolution, value of the horizontal frictional parameter, and topographic smoothing, a major ms is in preparation.

Process studies include generation of Florida Current meanders and frontal eddies, as in Fiechter and Mooers (2003).

Validation studies have been limited to historical datasets such as STACS current and CTD profile data and current meter arrays, contemporary coastal sea level data, and satellite thermal and color imagery, while awaiting SEA-COOS data; e.g., WERA-derived surface current fields and SWAMP current and CTD profiles.

The baroclinic version of EFS-POM has been used for pioneering process and model testing studies in a strictly simulation mode so far. Results for simulations of frontal eddies on the EFS were validated against observed values reported in the literature and have been published (Fiechter and Mooers, 2003). Those initial results have been extended to include a NPZD ecosystem model, that has been partially validated through comparison of simulated phytoplankton fields to MODIS color imagery, representing chlorophyll-a concentrations (Fiechter and Mooers, 2004a,b). Mr. Jerome Fiechter, PhD student, conducts this effort.

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| <ul style="list-style-type: none"> <li>Alternative sources of open ocean boundary conditions will be evaluated.</li> </ul> | 10% |
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**Status:** The possibilities of various potential sources of open boundary conditions have been explored. The most promising sources are operational (1/8 deg) Global-NCOM from NAVO and quasi-operational (1/24 deg) IAS-NCOM from NRL. NCDDC plans to serve the Global-NCOM fields to the civilian community by later this summer. Funding needs to be arranged to make IAS-NCOM fields available to the civilian community for the next few years until NAVO makes IAS-NCOM operational.

- Participation in the initial SEACOOS storm response analysis and the initial SEACOOS merged nowcast/forecast study will be continued. 30%

Status: Tests and comparisons with the other SEACOOS models are made in their overlapping domains. Some of the effort is directed to preparing a set of comparisons with observations and other models for the barotropic response of the SEACOOS domain to the passage of storms, an effort that is expected to lead to a MODPROD Working Group publication. These comparisons have led the three modeling groups to adopt common bottom topographies, tidal and atmospheric forcing, synchronization, and so forth. Dr. Inkwon Bang, Research Scientist, conducts this effort.

- Nested modeling for the Dry Tortugas subdomain will be continued, and Lagrangian trajectories will be extended to three-dimensions. 30%

Status: This is one of the central topic areas of Mr. Fiechter's PhD dissertation research. After achieving initially promising results for a nested Dry Tortugas subdomain, he has been focusing on improving the implementation of baroclinic EFS-POM before returning to this topic area.

- EFSIS (East Florida Shelf Information System) will continue to be upgraded with more complete and realistic forcing. 10%

Status: The barotropic EFSIS continues to evolve even while it is running continuously and autonomously as a nowcast/forecast system with output graphics to the EFSIS Website. The baroclinic EFS-POM is being readied for use in the baroclinic EFSIS, for which tidal forcing is being added. The wind forcing has been improved to the 12 km resolution NCEP Eta winds. The lack of open boundary condition data is a limiting factor.

- Preparations will be made for a nested subdomain in the WERA footprint between Key Largo and Port Everglades. 2%

Status: For example, there will be a model validation and verification phase when the WERA surface current data become available, followed by design of a data assimilation and verification phase. Completion of the WERA installations is being awaited to determine the nominal radar coverage, which is needed to design the high-resolution (ca. 1 km) nested subdomain.

- Major contributions to the governance and planning of SEA-COOS are intended, especially for the development of federal agency interfaces. 20%

Status: Coordination with Navy and NOAA entities to obtain access to Navy Coastal Ocean Model (NCOM) fields is in progress. The PI is engaged in numerous SEA-COOS related activities; such as, serving on the EXCOM, planning the program for the SEA-COOS Spring WS, editing the State of the SE Coastal Ocean Report, and coordinating the SEA-COOS Strategic Plan.

#### Presentations and Publications

Fiechter, J. and C.N.K. Mooers (2003). Simulation of Frontal Eddies on the East Florida Shelf. *Geophysical Research Letters*, 30 (22), 2151, doi:10.1029/2003GL018307.

Fiechter, J. and C.N.K. Mooers (2004a). Numerical Simulations of Florida Current Eddies with Implications for Mesoscale Biophysical Processes and Fisheries Oceanography. ASLO/TOS Ocean Research Conference Abstract Book, p.48.

Fiechter, J. and C. N. K. Mooers (2004b). Simulation of physical-biological interactions related to Florida Current frontal eddies and interpretation of associated satellite ocean color imagery. *Geophysical Research Letters* (submitted).

## University of South Florida

WFS Modeling Subprogram- P.I. Robert Weisberg, USF

	%complete
<ul style="list-style-type: none"> <li>Baroclinic hindcasts. We are presently using 3 different models, depending on application. The primary vehicle is the POM (Blumberg and Mellor, 1987), which we are using for baroclinic hindcasts and for barotropic nowcast/forecasts. Our baroclinic hindcasts are all quantitatively gauged against data. On this basis we are attempting to determine model limitations and corrections. Surface forcing appears to be the primary limitation (as contrasted with model physics). While overly simplified, surface heat flux is limiting on seasonal scales and surface momentum flux is limiting on synoptic scales.</li> </ul> <p>Given adequate forcing functions we can do reasonably well on integrations of several months duration, and comparisons between independently derived momentum balances from the data and the model demonstrate that the model performance is correct. We are using optimal interpolation (O/I) techniques to 1) composite SST fields from different satellites (AVHRR and TMI) to produce cloud-free daily images (He et al., 2003 for surface heat flux relaxation and 2) composite surface wind fields from EDAS (model) and buoy and coastal observations for improved surface momentum flux forcing. The ocean model results from these O/I fields are demonstrably better than from the nominal EDAS fields alone (He, Liu, and Weisberg, 2003). From this we may conclude that the most effective way of improving ocean state specification by models is to improve the coastal marine weather forecasts used to drive the coastal ocean models. This quantitative finding underscores the importance of coastal ocean observing systems.</p>	50%

Status: Hindcast experiments proceeding with three different types of models as planned.

- Nowcast/forecast. Our barotropic nowcast/forecast uses EDAS nowcast/forecast winds to drive the WFS POM, inclusive of tidal forcing at the open boundary. For year 2 we will implement baroclinicity now that we have an SST product for surface heat flux relaxation. 50%

Status: Nowcast/forecast system is operational.

- SEACOOS domain model. For the purposes of improving the open boundary condition specifications for the WFS regional model we also implemented a larger SEACOOS domain grid. Initial experiments were with tides forced at the open boundaries along with climatology for surface dynamic height and subsurface hydrography adjusted for total transport. Coupling of the regional coastal ocean models with larger scale deep ocean models will be explored in collaboration with our SEACOOS colleagues and other modeling groups. A formal relationship through NOPP now exists between USF and the HYCOM/GODAE team of E. Chassignet, RSMAS. 50%

Status: Climatology complete. Experimenting with open boundary specifications on SEACOOS domain model. NOPP work pending award.

- Estuarine applications. In use for estuarine applications is the ECOM3D-si (Blumberg, 1993). Along with the Tampa Bay PORTS applications of M. Luther, we have applied this to the Charlotte Harbor estuary (Weisberg and Zheng, 2003 and Zheng and Weisberg, 2003). 50%

Status: One paper published and one paper in press on the Charlotte Harbor estuary. Preliminary model analyses on Tampa Bay estuary.

- Linking the estuaries with the shelf. For the purposes of achieving high resolution without nesting, and thereby being able to directly link the estuaries with the continental shelf, we are using the FVM of Chen et al. (2003). Two applications each with direct outreach implications have been performed. The first is a set of hurricane storm surge simulations for which we translate prototypical category 2 and 4 hurricanes into the Tampa Bay region, making landfall at several locations, from several directions, and with several approach speeds. By combining the flooding/drying capabilities of the model with the most recent merged NOAA/USGS bathymetric/topographic data we have a highresolution simulation with important emergency management implications. The second is an application the FVM to the Pinellas Co. Inter-Coastal Waterway (ICW). Starting sufficiently offshore to properly force the tides we pare down to 40 m resolution within the ICW to look at its time varying flow fields and how the various inlets exchange water with the coastal ocean. Year 2 activities will include FVM simulations in fully baroclinic mode to study the evolution of salinity fronts by the coalescence of estuarine and shelf processes. We will also continue our local outreach activities.

50%

**Status:** Tampa Bay region hurricane storm surge analysis complete. Preliminary hindcasts of the West Florida Shelf inclusive of the Tampa Bay and Charlotte Harbor estuaries complete. Storm surge results shared with local county officials.

## Information Management

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### University of South Carolina

Data management and communications – P.I.s Madilyn Fletcher, Dwayne Porter

- The networking and problem-solving activities of the DMCC will be enhanced, and constructive linkages with additional data management activities will be utilized, such as those with GoMOOS and SURA/SCOOP.

%complete

70%

**Status:** At the previous SEACOOS conference, representatives from NDBC, NCDDC and NOAA were present to learn and contribute discussion to our ongoing efforts. There is an upcoming tech conference about technology products, data and metadata discussions planned for May 2004 in which member of SEACOOS plan to actively participate. A general technology document has been posted outlining several

technology components that are currently contributing to the SEACOOS efforts ( <http://caro-coops.org/bb/viewtopic.php?t=249> ). Other documents are available on Celoxis detailing some of the data aggregation efforts and issues.

%complete

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- DODS and LAS functions will continue to be tested by exchange of information among the partner institutions. 90%

**Status:** SEACOOS in-situ and model data are available via DODS/OPeNDAP NetCDF servers, but DODS/OPeNDAP is not utilized internal to the current SEACOOS efforts due to the small file sizes transmitted(the data are only representative of the most recent conditions). It is faster to retrieve the whole file directly from a data provider via HTTP rather than adding the additional complexity and overhead of utilizing the DODS/OPeNDAP interface. While DODS/OPeNDAP is not currently useful to existing SEACOOS products, the SEACOOS datasets are available to those in the outside community who might prefer to use the DODS/OPeNDAP interface when initiating data transfers.

LAS was installed and reviewed at the USC institution. While LAS might be a useful tool for others in the scientific community, SEACOOS is utilizing MapServer GIS to achieve the same goals of integrated data discovery and display. The MapServer GIS supports additional features such as multiple data layer overlays for visual comparison and is better supported technically from the larger GIS community from which it draws.

A full review of DODS/OPeNDAP and LAS is available as part of the Celoxis documentation.

%complete

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- Efforts will continue to establish consistency among vocabularies, where needed. 40%

**Status:** A data dictionary has been defined as an Excel spreadsheet which was circulated and edited by all SEACOOS institutions and is part of the Celoxis documentation. This data dictionary will be helpful in defining the core variables and immediate products which SEACOOS may want to pursue. This data dictionary will also help in performing variable lookups and cross-references on queries against the SEACOOS datasets.

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%complete

- One anticipated demonstration will be to identify and test a concrete example of model data (stored on a DODS server) over-laid with integrated data product utilizing real-time data (also stored on a DODS server). 20%

**Status:** This item is a topic of ongoing consideration. The modeling group has many complex issues of resolution and interpolation which need to be resolved before integrating the merged model products with other products.

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%complete

- Evaluation of OPeNDAP to non-gridded datasets. Historically OPeNDAP is better suited to supporting gridded data, but efforts are being made to better support in-situ datasets which may have data and metadata collected in Relational Database Management Systems(RDBMS) utilizing commercial systems such as Oracle and SQL Server, and open source systems such as mySQL and PostgreSQL. 20%

**Status:** In addition to the comments noted above on DODS/OPeNDAP, another effort to utilize DODS/OPeNDAP is to use the DODS DRDS (DODS Relational Database Server) to allow SEACOOS to serve the aggregated wind product and sea surface temperature datasets and other future database tables which are collected centrally on the PostgreSQL relational database via the DODS interface.

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%complete

- Enhancement of Web portals for dissemination of data, metadata, and data. This will involve the maintenance and further development of the SEACOOS portal ([www.seacoos.org](http://www.seacoos.org)), as well as linkages and clarification of relationships among the various related Web locations. Particular attention will be paid to communication with various user communities. Community bulletin boards have been established at several sites ([www.carocoops.org/bb](http://www.carocoops.org/bb), <http://redington.me3.com/php/gomoos/phpbb/index.php>), which cross-reference discussion and documentation as it affects data management issues within the community. These discussion threads are keyword searchable within the bulletin board and also searchable by popular search engines such as 'Google'. 20%

**Status:** A second PostgreSQL database instance is planned which will shadow the data on the existing aggregated database as well as keeping an ongoing archive of the data. This database would be open for SQL queries by SEACOOS parties initially and others

perhaps as credits, disclaimers and additional metadata needs are worked out. A query, download and graphing component is also being developed which will run against the SEACOOS aggregated datasets.

%complete

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Further development of data integration software and processes.

These include:

- 
- (1) QA/QC procedures, including those for (near)real-time data streams; 20%

Status: Below is a listing of a sample netCDF representation of QA/QC as discussed in Celoxis documentation. The qc\_level and qc\_flag documentation could be the same reference, but they are separate in the listed example. Following recommendations from the QARTOD meeting, a 'quick' scan of qc level (done, not done, etc), followed by the longer list and methodology which might apply to each dataset and variable are both performed. The 'myimplementation.html' reference would describe any individual flag-mapping scheme (the layout as it exists in the netCDF).

The qc\_convention is a reference both to general documentation and a programmatic reference which would allow programs familiar with the convention to begin QA/QC processing automatically.

%complete

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- (2) procedures for updating, refining, or correcting QA/QC documentation; 10%

Status: SEACOOS plans to develop code libraries which would accept input variables with appropriate necessary metadata to be processed by matching QA/QC functions defined for range limits, time continuity and internal consistency and output one or several string flags which correspond to the QA/QC documentation standard being used. The goal would be to encourage not only generalized documentation of the QA/QC processes, but generalized code functions which could be immediately reused by a data provider to revise or correct their own datasets with the appropriate quality control flags.

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%complete

- (3) documentation of metadata, identification and establishment of metadata standards; and (4) implementation of processes to facilitate metadata documentation. 30%

**Status:** Federal Geographic Data Committee (FGDC) metadata was generated to facilitate data discovery via the FGDC Clearinghouse. Metadata documentation was primarily focused on the overall themes and data procedures of the SEACOOS program.

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%complete

- Access to external data streams to support modeling and outreach efforts. Required data will be (1) static data, i.e. those that do not change or change only slowly in time, and (2) the real-time or near-real-time data. The management of those data will evolve as finer resolution or more accurate static data become available and as new technologies affect the delivery of data. 40%

**Status:** Within the IOOS effort, SEACOOS has provided semantic templates that others have used as well as MapServer-specific code for the group. With the help of USF, color schemes were established for all remote-sensing and in-situ IOOS participants to follow. SEACOOS also assimilated UC Santa Cruz' in-situ SST data by providing them with the SEACOOS NetCDF in-situ SST format and instructions and pushed their data via the WMS service to IOOS.

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- Development of geospatially-referenced, web-based products from data streams and model outputs, which include information and overlays. The development of GIS applications and presentations of data, model outputs, and other data products will be initiated in Year 2 and are expected to be important SEACOOS products. Visual and layered presentations are particularly useful and instructive for a variety of user groups, ranging from resource managers to education platforms. We anticipate that some of this activity will be closely allied to the Outreach Working Group's work and SURA/SCOOP activities. 80%

**Status:** Development of initial GIS interfaces and data workflows for in-situ observations, merged model output and remote sensing observations has been completed. SEACOOS is organizing committees representative of outreach and research efforts which will gather requirements to better focus product development.

SEACOOS has participated in the IOOS integration efforts by supplying map images representative of in-situ wind speed and direction and sea surface temperature via the OpenGIS Consortium (OGC) Web Mapping Service (WMS) protocol. These in-situ measurements are aggregated from a variety of federal and non-federal sources. The SEACOOS GIS interface has been enhanced with additional raster (image) querying capabilities as well as additional visualization elements such as more refined color legends. Initially, the in-situ, modeling and remote sensing developments are being treated as separate entities, but once each entity has resolved presentation and work flow issues the next step would be towards integration of the entity products.

Information Management (cont.)

## University of North Carolina at Chapel Hill

UNC-CH Data management – P.I. Harvey Seim, UNC-CH

	%complete
<ul style="list-style-type: none"> <li>• <i>DODS Evaluation.</i> We will continue to evaluate the use of DODS Servers for near, real-time data dissemination. This also includes participating in a workshop hosted by Peter Cornillion (University of Rhode Island) scheduled for Fall of 2003 on NVOIS to provide feedback about OPeNDAP protocol and software.</li> </ul>	50%

**Status:** the DODs server (nemo.unc.edu) has been operational since April 2003 and continues to work well. Sara Haines has participated in a number of conferences.

	%complete
<ul style="list-style-type: none"> <li>• <i>Data Integration.</i> Collaboration with SEACOOS data management personnel to develop and implement processes to aggregate external data streams for modeling and outreach products. These external data streams are from federal data providers such as NBDC, NWS, and USGS.</li> </ul>	50%

**Status:** Haines, Stearns and Semone at UNC have actively participated in the development and refinement of the CDL standards adopted by SEACOOS DMCC. Haines/UNC has been responsible for ingestion, formatting, and DODs presentation of NWS/METAR and USGS gauging stations available through seacoos.org.

%complete

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- *Data Quality and Control.* We will participate in the identification, design, and documentation of QA/QC practices to be used by SEACOOS data partners. 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. This also includes participating in a workshop with NDBC on real-time QA/QC practices. 25%

**Status:** Haines attended the QUARTOD workshop in December 2003. Discussions are underway about how to implement the QA/QC standards conventions discussed at the workshop.

%complete

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- *Establish metadata and data structure for NC observations.* 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 is consistent with those throughout SEACOOS. 50%

**Status:** Underway. Haines has played a central role in the SABSOON database development and continues to lead efforts to update it. The structure will be mimicked for NC observations. Stearns has led the development of the HF radar database, and is currently using the HFRC package from David Kaplan/UCDavis and Mike Cook/Naval Postgraduate School. Development of a netCDF format consistent with SEACOOS CDL is underway.

%complete

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- *Operational data streams.* Scripts and programs will be developed 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. These automated processes will need to be sensitive to when sensors and equipment are brought online and offline or when there is a telemetry failure. Also, these scripts will need to access information about changes in calibrations and maintenance. 75%

**Status:** Underway. Current emphasis is on making HF radar available, both to SEACOOS and MARA. For SEACOOS we are establishing the necessary CDL; formatting requirements within MARA are less clear.

- *Design relational equipment database.* A relational database will be designed to hold information about field equipment and sensors, history of maintenance, calibration data and threshold standards. This will improve the communication of very detailed and pertinent information between the field personnel and data management personnel. This database will be updated by field personnel and used by operational scripts and programs a crucial step towards operational function.

25%

Status: underway. The inventory was initiated at the fall 2004 workshop. Stearns, Muglia, and Cleary (GIS guy) are involved in this initial observing WG technical activity.

Information Management (cont.)

University of South Florida

USF Data management-P.I. Mark Luther, USF

- We are participating in all areas of data management integrating efforts with colleagues at USC, UNC and RSMAS. Data are being served at the COMPS, NDBC, and SEACOOS websites.

Status: Our SEACOOS/COMPS real time data (winds in particular) are available to the NDBC for inclusion in their data streams.

- We installed an OPeNDAP (DODS) NetCDF server on a newly acquired Dell PowerEdge 2650 server running Red Hat Linux 7.3. This server is currently being populated with available real time and historical data collected on the WFS, and it is linked to the COMPS and the SEACOOS web sites.
- We are providing real time wind measurements from all of our stations in NetCDF format through the OPeNDAP (DODS) server for the production of a total SEACOOS area merged wind product that will be made available in near real time on the SEACOOS web site. All additional parameters collected on our buoy and coastal platforms may also be transmitted in the same manner.
- Metadata records for our WFS real time meteorological and oceanographic data have been prepared using the Cast-Net on-line metadata entry tool. These records were submitted to the Dauphin Island Sea Lab server and are ready for submission to an Isite node. The html and xml versions of these records are available on the COMPS website.

## Outreach and Education

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North Carolina Sea Grant Outreach – P.I. Jack Thigpen, NCSG

	%complete
<ul style="list-style-type: none"><li>• Explain SEACOOS capabilities to potential NC users. 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.</li></ul>	25%

**Status:** State and regional associations and organizations have been identified. A timetable of upcoming annual meetings is being developed. At these meetings SEACOOS materials (brochure, poster and PowerPoint presentation) will be used to create an awareness of ocean observations potential and SEACOOS projects and products. This will also be used as a test-bed for the web products that are under development.

	%complete
<ul style="list-style-type: none"><li>• <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.</li></ul>	25%

**Status:** Jack Thigpen is working with Mike Muglia, SEACOOS and Coastal Studies Institute, and Sara Mirabilio, NC Sea Grant fisheries specialist, to determine offshore fishermen's' needs and preferences for CODAR information. We are scheduled to visit the Rutgers University CODAR project in April 2004 to learn how they developed products for New Jersey fishermen and how to best deal with public-private issues with CODAR and other ocean observing products. Product review committees of commercial fishermen and offshore recreational anglers. In February 2004 the current CODAR prototype products we displayed along with other SEACOOS information at the North Carolina Fishermen's Association annual meetings. There was considerable interest from commercial fishermen.

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%complete

- Evaluate information delivery scheme for Cape Lookout buoy measurement system: 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 (Morehead City). Establish user preference for combinations of web-based, radio and telephone delivery methods.

20%

**Status:** This buoy is slated for deployment for Fall 2004. Preliminary outreach efforts include contacting local commercial fishermen, recreational anglers and boaters about their information needs are preferred delivery methods. More activity will occur this summer as the time of deployment gets closer.

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%complete

- Develop outreach brochure and publication. A tri-fold color brochure and an eight-page color brochure will be designed and produced. These materials will serve as an introduction to SEACOOS and coastal ocean observing and will be distributed to potential users.

• 40%

**Status:** A draft brochure is being edited and produced by the management team with input from Outreach and Education workgroup members. This will be ready for the Spring 2004 workshop. The eight-page color brochure has transformed into a combination brochure and annual report that will do double duty as an awareness outreach product and serve as a report of Year 2 progress.

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- Assessing regional impacts of coastal observing: The known literature covering the economic and social impacts of coastal observing for the southeast region will be reviewed and compiled. Additional research will be conducted in areas of weakness.

• 20%

**Status:** Proposals for this project have been requested from NC universities. Negotiations are underway and we expect to award this contract by end of April 2004. Report must be delivered by August 2004.

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%complete

- Partner with OCEAN.US on national workshop on outreach methods for regional ocean observing projects. To advance outreach and education methodologies, a workshop for all regional observing efforts is planned to enable the cross-fertilization of practices. • 25%

**Status:** OCEAN.US was planning a Spring 2004 outreach workshop when this particular project was included. Jack Thigpen is working to initiate such a workshop for August 2004.

Outreach & Education (cont.)

Florida Sea Grant Outreach – P.I.s Mike Spranger and Jim Cato (FLSG)

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- Regional outreach coordinator. A regional outreach coordinator will be hired to work directly with state outreach and education teams in the states of Florida, Georgia, South Carolina and North Carolina to insure efforts are carried out in an efficient, effective and timely manner. The coordinator will work directly with outreach workgroups and SEACOOS researchers to continue and expand the Year 1 outreach program. The coordinator will serve as the principal regional connection between users and the project workgroups.

**Status:** After a national search, Dr. Christina Simoniello was hired by Florida Sea Grant as SEACOOS Regional Outreach Coordinator. She will be based at the University of South Florida in St. Petersburg, Florida. She will work assist in the design, development, implementation and evaluation of regional education and outreach programs. She will assist the individual Sea Grant Program staff and researchers in North Carolina, South Carolina, Georgia and Florida in the identification of constituent needs and in the development of a various useful and relevant coastal ocean observation products and services.

In 2004, Dr. Simoniello will also work with Sandy Enslinger, SERA-COOS Coordinator, based in South Carolina on projects that complement their activities. These will include developing case studies on use and application of ocean observation system products and services in the region; collecting media stories on use and/or potential applications of ocean observation system products; writing a report on the 2003 user survey needs assessment; and working on the outreach and education web page. The Coordinator will also represent outreach and education on the SEACOOS Product Interface Committee, and also maintain contacts with the other SEACOOS Working Groups. The Coordinator will also assist the staff of the NC, SC, GA, and FL Sea Grant programs in

increasing their capacity in developing SEACOOS programs. The Coordinator will also attend appropriate national, regional and state constituent meetings and deliver educational programs that increase the awareness, understanding and potential use of SEACOOS products and services.

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- Florida Information meetings and development of outreach materials. Informational meetings will be held to gain an understanding of capabilities of the observation system, focus on potential uses and to identify targeted user groups. In addition, convene at least 3 in-state meetings with local community user groups and project scientists to better design the observing systems, data collection and product development to optimize usefulness to local interests and needs

Status: A poster display and fact sheet was developed and provided at the Florida Association of Extension Professionals (FAEP) annual meeting, held in Jacksonville, Florida (September 2003). More than 350 extension agents and specialists from all of Florida's 67 counties developed a better understanding of SEACOOS and awareness of the capabilities of an observation system. Follow-up activities with FAEP will occur in 2004.

A presentation on SEACOOS was made at the International Boat Builders Exposition (IBEX), held in Miami, Florida (September 2003). 35 boat manufacturers and marine professionals developed a better understanding of SEACOOS and awareness of the capabilities of an observation system.

A poster display and fact sheet was developed and provided at the 2004 Miami Boat Show, held in Miami, Florida (February 2004). Thousands of recreational boaters were provided a better understanding of SEACOOS and awareness of the capabilities of an observation system. Over 350 fact sheets were provided to interested individuals who asked for additional information. Follow-up activities in 2004 and 2005.

A poster was displayed and presentation was made on SEACOOS at the American Boat Builders and Boat Repairers Association's (ABBRA) and Marine Environmental Education Foundation's annual meeting, held in Ft. Lauderdale, Florida (February 2004). 35 boat manufacturers and marine professionals developed a better understanding of SEACOOS and awareness of the capabilities of an observation system.

It is anticipated that additional in-state meetings with local coastal community and marine user groups will occur in selected Florida coastal counties in 2004.

- Determine the needs and requirements of a real-time wind, tide, and current monitoring system. Determine needs and wants of clientele groups on application of real-time observational systems in their daily activities, monitoring and communication equipment, and support personnel that might be needed to implement real-time systems. Investigate pilot project sites.
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**Status:** A planning meeting was held for Florida Sea Grant county faculty on SEACOOS in Gainesville, Florida (August 2003). It is planned that these faculty will provide presentations on SEACOOS to their individual coastal advisory committees in 2004, as part of their individual plans of work. These groups will help to determine needs and wants of on application of real-time observational systems in their daily activities, monitoring and communication equipment, and support personnel that might be needed to implement real-time systems. Potential pilot project sites in their specific locales will also be explored.

- Contact first responders, inform them of SEACOOS objectives and potential and ask them to list services that would be the most useful from a real-time coastal observing system: Meet with the emergency managers in Florida's coastal counties brief them on SEACOOS efforts and potential assistance in their operations, obtain a comprehensive list of their needs, transform the list of needs to a practical plan of instruments and personnel to implement those needs, and develop a projected budget and time-line to implement the Emergency Management component of SEACOOS.
- 

**Status:** 1) We are exploring opportunities to combine a NOAA Coastal Storms Initiative (CSI) project directed at "first responders" with the SEACOOS project. Currently, there are two pilot projects that involve emergency preparedness professionals under the CSI in Volusia and Brevard Counties. We will also work with Sandy Eslinger, SERA-COOS Coordinator who has developed a regional needs assessment and will be working with the coastal hazards community, as part of her duties.

2) A presentation on CSI and SEACOOS was presented at the CSI work group meeting, held in Astoria, OR (October 2003). Both the CSI and SEACOOS projects were explained. A second national CSI project is being established on the West Coast of the United States. The first CSI national project was developed in the Northeast Coast of Florida.

South Carolina Sea Grant Outreach – P.I. Robert Bacon, SCSGC

	%complete
<ul style="list-style-type: none"> <li>Coastal hazards extension education and technology transfer program: recruit and hire a Coastal Hazards (CH) specialist. Under the leadership of the CH Specialist, a SCSGEP/SEACOOS Coastal Hazards Outreach Advisory Committee will be formed to oversee a coastal hazards/ocean observing system outreach needs assessment, extension and communications products, and research in subsequent SEACOOS project years.</li> </ul>	<ul style="list-style-type: none"> <li>65%</li> </ul>

**Status:** A Coastal Hazards Specialist was hired in November, 2003 and a Coastal Hazards Outreach Advisory Committee has been formed. Completed and ongoing activities associated with this effort include:

- The completion of a draft slide presentation to familiarize stakeholders with the SEACOOS efforts.
- The development of a draft Outreach web page interface for the SEACOOS web site.
- Ongoing completion of user community profile interviews to develop an assessment of stakeholder interests and needs in the COOS arena. This interview process is 100% complete on a sub-regional level (primarily SC) and is approximately 25% complete for regional expansion. Community groupings include representatives from the following sectors:
  - Weather & Climate
  - Disaster Response
  - Public Health
  - Recreation & Tourism
  - Commercial Shipping
  - Education
  - Commercial Fishing
  - (External)
  - Industrial
  - Financial
  - Coastal Resource Management
  - Military
  - Scientific Community
- Completion of stakeholder review focus group sessions to provide feedback for ongoing SEACOOS product development efforts.

South Carolina Sea Grant Education – "SouthEast COSEE, serving the regional education of NC, SC and GA". P.I. Lundie Spence, SCSGC

	%complete
<ul style="list-style-type: none"> <li>Develop a regional SEACOOS educational forum. SouthEast COSEE (NC, SC, GA) and FL with representatives from the educational and SEACOOS communities will meet to discuss SEACOOS in light of educational application. State standards will be identified and existing courses (physical science, physics, chemistry, science, biology) that could apply SEACOOS data, processes and technology. Additional "satellite" workshops will result.</li> </ul>	100%

**Status:** This workshop has been expanded so that SouthEast COSEE is co-hosting with Ocean.US, NOAA/CSC and South Carolina Sea Grant Consortium a national workshop, March 22-24, 2004, NOAA/CSC, Charleston, SC. Over 60 participants have been invited which include people from SEACOOS and other regional COOS, data visualization experts, representatives from other COSEE sites and researchers. The two objectives are to develop a national network of COOS educators resulting in shared initiatives and ideas and to identify and review some of the best ways educators access COOS type data for inclusion into formal and free choice institutions. This partnership has resulted in leveraging outside funds at a 1:3 ratio.

SEPORTs (South East Portals to Ocean Sciences for Teachers) Based on the geographic associations of the 29 teachers from the 2003 Ocean Sciences Education Leadership Institute, a series of partnerships have been initiated with 12 "free choice" institutions to conduct a SEPORT Ocean Awareness Day (6 hour professional development). By May, all twelve will have been implemented. The objective is to develop an infrastructure by which ocean science research can be passed to local teachers (near the SEPORT sites). In this Year One of SEPORTs, the infrastructure was established. When SEACOOS has its educational website active, the posters prepared, each of these institutions will become aware of the information and sent samples. As SEACOOS products are still in development, very little could be shared this year. However, both the Institute and the 2004-05 SEPORTs will have COOS information. The SEPORTs include the following sites: UGA MECA, Fernbank (Atlanta), Museum of Aviation (Warner Robbins), West GA State University (Carollton); SC Museum (Columbia), ACE Basin (Colleton Cty); SouthEast Phytoplankton Monitoring Network NOAA/Hollings Marine Lab (Charleston); Discovery Place (Charlotte), Life and Science Center (Greensboro), NC Museum of Natural Sciences (Raleigh); Cybercampus of NC Math Science Education Network ECU (Kinston), NC Aquarium (Wilmington). Each SEPORT set of participants have provided an evaluation survey and each SEPORT contact person at the Institution will receive a telephone interview for normative and summative evaluation. This evaluation scheme will be

complete by May, 2004.

	%complete
<ul style="list-style-type: none"><li>Electronic newsletter for educators: An electronic newsletter, located on the SouthEast</li></ul>	100%

**Status:** The first issue of this website was loaded Jan 4, 2004 and is available on the SouthEast COSEE website. The second issue is scheduled for uploaded in May. "Passport to the Sea" [http://www.scseagrant.org/se-cosee/newsletter/passport\\_current.htm](http://www.scseagrant.org/se-cosee/newsletter/passport_current.htm)

	%complete
<ul style="list-style-type: none"><li>SEACOOS Education Program poster. A poster will be designed and produced to introduce educators and students to oceanography and the SEACOOS project as a tool for teaching science principles. Targeted at Middle school students, with SEACOOS, SE COSEE, FL COSEE and Gulf of Mexico COSEE, SC Sea Grant Consortium, NC Sea Grant and GA Sea Grant working together for content and distribution.</li></ul>	60%

**Status:** A draft poster is in a design stage with SouthEast COSEE staff working with SEACOOS researchers on the text and format. Accompanying text and activity information is being collated by Margaret Olsen, SECOSEE Education Specialist representing GA Sea Grant. An August completion date is set. However, if possible, we are presenting this poster at the National Marine Educators Association conference, Tampa, Florida, July 2004.

#### Outreach & Education (cont.)

Georgia Sea Grant Outreach – P.I. David Stooksbury

	%complete
<ul style="list-style-type: none"><li>Georgia Ports and Coastal Hazards. A SEACOOS Advisory Panel will be formed to provide technical and programmatic direction for the Georgia outreach initiative and help determine the needs and requirements of a real-time wind, tide, and current monitoring\ system that would greatly improve the safety and profitability of the Savannah and Brunswick Ports. The specific needs of Brunswick and Savannah Port clients for a real-time observational system will be determined.</li></ul>	

**Status:** Interviews were conducted with the Savannah and Brunswick Ports Authorities. While, they were not opposed to such a project, their primary interest was within the port boundaries and not in the near-shore ocean and estuarine areas approach the ports.

%complete

- First Responder and Weather Hazard Decision Makers: The GA outreach team will meet with the emergency managers of the eleven coastal zone management counties and with Georgia Emergency Management Agency (GEMA) officials to brief the officials SEACOOS efforts and potential assistance to their offices and agencies; obtain a comprehensive list of their needs, and transform the list of needs to a practical plan of instruments and personnel to implement those needs. Then a projected budget and timeline to implement the Emergency Management component of SEACOOS will be developed.

•

**Status:** First Responder and Weather Hazard Decision Makers are scheduled to meet in the summer of 2004. David Stooksbury is arranging for the inclusion of a SEACOOS awareness presentation in the agenda.

Outreach & Education (cont.)

#### Florida Sea Grant Education

%complete

- A presentation will be made on SEACOOS and ocean observation systems at a Graduate Class on Ecotourism, attended by 45 students at the University of Florida (October 2003).

• 100%

Outreach & Education (cont.)

#### Florida Sea Grant Education – P.I. Paula Coble (USF)

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- Summer Physical Science workshop: A one-week, summer Physical Science workshop will introduce SEACOOS science concepts to secondary teachers and provide them with training and resources needed to use SEACOOS data products in the classroom. Alignment with needs of teachers and state science standards will be based on feedback from regional forum activity. In addition, Florida COSEE at USF will develop a pilot program.

•

**Status:** The week long summer physical science workshop has been scheduled for June 7-June 11. At this time, Bob Orlopp, the Pinellas County Science Coordinator, has agreed to identify teachers who would most benefit from this experience. In addition four SEACOOS scientists, a College of Education science educator, a Florida Sea Grant

informal educator, and FCOSEE staff have agreed to lend their expertise to this workshop. This pilot workshop will consist of inquiry based activities coordinated around three distinct events: an introduction to buoy technology with onsite visits to SEACOOS labs at the USF College of Marine Science, a research cruise, and opportunities to interface with the SEACOOS website. The focus of this initiative is to bring research scientists, university level science educators, and second teachers together to develop a template for future professional development experiences. The three day, authentic, research cruise experience will immerse teachers in SEACOOS science. Teachers will take part in pre-board preparation and onboard science activities such as buoy monitoring, maintenance, and deployment followed by opportunities to share what they have learned, discuss best teaching practices, and develop activities using SEA COOS science and data as the foundation for the creation of classroom inquiry based experiences. Portions of the research cruise will also be videotaped to provide a visual record of activities taking place. Video clips will be used to introduce SEACOOS science to a broad audience via the SEACOOS website. Additional footage will be used in future projects such as a SEACOOS training DVD targeting teachers.

## Operations

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### University of North Carolina System

Sarah Smith, Grants Manager, and P.I. Russ Lea, VP of Research and Sponsored Programs, University of North Carolina

	%complete
<ul style="list-style-type: none"> <li>• Financial and administrative oversight: The University of North Carolina will provide financial and administrative oversight for the project including compliance monitoring, budget management, and project coordination for governance. In year 2, systems will be developed for tracking periodic progress against project milestones. Budget management systems will also be upgraded to allow more comprehensive analysis and monitoring of the project budget and subawards.</li> </ul>	40%

**Financial and administrative oversight:** The University of North Carolina provided financial and administrative oversight for the project including compliance monitoring, budget management, and project coordination for governance. A process was formalized for the review and allocation of annual carry over funds. UNC continues to maintain and improve financial tools for the purposes of budget allocation and management at the macro level and conducts monthly drawdowns against the grant award from the Office of Naval Research.

UNC has also implemented a schedule for conducting administrative site visits with all collaborating entities that receive funding under SEACOOS. All site visits will be conducted during the current program year. The site visits, in keeping with “best practices” for managing subrecipients, are conducted to review with the subrecipients

the institutional, administrative and financial compliance aspects of the award. Things that will be covered in the site visits include, an overview of project activities to date, a review of award/contract documents, including the SEACOOS Master Agreement, discussion of institutional compliance with cost accounting standards, if applicable, OMB Circulars A-21 and A-110, assurances and certifications, reporting requirements and internal controls for the review and approval of expenditures. Formal site visit reports are issued and become part of the official award file for SEACOOS.

**Governance:** The SEACOOS Board of directors voted to approve the amended SEACOOS Articles of Collaboration. The amended Articles of Collaboration were circulated to all collaborating institutions and facsimile approval has been received. The amendment Articles of Collaboration are now available at: [http://intranet.northcarolina.edu/docs/aa/research/initiatives/SEACOOS\\_Gov\\_Amended\\_11\\_14\\_03.pdf](http://intranet.northcarolina.edu/docs/aa/research/initiatives/SEACOOS_Gov_Amended_11_14_03.pdf)

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<ul style="list-style-type: none"> <li>• <i>Project management services:</i> through a subcontract to OASIS/UNC-CH provide staffing and office services support for SEACOOS Project Investigator (PI). These services would include: gathering information and creating status reports; handling day-to-day management details for the SEACOOS P.I.; coordinating conferences, meetings; facilitating partner communications; managing day-to-day office tasks (filing, answering/making calls, etc.); and expediting project-level goals and specific tasks.</li> </ul>	<ul style="list-style-type: none"> <li>• 100%</li> </ul>
<ul style="list-style-type: none"> <li>• UNC will administer funds for programmatic support including the recruitment of a project manager, who will oversee the day-to-day operations of the project and the continued development and enhancement of the SEA-COOS web portal.</li> </ul>	<ul style="list-style-type: none"> <li>• 100%</li> </ul>

**Status:** OASIS/UNC-CH provided staffing and office services support for SEACOOS Principal Investigator (PI) by recruiting a Project Manager (Claire Eager). Ms. Eager's duties include expediting project-level goals and specific tasks; handling day-to-day management details for the SEACOOS PI; coordinating conferences and meetings; facilitating partner communications; gathering information and creating status reports; Celoxis training and functional assistance; management of the Communications Associate; and managing day-to-day office tasks (filing, answering/making calls, etc.).