



**Caribbean Regional Association
Progress Report
Reporting Period December-May 31, 2007**

NOAA Grant # NA05NOS4731126

1) *Project Summary:*

The goal of the CaRA project is to develop the framework for a regional association to establish and sustain an integrated ocean and coastal observing system serving the Caribbean Exclusive Economic Zone of the United States of America. The observing system will endeavor to meet the informational needs of local, regional and federal decision makers, resource managers, entrepreneurs, educators, scientists and general citizenry. The regional association will vigorously promote the establishment of observing system components and projects, ensure that regional observing activities are coordinated with the U.S. Integrated Ocean Observing System and consistent with national guidelines and standards, provide for operational oversight of system activities as required, take all necessary steps to ensure the usefulness and sustainability of the system, and represent the interests of the system participants through their inclusion in the development of a formal governance structure and operating plan.

2) *Progress and Accomplishments*

CaRA Organizational Structure

- A CaRA governance meeting was held on January 29, 2007. Themes discussed were:
 - Alternatives for governance structure and related concerns
 - Identification of potential board members and outreach strategies
 - The development of MOU (Memorandum of Understanding) and “not for profit” corporation governance structure drafts.
- During the 2nd Steering Committee Meeting held on April 27, 2007 the governance structure drafts were discussed.
 - MOU under coverage of host University or non-for-profit corporation were the alternatives were considered viable for CaRA. The consensus result was: Steering Committee recommended MOU at this stage, but considers incorporating as a non-profit when the RA is more mature. MOU and Bylaws drafts are available for revision and comments in CaRA’s website (<http://cara.uprm.edu>)

Planning and Implementation



- **Development of the business plan**

A draft of the Business Plan, developed with the assistance of A. Molinares (CaRA consultant) was also presented at the Steering Committee Meeting. Committee members and stakeholders are requested to comment through CaRA's web page. The Business Plan Draft is available for comments at <http://cara.uprm.edu>.

CaRA's Steering Committee Members are listed below:

1. Julio Morell, PI
2. Jorge Corredor, Co-PI
3. Roy Watlington, Co-PI
4. Frank Muller-Karger, University of South Florida
5. Christa G. von Hillebrandt-Andrade, UPR- PR Seismic Network
6. Aurelio Mercado, UPR-Coastal Hazard of Puerto Rico
7. Scott Stripling, NOAA-NWS
8. Ruperto Chaparro, Puerto Rico Sea Grant Program (PRSGP)
9. Nasser Idrisi, UVI
10. Elizabeth Ban, UVI

- **Pilot projects:**

Development of user-responsive data streams is essential to build credibility for the RA. Development of low-cost high-impact pilot projects should be a priority for the CaRA project.

Two projects, responsive to stakeholders needs, are now under development:

- Wind product– In the recreational sector canvassing, the most sought after product was coastal winds. A number of anemometers are operational at coastal weather stations, the tsunami network of sea-level gauges etc and are sub-utilized. Scott Stripling of NWS San Juan is currently running the WARF program that, together with this real-time data can provide much finer, resolution for the coastal area of the islands. CaRA agreed to provide the hardware, archival services. Stripling is assisting CaRA's graduate intern, J. Gonzalez in developing the product.
- Turbidity product – Expressed needs of environmental managers included a product to assist in coral reef management and in developing criteria for beach closures due to fecal contamination. As the latter is associated with terrestrial runoff, a satellite-derived product will be useful. Frank Muller-Karger of USF's Institute for Marine Remote Sensing and a member of the CaRA Steering Committee (is assisting in the development of this project. A prototype subset of MODIS data encompassing PR and USVI is now available at



http://modis.marine.usf.edu/weekly/pr_vi/pr_vi.index.html. CaRA will assign one intern to perform the programming necessary for subsetting at a finer scale and will provide archival service.

Several other initiatives, responsive to specific regional needs and to NFRA priorities are being pursued:

- National Center for Maritime Security and Coastal Safety (MARSECS) proposal in response to DHS-07-ST-061-003 – Department of Homeland Security Center of Excellence for Maritime, Island and Extreme/Remote Environment Security. In collaboration with Stevens Institute of Technology and Rutgers University, both in New Jersey, and other institutions, Corredor and Morell from CaRA, are developing a proposal for establishing this Center. The initiative has progressed from a Letter of Intent to selection on the part of DHS for submission of a full proposal. Through MARSECS, CaRA will install and operate a high frequency radar system for real-time visualization and monitoring of vessel traffic and surface currents in the Mona Passage between the islands of Puerto Rico and Hispaniola.
- Through a grant from NSF to Michael DeGrandpre of the University of Montana titled “Collaborative Research: Autonomous pH and alkalinity sensors: in situ testing and carbon cycle research” CaRA is assisting in the development of long-term autonomous sensors for pH and pCO₂. Two sensors are now installed at NOAA’s ICON/CREWS mooring at Media Luna Reef off the southwest coast of PR.
- CaRA continues to support Jobos Bay National Estuarine Research Reserve by deriving products from their historic and real time data streams on water quality for the reserve area. A climatology–plotting product that will serve to determine baseline conditions for real time stations is currently being developed. Also CaRA has provided financial assistance for acquisition of hardware needed to add real time data transmission capability to an additional monitoring station. Once the station data is on-line, data from the two ecosystems “end members” (coral reef, inshore mangrove lagoon) may be monitored using the plotting product described above.
- CaRA assisted the Virgin Islands Territorial Emergency Management Agency in a successful proposal to NWS/National Tsunami Hazard Mitigation Program. The award facilitates enhancement of tsunami readiness with the acquisition of a turn-key receiving antenna for tsunami warning. This asset would also allow demonstrating low-cost direct access to satellite ocean observing data.



- CaRA has promoted a demonstration project involving the Virgin Islands Experimental Project to Stimulate Competitive Research (VI-EPSCoR), the West Indian Company (cruise ship dockers) in which an acoustic profiler will be deployed in the busy Charlotte Amalie harbor to provide wave and current data that facilitates vessel movement and docking.
- CaRA is supporting the UVI Center for Marine and Environmental Studies in demonstrating a water quality product for the heavily used Brewers Bay on St. Thomas. The demonstration product will be the display of output data for beach goers and for environmental managers who monitor water quality.

Stakeholder Engagement

- **Workshops:**

In its second year CaRA opted to reach out to stakeholders less in large-group workshops and more in personal and small-group briefings and through the media. Among the stakeholders engaged in this manner were resource managers, ports and dock managers, emergency managers and government officials newly elected in 2006. CaRA's Regional Meeting for formalization of the Association will be held early during fall 2007, the third project year.

- **New Partnerships:**

- Partnering with PR Seismic Network to hold a Sea Level Workshop in August, 2007
- CaRA hosted a visit on the part of Dr. Bror Jonsson of Boston University and Dr. Joe Salisbury of the University of New Hampshire to explore the possibility of using the FVCOM platform for developing a coastal circulation model for PR and the USVI. CaRA is working closely with Prof. Aurelio Mercado of the UPRM/NOAA Coastal Hazards Center on this initiative.
- NWS – Scott Stripling, NWS meteorologist and CaRA intern Juan Gonzalez are developing the WRF wind product. Gonzalez visited the NWS offices in San Juan during June 20-22 for this purpose.
- CaRA intern André Amador is developing climatologies for data products from the Jobos Bay National Estuarine Research Reserve instrument network. Dr. Ru Morrison of University of New Hampshire has generously provided CaRA with MatLab code he has developed for climatological products
- CaRA hosted a visit on the part of Dr. José A. Borges and 2 graduate students to explore collaborate on the JOBANERR initiative. Dr. Borges



and his students are affiliated with the project entitled “An Infrastructure for Wide Area Large Scale Automated Information Processing” (WALSAIP) funded by NSF. The group expressed interest in assisting CaRA in the development of the climatologies discussed above. A partnership between CaRA and WALSAIP is of great interest given their expertise in data handling and signal processing.

- CaRA took the opportunity of the presence of the *R/V Nancy Foster* in CarICOOS waters to facilitate the occupation of two regional serial stations (CATS, south of Puerto Rico and ACTS in the Anegada Passage) in addition to the deployment of satellite tracked drifters.
 - Yacht Haven Grande with Seakeepers Society International – Seakeepers identified the newly developed Yacht Haven Grande marina as a potential partner for deploying observational sensors aboard privately owned vessels as well as within the marina itself. CaRA has participated in discussions of a stakeholder-directed demonstration project.
 - The Virgin Islands Experimental Project to Stimulate Competitive Research (VI-EPSCoR) has contributed to the establishment of CaRA by assisting in informing potential stakeholders in the USVI about CaRA and CarICOOS. Several VI-EPSCoR scientists serve as CaRA Core Advisors and provide scientific representation at focused meetings (e.g., modeling). VI-EPSCoR has also agreed to provide an AWAC profiler for a stakeholder’s demonstration of the usefulness of wave and current observations in key harbor and port areas.
 - To build synergistic relations among previously uncoordinated scientists who are considering sensor deployments in the region, CaRA hosted a meeting between NOAA/SEFC, VI-EPSCoR and University of South Florida scientists.
- **Web page development:**
 - CariCOOS web page, providing links to most regional ocean data streams, products and forecasts in now available online at: <http://caricoos.org>
 - Both Spanish and English versions of CaRA’s web page can be accessed at: <http://cara.uprm.edu>



- **Education connections and products:**

- Dr. José López, University of Puerto Rico in Mayagüez, Department of Marine Sciences, is collaborating with CaRA in the area of Education & Outreach.
- Results of PRSGP “Stakeholder canvassing and assessment of observing needs for the recreational sector” were presented in the Steering Committee Meeting as a result of interviews conducted by PRSGP Personnel for CaRA. Presentation available through our web page: <http://cara.uprm.edu>
- In the Virgin Islands sub-region a listserv is used for circulating the CaRA Update newsletter and for information exchanges among stakeholders in the sub-region.
- Sea Grant/Virgin Islands Marine Advisory Service is assisting with a broadly circulated canvassing and assessment questionnaire to determine the usages of the ocean and data needs of stakeholders.
- CaRA received considerable publicity by organizing and hosting a seminar by scientists from the *Galathea* Danish ocean expedition.

- ***Other Activities:***

- As part of the agreement to collaborate with the Caribbean Regional Association’s (CaRA) effort to establish an Integrated Ocean and Coastal Observing System (IOOS) for the U.S. Caribbean Exclusive Economic Zone, PRSGP, jointly with the Interdisciplinary Center for Coastal Studies (CIEL) of the University of Puerto Rico at Mayagüez are developing a canvas and rapid assessment of the potential clientele (stakeholders) including the identification of main needs for information from an IOOS.
- January 24-26, 2007: Storm Surge and Inundation Workshop, CaRA was represented by Prof. Aurelio Mercado from the Coastal Hazard Management
- January 29, 2007: Governance Meeting in San Juan, Puerto Rico
- Feb, 2007: A beta version of CarICOOS web page is now online at <http://caricoos.org>. We also continue developing the CaRA’s web page at: <http://cara.uprm.edu> , now also in Spanish
- March 8-9, 2007 NFRA meeting in Chicago. Morell and Corredor attended.
- April 27, 2007 Steering Committee Meeting. A list of 28 attendees participated to the meeting held on Condado Plaza at San Juan, PR.
- May 18, 2007 Meeting with PRSGP Director, R. Chaparro, to discuss future canvassing target sectors
- May 24, 2007 Meeting with UPRM representatives, Dr. Aponte, Director of Marine Sciences and Dr. Orengo, Dean of Arts & Sciences to



discussed the advantages of the RA and to coordinate our next meeting with the Chancellor Dr. Jorge Iván Velez-Arocho

- May 2007 Initiating mail and e-mail correspondence with the VI Congressional Representative on her co-sponsorship of the House Bill supporting the US ocean observing initiative (HR 2337) and on NFRA's endorsement of the provisions of Senate Bill 950.
- June 18 Gulf of Mexico Observing System (GMOOS) Regional Association Education and Outreach Council Annual Meeting, Spanish Fort, Alabama. Dr. J.M. López represented CaRA at the meeting.
- June 19. Gulf of Mexico Alliance Environmental Education and Outreach Network Annual Meeting Dr. J.M. López represented CaRA at the meeting.
- June 23. Article on CaRA progress and goals authored by Corredor and Morell appeared in the Science section of the leading newspaper in Puerto Rico, El Nuevo Día.

- ***In Agenda:***

- June 6, 2007 Scientific Meeting of the Association of Marine Laboratories in the Caribbean. CaRA's presentation: *Improved Understanding Of Oceanic Processes Through An Integrated Caribbean Coastal Ocean Observing System*
- June 13-15, 2007 CaRA-VI will assist VITEMA in accommodating NWS officials in the Virgin Islands to discuss funding of tsunami preparedness and feasibility of use of NTHMP funds for an EMWIN antenna to receive ocean-observing satellite data and hazard warnings. A Power Point presentation for this occasion will be heard by the Lieutenant Governor, the Islands Administrators (mayors) of St. Croix and of St. Thomas and VI National Guard Officials.
- June 25, 2007 Briefing of Homeland Security, US Coast Guard and DPNR Enforcement officers on "Ocean Observing Systems, Security and CaRA" and discussion of their possible contributions to needed ocean observational assets.
- June 26, 2007 – Radio interview, "The Afternoon Mix", WWVI, AM 1000 KHz.
- June 28, 2007 meeting with Chancellor Dr. Jorge Iván Velez-Arocho from University of Puerto Rico at Mayagüez to provide the Chancellor with an update of progress, to assure UPRM participation in the proposed MOU and UPRM's continued support in hosting CaRA.
- July 9, 2007 -- Tourism/Hoteliers planning meeting for water quality demonstration project.
- July 13, 2007 – CaRA briefing for ports and airports managers – Port Authority, WICO Dockmaster, Magens Bay Authority.



- July 20, 2007 -- Discussions with Weatherflow™ to plan a hotel-lobby display of water quality, sailing winds and surf waves in key marine recreation areas.
- July 23, 2007 – Meeting of CaRA-Virgin Islands Core Advisors
- Sub-regional discussions of ByLaws and business plan.
- Continued identification of potential CaRA governing body leaders and officers.
- Continue refining the CaRA's business plan.
- 2nd Newsletter publication.
- To develop new products for our web page.
- CaRA Regional Meeting.
- Begin nomination process for CaRA Governing Council.

3) Scope of Work:

The scope of work for the next funding year does not depart significantly from that presented in the project proposal. Efforts will be focused in advancing the regional master development plan for infrastructure deployment, data acquisition and DMAC compliance as well as in furthering modeling and predictive capabilities in the region. Such design will incorporate priorities derived from consultation with stakeholders and recommendations from technical consultants and visiting experts. Funding for the latter is included in the project's proposal.

Further development and publication of ongoing pilot project results has been identified by the PI's as essential for fostering credibility by stakeholders and funding agencies as well.

4) Leadership Personnel:

CaRA PR Personnel

In Year 2, the following persons comprised the CaRA-PR team:

1. Julio M Morell, P. I.
2. Jorge Corredor, Co-P.I.
3. Jacqueline Rodríguez, Administrative Assistant
4. Francis Torres, Legal counsel
5. Alexis Molinares, consultant
6. José López, Education and Outreach
7. Jorge Capella, DMAC
8. Sylvia Rodriguez - CaRA Student Intern
9. André Amador – CaRA Student Intern
10. Dhalia Fuentes- CaRA Student Intern
11. Juan Gonzalez- CaRA Student Intern

CaRA VI Personnel

In Years 1 and 2, the following persons comprised the CaRA-VI team:

1. Roy A. Watlington, Co-P.I. and Sub-regional Coordinator of CaRA;



2. Elizabeth Ban, CaRA Outreach Assistant
3. Kemit Amon Lewis (Sea Grant/Virgin Islands Marine Advisor) CaRA Core Advisor,
4. Nasseer Idrisi (Biological oceanographer and modeler) CaRA Core Advisor
5. Mark Sabino (Dockmaster) CaRA Core Advisor
6. Tyler Smith, (Biological oceanographer and manager of the Virgin Islands Coral Reef Monitoring project) CaRA Core Advisor.
7. Jacqueline Heyliger (VITEMA Deputy Director) natural hazard advisor
8. *Ad hoc* consultants:
 - Judi Shimel-Freeman, for planning and logistic support in workshops and outreach;
 - James Robert Austin, for workshop facilitation.



5) Budget Analysis

A detailed analysis of funds received, funds spent and funds obligated shows that budgeted funds have proved adequate for the task of developing the RA. As previously reported, significant savings were achieved by modifying our approach to interaction with stakeholders; rather relying exclusively on large meetings as originally planned, we have opted also for a one to one format which has allowed more effective communication. These savings have been utilized for additional student intern support and support for pilot projects.

The most recent Financial Status Report submitted by our Research and Development Office covers the period from Oct 1 2006 to March 31 2007. An additional report is expected for June 30th of the current year. This former report however does not include substantial expenses incurred including sub-contracts to UVI, to the Legal Counsel and to the Consultant-Facilitator. Likewise, the report does not cover salaries drawn by PI, CoPI and other advisors.

We anticipate full use of remaining funds within the period of the grant.