

**VIRGIN ISLANDS EPSCOR
RESEARCH INFRASTRUCTURE IMPROVEMENT AWARD
ANNUAL REPORT**

A. EXECUTIVE SUMMARY

Vision

VI-EPSCoR's vision is to develop the territory's scientific capacity in support of economic development by drawing upon and strengthening the territory's physical and human resources by 1) integrating investments in capacity for marine and environmental research, policy and decision-making, education, and outreach, and 2) enhancing partnerships between researchers and policy and decision makers, educators, and the broader community—in order to address marine and environmental issues of vital importance to a healthy and sustainable future for the territory.

Brief report component descriptions and accomplishments

Research efforts

A key to developing the territory's science capacity is through stimulating research that in turn provides educational opportunities for students and faculty alike. Our current VI-EPSCoR RII grant targets a greater integrative understanding of the influences of biotic, physical and human interactions in coastal ecosystems and the oceanographic and climatic forcing functions on coral reef ecosystems.

Key Accomplishments. Over the course of the past year, our researchers have submitted 15 proposals with \$7.2 Million worth of proposed research activities. 9 of those 15 have been funded and will provide \$3.86 Million towards research targeting a range of issues from reducing sediment loads on coral reefs in the USVI, understanding the relationship between climate change and the dinoflagellates that cause ciguatera fish poisoning, and educational scholarships for future environmental leaders.

VI-EPSCoR has also completed a request for proposals for our 2009 incubator proposals and received 23 proposals that will continue to address more comprehensive research questions in the areas of biodiversity, ecology and coastal oceanography. The proposals are under review, and selection and funding of the new research projects will begin in August 2009, which will allow researchers and students to begin their research at the start of the fall semester of the 2009-2010 academic year.

Planning is underway for improvements of the sea table system at the MacLean Marine Science Center on St. Thomas. These improvements include installing new seawater tables close to the land-sea interface, upgrading the security of the area, and repositioning seawater intake pipes. We are currently working to resolve Coastal Zone Management permitting requirements. Once permitting requirements are met, renovations will begin; we expect to have the work done by the end of 2009.

Development of a new Environmental Analysis lab and a new Spatial Analysis and Statistics lab are being resourced through EPSCoR funds for equipment and use of indirect cost monies to support renovations costs. Space for the facilities has been committed by the University. We are currently preparing an RFQ for renovations of the Environmental Analysis lab and expect renovations to be complete by December 2009.

Renovations for the Spatial Analysis and Statistics lab will begin as soon as the space is vacated (by the end of 2009). In the meanwhile, we have completed an assessment of requirements for the

establishment of a project data repository. The recommendations are being used to implement a network accessible storage system and GIS server, expected to be complete by January 2010.

Applications for two CMES research faculty positions are under review, with an expected start date of August 2009. Three technical positions are also being recruited, and expected to start by September 2009. These positions include a boat and facilities technician, an ecology lab technician, and a spatial analysis lab technician.

Diversity and Workforce Development

The US Virgin Islands is unique among EPSCoR jurisdictions, in that 89% of US Virgin Islands residents are non-white. The Virgin Islands EPSCoR program is housed at a member of the Historically Black Colleges and Universities (HBCUs), the University of the Virgin Islands. At the University, minority students make up 77% of the students in the Division of Science and Mathematics, and 75% of the Division's students are women. Expanding a diverse and well-trained technical workforce in the territory is critical to the goals and vision of VI-EPSCoR.

Key Accomplishments. VI-EPSCoR was able to recruit Dr. Kim Waddell as the new VI-EPSCoR Program Liaison for research and educational outreach, including activities to strengthen K-18 science and math education. Mr. Nicolas Drayton was recruited as VI-EPSCoR Program Coordinator; his responsibilities also include educational outreach. A faculty recruitment and retention plan was submitted to the NSF EPSCoR office in March 2009 along with the VI-EPSCoR strategic plan. In the first year of the new grant VI-EPSCoR participated in three successful proposals to strengthen K-18 STEM education. The Virgin Islands received a \$300,000 two-year MSP-Start proposal to strengthen K-12 STEM education, in a partnership between the University of the Virgin Islands and the VI Department of Education with VI-EPSCoR playing a facilitating role. UVI was awarded an S-STEM award for \$276,000 over four years to enable underrepresented students in the MMES program to succeed and advance into environmental leadership roles. VI-EPSCoR also received a \$55,000 grant from the Lana Vento Charitable Trust including a \$10,000 MMES student research support fund. In the past year we graduated 5 masters students from the MMAT (4) and MMES (1) program (with two additional MMES students expected to complete their degree requirements by the end of the summer). We have also successfully recruited and hired Dr. Anthony D'Andrea as the permanent MMES coordinator who will begin in August 2009. Meanwhile, the interim coordinator has successfully recruited a strong new cohort of 12 students who will start their studies this fall. The NSF S-STEM award of \$276,000, mentioned above, enhanced funding support for these incoming MMES students. VI EPSCoR has prepared an annual budget for our "Visiting Scholar" program for the 2009-2010 academic year and have extended an invitation to a researcher with expertise in environmental geosciences that we anticipate will support our research thrusts and facilitate collaborations with our faculty here at UVI.

Cyberinfrastructure

VI-EPSCoR has worked with UVI Information Technology Services (ITS) on infrastructure investments to strengthen the university environment for research. VI-EPSCoR goals for cyberinfrastructure improvements at UVI include establishing the necessary cyberinfrastructure to support marine and environmental research, policy and decision-making, education, and outreach activities.

Key Accomplishments. VI-EPSCoR and UVI are sharing the costs of new inter-island microwaves between UVI's two campuses, as one of the final steps to deploying full broadband and Internet2 on both campuses. Because of the economic downturn, a contribution from the Foundation of the University of the Virgin Islands has been delayed, slowing acquisition of the microwaves. In the meanwhile, new equipment was purchased for both campuses to provide redundancy to the University's Internet routers and to allow peering between each of the Internet providers and the UVI microwave. Internet2 service is now fully operational on the St. Croix campus. New maintenance on

the existing microwave significantly increased its current capacity, and routing changes were made so that the St. Thomas campus could access Internet2 via the microwave, as well as via a 45 mb Internet pipe to the St. Thomas campus that carries Internet2 traffic and additional commodity Internet. A network engineer has been recruited to lead deployment of the new microwave system expected to be complete by July 2010.

Outreach and Communication

VI-EPSCoR goal with outreach and communications is to strengthen partnerships between researchers, decision-makers, educators, and the public, to address local and regional marine and environmental issues activities.

Key Accomplishments. As mentioned earlier, Dr. Kim Waddell was recruited to lead VI-EPSCoR research and educational outreach, including development of community research partnerships. Mr. Nicolas Drayton was recruited as VI-EPSCoR Program Coordinator; his responsibilities include public awareness, education, and outreach. VI-EPSCoR is collaborating with Alaska EPSCoR in developing a tropical version of their very successful ***“Living on Earth, the NSF EPSCoR Social-Ecological Systems (SES) Workshop”***. The purpose of the workshop will be to bring together researchers from the USVI, the nation and the region to share information on the current state of integrated and interdisciplinary research addressing social-ecological systems, with coral reefs and associated systems as the areas of primary focus. VI-EPSCoR has also partnered with the UVI’s Seagrass Outreach Program (formerly the Virgin Islands Marine Advisory Service –VIMAS) in the printing of ***“Waves of Change: A Resource for Sustainable Development Solutions in the US Virgin Islands”***. This reference document represents the collaborative efforts of dedicated environmental professionals in government, education, marine biology, conservation, and resource management across the USVI, and features nine environmental topics that are of particular relevance locally. ***Waves of Change*** is a collection of briefing statements that provides information on some of the important environmental issues affecting the Territory. Launch issues of the 500 copies of “Waves of Change” will be formally presented to the members of the VI senate at a reception in July of this year. The remainder will be distributed as a teaching and information resource to MMES students, V.I. libraries, local NGO partners, legislators, Government Department heads, fishermen, boat operators and the Virgin Islands Network of Environmental Educators (VINE). VI-EPSCoR, along with the NOAA Restoration Center and the Gulf of Mexico Foundation, and UVI Center for Marine and Environmental Studies co-sponsored a one-day Coastal Habitat Restoration Workshop to discuss the various resources available for coastal habitat restoration projects in the USVI. The workshop had approximately 50 individuals registered, and provided an overview and discussion of regional coastal restoration priorities and strategies. It is expected that one of the workshop products will be a list of research and conservation priorities for the USVI. In another outreach effort VI-EPSCoR was asked to give a presentation on the importance of marine and coastal research and its relevance to education and management at the official inauguration of the territory’s first marine park—St. Croix’s East End Marine Park.

Management Structure

The VI-EPSCoR management structure consists of the Project Management Team, a Governing Committee with territory-wide representation, a Research Advisory Board for the thrust on Biocomplexity of Caribbean Coral Reefs, and an Education Advisory Board for K-12 STEM education.

Evaluation and Assessment

Barbara Kimbell Consulting and Minnick and Associates were brought on as the VI-EPSCoR evaluation and assessment team this past year.

Key accomplishments. The evaluation team familiarized themselves with the VI-EPSCoR program and prepared for a strategic planning session that was held in November 2008. Kimbell and Minnick followed up with a review of the meeting proceedings via email and phone conversations with VI EPSCoR staff. With their guidance, improvements to the overall research infrastructure, especially in terms of intellectual resources and facilities, have facilitated the development of new programs, significant research projects, and valuable partnerships. Progress within the ICCE research thrust has been significant, especially considering that UVI is primarily a teaching institution.

Intellectual Merit

Improvements to the overall research infrastructure, especially in terms of intellectual resources and facilities, have facilitated the development of new programs, significant research projects, and valuable partnerships. Progress within the ICCE research thrust has been significant, especially when one considers that UVI is primarily a teaching institution. Some key research results to date include significant progress in understanding coral reef function under variable levels of stress, evaluating the role of marine protected areas in rebuilding commercially important grouper populations, and identifying linkages between biological patterns and oceanographic processes that enhance predictability and management of fishery resources.

Broader Impacts

The ICCE program of research has built a foundation for greater research competitiveness in the Virgin Islands in marine and environmental sciences that will provide scientific support to local decision-makers in natural resource management. The VI-EPSCoR program supported training in STEM disciplines for students, many of whom are under-represented minorities and women, at both the undergraduate and graduate level. VI-EPSCoR developed the first two STEM graduate programs at UVI and created significant research opportunities for UVI faculty and undergraduates.

Personnel Challenges

VI-EPSCoR has faced personnel challenges in the first year of the new RII grant. Dr. Whitaker, the PI/PI, underwent medical treatment between January and August 2009 that greatly limited the level of effort she could provide. Dr. Nemeth, the co-PI for the ICCE research thrust and CMES Director, was on sabbatical from September 2008 to August 2009. Dr. Idrisi was Acting CMES Director during his sabbatical and led the ICCE research thrust, as well as covering some of Dr. Whitaker's responsibilities. Two key VI-EPSCoR administrative positions (Program Administrator and Program Coordinator) were vacant at the beginning of the new grant. Mr. Drayton, the new Program Coordinator, was hired as of March 2009. Dr. Waddell, the new Program Liaison for research and educational outreach, was serving as MMES Coordinator for spring term 2009, and begins his new duties as Program Liaison on 1 August 2009.

Despite the best efforts of all concerned, the shortage of key administrative personnel slowed progress in the first year. However, with Drayton and Waddell in place now, and Whitaker and Nemeth fully returned by the end of year 1, we expect to make much greater progress as we enter year 2 of the grant.

B. DETAILED REPORT

B.1. RII PARTICIPANTS AND PARTICIPATING INSTITUTIONS

Participating Institution: University of the Virgin Islands

Participant information may be found in FastLane and Appendix B.

B.2. PROGRAM/PROJECT DESCRIPTION

B.2.1. RESEARCH ACCOMPLISHMENTS: INTEGRATED CARIBBEAN COASTAL ECOSYSTEMS

Goal: The overall goal of the Integrated Caribbean Coastal Ecosystems (ICCE) program is to develop a fully integrated program that crosses physical, biological, and social sciences as the means to understand patterns and processes in tropical island systems. Spatial analysis and statistics and cyberinfrastructure are important services to support ICCE.

The ICCE research thrust includes three research platforms: Evolutionary and Ecological Patterns and Processes, Ocean and Coastal Processes, and Environmental Analysis and Management.

B.2.1.i. Evolutionary and Ecological Patterns and Processes

Goal: Build nationally competitive research capacity in evolutionary and ecological patterns and processes that is integrated with oceanographic patterns and processes, social sciences, and management issues and implications.

People

Build collaborative research team. Develop partnerships with other institutions that provide necessary expertise/data. VI-EPSCoR is currently in the process of recruiting a faculty member in Marine Biology to be part of the ICCE team. Collaborations have been strengthened between UVI and other institutions through memorandums of understanding, specifically with Woods Hole Oceanographic Institute and the Rosenstiel School for Marine and Atmospheric Science at the University of Miami. Another MOU is being finalized between UVI and the USGS Earth Resources Observation and Science Center. The collaboration with the NOAA Biogeography Program has been renewed for this upcoming year. Several proposals have been submitted with these partner organizations that include a NSF BIO OCE proposal submitted on 2/15/2009 on Elkhorn Coral disease meta-population modeling, a CAMEO proposal submitted to NOAA on 2/4/2008, and an Ocean Exploration proposal submitted to NOAA on 10/21/2008. These proposals include graduate student research assistantships to support the MMES graduate program.

Facilities

Upgrade ecology research facilities and technical staff. VI-EPSCoR is in the process of recruiting an ecology lab technician. Plans to upgrade ecology lab seawater systems are currently being developed. Once required permits are obtained, renovations are expected to begin in September 2009. Six researchers underwent (June 7-11, 2009) training in Tri-mix SCUBA for extended deep dives. One 17' boat has been purchased for near-shore research in October 2008.

Tools

Develop observational networks, data collection, and modeling tools. The established

monitoring program is on-going within the territorial waters of the US Virgin Islands to characterize the coral reef fauna and flora. Extensive mapping of the benthic habitat has taken place as a collaborative effort between NOAA and UVI scientists in March 2009 to characterize the benthic habitat extending from Puerto Rico to St. Thomas. CaRA-IOOS is in the process of setting up an environmental network that encompasses St. Thomas and St. John at this stage to collect meteorological data as well as input to models for waves and weather prediction.

Management

Identify areas of high biological diversity and develop management strategies (i.e., MPA networks) to enhance sustainability of coral reefs. Linked to B.2.5. Outreach and Communication. Discussions have begun with VI Department of Fish and Wildlife and the National Marine Fisheries Service to secure funding to begin extensive surveys for invasive lionfish, including a proposal submitted for VI-EPSCoR incubator funding.

B.2.1.ii. Ocean and Coastal Processes

Goal: Build nationally competitive research capacity in ocean and coastal processes relevant to evolutionary and ecological patterns and processes, social sciences, and management issues and implications.

People

Build collaborative interdisciplinary research team that integrates research through the land-sea gradient. Increase research capacity through faculty and technical staff new hires. Develop partnerships with agencies and institutions that provide necessary expertise/data. Target relevant granting agencies for future funding. VI-EPSCoR is currently in the process of recruiting a faculty member in Physical Oceanography to be part of the ICCE team. Collaborations have been strengthened between UVI and other institutions through memorandums of understanding, specifically with Woods Hole Oceanographic Institute and the Rosenstiel School for Marine and Atmospheric Science at the University of Miami. Another MOU is being finalized between UVI and the USGS Earth Resources Observation and Science Center. The collaboration with the NOAA Biogeography Program has been renewed for this upcoming year. Several proposals have been submitted with these partner organizations that include a NSF BIO OCE proposal submitted on 2/15/2009 on Elkhorn Coral disease meta-population modeling, a CAMEO proposal submitted to NOAA on 2/4/2008, and an Ocean Exploration proposal submitted to NOAA on 10/21/2008. These proposals include graduate student research assistantships to support the MMES graduate program.

Facilities

Upgrade oceanographic research facilities. VI-EPSCoR is in the process of recruiting an IT staff technician. New computer servers are currently being purchased for ocean model simulations as well as data services such as THREDDS.

Tools

Develop observational networks, data collection, and modeling tools coordinated with the Caribbean Integrated Coastal Ocean Observing System (CarlCOOS) program. The established monitoring program is on-going within the territorial waters of the US Virgin Islands to characterize the coral reef fauna and flora. Extensive mapping of the benthic habitat has taken place as a collaborative effort between NOAA and UVI scientists in March, 2009 to characterize the benthic habitat extending from Puerto Rico to St. Thomas. CaRA-IOOS is in the process of setting up an environmental network that encompasses St. Thomas and St. John at this stage to collect meteorological data as well as

input to models for waves and weather prediction.

Management

Establish community partnerships to link research with policy and decision-making, education, and outreach. Linked to B.2.5. Outreach and Communication.

B.2.1.iii. Environmental Analysis and Management

Goal: Promote scientific and societal discovery by carrying out nationally competitive collaborative capacity building in environmental analysis and management by integrating physical, biological and social scientific research within tropical island systems.

People

Build collaborative research team. Hire faculty. Enhance partnership with the International Institute for Tropical Forestry (IITF) and USDA Forest Service in Puerto Rico by co-authoring proposal to investigate scale-dependent nutrient fluxes (e.g., patterns and processes) along a gradient of island size. Establish collaborations and partnerships with academic institutions, national, and local agencies. Establish partnerships with academic socio-economic research teams. Recruitment of faculty within the Environmental Analysis and Management platform will commence in the start of Year 2 of the current grant. During this time development of research plans and building of the research team will take place.

Facilities

Build an analytical laboratory to perform nutrient and elemental analytical techniques; move toward EPA accreditation/certification for laboratory. Hire staff for laboratory. Although the process has been slow, VI-EPSCoR has received a commitment from UVI for laboratory space to be used for the Environmental Resource Laboratory. Materials and supplies for the laboratory have been ordered at this time.

Management

Establish community partnerships to link research with policy and decision-making, education, and outreach. Linked to B.2.5. Outreach and Communication.

B.2.1.iv. Spatial Analysis and Statistics

Goal: Establish infrastructure for spatial analysis and statistics to support marine and terrestrial environmental research, policy and decision-making, education, and outreach activities.

People

Build collaborative team of GIS and statistical specialists. A staffing plan is being finalized for the Spatial Analysis and Statistics component; in the interim, the VI-EPSCoR Director, ICCE co-PI, and NOAA Resident Scientist are managing its development. As of June an SAS lab technician was being recruited, with expected start date of August. Two new faculty with GIS skills are expected to contribute both to the ICCE research thrust and the MMES program -- the new Natural Resource Management faculty (a geographer) and the new MMES program coordinator. VI-EPSCoR provided funding for coursework in Experimental Design and Biometry for a DSM faculty in mathematics; he is

also expected to contribute to the research thrust and the MMES program upon his return from sabbatical.

Facilities

Upgrade spatial analysis and statistics facilities and technical staff. VI-EPSCoR funded an assessment of requirements for the establishment of a project data repository. The recommendations are being used to finalize staffing plans and implement a network accessible storage system and GIS server, expected to be complete by January 2010. Spatial Analysis and Statistics lab renovations have been delayed due to difficulties in obtaining on-campus space; a commitment of space has now been obtained, and renovations are expected to begin by December 2009.

Management

Establish community partnerships to link research with policy and decision-making, education, and outreach. Linked to B.2.5. Outreach and Communication.

B.2.2. DIVERSITY AND BROADENING PARTICIPATION, INCLUDING INSTITUTIONAL COLLABORATIONS

B.2.2.i. Broadening Participation

The US Virgin Islands is unique among EPSCoR jurisdictions, in that 89% of US Virgin Islands residents are non-white. The Virgin Islands EPSCoR program is the only EPSCoR program to be housed at a member of the Historically Black Colleges and Universities (HBCUs), the University of the Virgin Islands. At the University, minority students make up 77% of the students in the Division of Science and Mathematics, and 75% of the Division's students are women. The University and VI-EPSCoR are committed to increasing the participation of nationally-underrepresented minorities in STEM research and education through investments in the University's STEM research and education programs.

The VI-EPSCoR Leadership Team in the grant is 50% African-American, 50% White; 25% female, 75% male. Faculty participants are 20% African-American, 80% White; 20% female, 80% male. Staff participants are 83% African-American, 17% White; 67% female, 33% male. Advisory Board members are 53% African-American, 47% White; 44% female, 56% male. See Appendix B for more details.

VI-EPSCoR education investments are strengthening STEM education in the territory and creating a pipeline of young Virgin Islanders entering the fields of marine and environmental science. In the first grant, VI-EPSCoR had three major achievements:

- Creation of a master's degree at UVI in marine and environmental science (MMES), as the cornerstone for training Virgin Islanders in marine and environmental science and natural resource management.
- Partnering with other NSF and NIH institutional strengthening programs at the University to strengthen undergraduate STEM education through enhancement of undergraduate research opportunities, particularly in marine and environmental science.
- Partnering with the University and the Department of Education to strengthen K-12 STEM education, through development of an Education Advisory Board for K-12 STEM education, and creation of a master's degree program in mathematics for secondary math teachers (MMAT).

New opportunities have arisen to strengthen STEM education at the K-12 and the university levels as a result of the new graduate programs. As MMES students assume new roles as Teaching and Research Assistants, VI-EPSCoR, MMES, the Division of Science and Mathematics, and the Emerging Caribbean Scientists program are partnering to create a new model of peer mentoring in the classroom and the research laboratory. The purpose of this initiative is to strengthen recruitment and retention of students from underrepresented populations in STEM disciplines at the undergraduate and graduate levels.

Strengthening the new graduate program in marine and environmental science

The first cohort in the new Master of Marine and Environmental Science (MMES) program began in August 2007 and the program had its first graduate in May 2009 with two more scheduled to defend their theses by the end of summer 2009. Continued support from NSF EPSCoR is critical to seeing this exciting new program mature to a point of stability, financial sustainability, and significant impact locally and regionally. We have successfully recruited and hired a permanent MMES Coordinator who will begin in August 2009. Meanwhile, the interim coordinator has successfully recruited a strong new cohort of students who will start their studies this fall. VI-EPSCoR has already begun working with the MMES program to develop new student fellowship and internship programs, student exchange and visiting scholar partnerships with other universities, and new opportunities for participation of UVI undergraduates, K-12 teachers and students, and regional students.

The first two cohorts of graduate Teaching and Research Assistants at UVI, MMES students have been strengthening undergraduate STEM education and providing much needed support for faculty research. These cohorts of students have received funding support from a mixture of Teaching and Research Assistantships, fellowships from agency employers, and local donors, and this upcoming year the program's support for the students will be further strengthened with a recent award of an NSF S-STEM grant of \$276,000. The MMES Coordinator will seek support from NSF GK-12 and other programs, as well as foundations. A summer internship program is also being developed to link MMES graduate students with potential employers in territorial and federal agencies and NGO's.

MMES has partnered with graduate programs at other universities to broaden its educational offerings, particularly in natural resource management, and to create linkages for advanced graduate work. For a third consecutive year, Yale University's Dr. Gabe Benoit has brought a class of graduate students down to UVI for an intensive short course on island hydrology and our MMES students interacted extensively with this visiting group. This came about as part of a partnership UVI's CMES has with Yale University's School of Forestry and Environmental Studies to offer student exchange and visiting scholar opportunities. VI-EPSCoR has developed a budget and extended an invitation to a well-known minority researcher in environmental geography from the University of South Carolina to serve as a visiting scholar and guest lecturer in the graduate program.

Strengthening UVI STEM education

A key driving force behind the first grant was the University's commitment to strengthening undergraduate STEM education by augmenting classroom learning with research opportunities for students and faculty. Prior to the first VI-EPSCoR grant, few teaching faculty had direct experience with research, and because few faculty were engaged in research, few UVI students had opportunities for hands-on laboratory or field research. As a result of VI-EPSCoR, 13 teaching faculty and 45 undergraduates became involved in research, with undergraduates supported from a combination of VI-EPSCoR incubator funds and other federal grants, including the National Institutes of Health Minority Biomedical Research Support-Research Initiative for Scientific Enhancement and Minority Access to Research Careers. Numbers are not yet available for the new RII grant, because the first incubator proposals are currently under review.

Programmatic Collaborations

VI-EPSCoR is collaborating with other federally funded programs to strengthen undergraduate research opportunities in STEM disciplines. 46 UVI undergraduate researchers participated in VI-EPSCoR incubator projects in the first grant, many of them funded by other federal grants, including the National Institutes of Health Minority Biomedical Research Support-Research Initiative for Scientific Enhancement and Minority Access to Research Centers. The advent of the new graduate program in marine and environmental science presents an exciting opportunity to link UVI graduate students with undergraduates in a peer mentoring model designed to attract students from underrepresented groups to careers in marine and environmental science.

In response to an identified need arising from a reverse site visit in 2007, VI-EPSCoR will work with the Emerging Caribbean Scientists program at UVI to strengthen linkages to NSF and other programs focused on increasing diversity of STEM students and faculty. Among the programs of particular relevance are:

- **AGEP.** UVI receives funding under the AGEP program through the University of Florida's SEAGEP grant.
- **LSAMP.** UVI intends to submit a proposal to LSAMP in Fall 2009.
- **ADVANCE.** UVI is eligible to receive funding from the NSF ADVANCE program. Given UVI's STEM student demographics, and given that UVI is receiving generous funding from the NIH MARC and MBRS-RISE programs, there are no immediate plans to pursue ADVANCE funding.
- **CREST.** UVI does not currently have doctoral programs, so it is not eligible to apply for CREST funding either as a Center or under the HBCU-RISE program.
- **HBCU-UP.** UVI has a very active program funded by the NSF HBCU-UP program. This is part of UVI's Emerging Caribbean Scientist alliance, and VI-EPSCoR works closely with the program.

As mentioned elsewhere, UVI also receives generous support through the MARC and MBRS-RISE programs at NIH. Students participating in these programs have numerous opportunities to participate in research related to ICCE. VI-EPSCoR works closely with the coordinators of these programs to maximize undergraduate research opportunities, especially for students from underrepresented groups.

B.2.2.ii. Institutional Collaborations

The Virgin Islands has only one institution of higher learning, the University of the Virgin Islands, which houses the Virgin Islands EPSCoR program. The University has been a primarily undergraduate teaching institution; in the first grant, VI-EPSCoR funded the development of a new UVI master's degree in marine and environmental science. The development of strong collaborations between UVI and external research universities, marine labs, federal agencies, etc. is vital to strengthening the Territory's research and teaching capacity. Equally important are strengthened partnerships between UVI and other territorial institutions involved in research and management activities related to VI-EPSCoR's research, education, and outreach focus on marine and environmental science.

VI-EPSCoR encouragement and support of UVI faculty has facilitated new collaborations with external researchers, and established stronger partnerships with federal and territorial resource management agencies. VI-EPSCoR investments in the first RII grant created new opportunities for external collaborations. At the end of the first RII grant, VI-EPSCoR researchers had 84 collaborators from 39 different institutions. Institutional ties had been established with 29 academic research organizations, including two Hispanic-serving institutions (Univ. Miami and Univ. Puerto Rico, Mayaguez) and two Tribal / Native Hawaiian-serving institutions (Univ. Hawaii and Univ. Guam). VI-EPSCoR researchers were collaborating with two national labs (Pacific Northwest National Lab and the Smithsonian) and three federal agencies (Dept. Energy, NOAA, and USGS), as well as two territorial agencies (V.I.

Dept. of Planning and Natural Resources and V.I. Territorial Office of Emergency Management), and one industry group (Weber Research). Three collaborations were established with international partners (Geological Survey of Denmark and Greenland, Univ. Hong Kong, and Univ. South Pacific-Fiji) and one with a regional entity (Caribbean Regional Association-Coastal Ocean Observing System (CaRA-COOS)).

Major research partners include National Oceanographic and Atmospheric Administration (eight collaborators), US Geological Survey (three collaborators), Univ. Hawaii (four collaborators), Univ. Miami's Rosenstiel School of Marine and Atmospheric Science (eight collaborators), Univ. Puerto Rico, Mayaguez (eleven collaborators), Woods Hole Oceanographic Institution (five collaborators), Yale (two collaborators), and Caribbean Regional Association-Coastal Ocean Observing System (eleven collaborators). This interest in partnering with UVI on new research initiatives has resulted in several multi-year cooperative agreements being drafted with Univ. Miami, USGS, DPNR, NOAA, WHOI, and Yale, and the placement of a NOAA research scientist at UVI.

This past year the CMES/VI –EPSCoR team met with the British Virgin islands (BVI) Permanent Secretary of the Ministry of Natural Resources, his staff, and representatives of the Conservation and Fisheries Department and the BVI National Parks Trust to discuss initiatives and opportunities for cross-boundary collaboration and data sharing. CMES's Dr. Nasseer Idrisi gave a short presentation on some of the modeling tools we have been working on at UVI. The team also discussed the **Living Oceans Foundation** Expedition initiative, and had some discussion on ways in which the BVI might partner with UVI and EPSCoR to identify trans-boundary research priorities for the Living Oceans Foundation. Potential opportunities for H. Lavity Stoutt Community College / UVI student and faculty collaborations were also explored. Data types that have already been shared with the BVI, include NOAA data products to help assess threats to the marine environment from our changing climate, specifically, climate data from 22 stations in the USVI providing monthly data from 1931 to 2009. Some plotted Sea Surface temperature (SST) from the NOAA Center for Coastal Monitoring and Assessment showing sea surface temperature anomalies since 1985 and maps showing predicted changes in Aragonite concentrations since 1980s were also shared. The issue of our collaborative approach to addressing climate change in the Virgin Islands is being considered as an agenda item for the BVI/USVI Inter-Virgin Islands Council. We are hopeful that by having the heads of our respective governments formally agree to the exchange of information and initiation of new collaborations, it will give the issue of climate change in the US and British Virgin islands (in reality, a single ecological system) the focus and attention it deserves.

VI EPSCoR has prepared an annual budget for our "Visiting Scholar" program for the 2009-2010 academic year and have extended an invitation to a researcher with expertise in environmental geosciences that we anticipate will support our research thrusts and facilitate collaborations with our faculty here at UVI.

B.2.3. WORKFORCE DEVELOPMENT

Goal: Build the pipeline of young Virgin Islanders in marine and environmental science by strengthening research skills and intellectual development of Virgin Islands teachers and students (K–12, undergraduate, and graduate).

People

Partner with USVI Department of Education and the UVI Divisions of Education and Science and Math to strengthen K-12 STEM education. Enable underrepresented students in marine and environmental science to succeed and advance. Facilitate class and / or school visits by science celebrities to "share the awe and wonder of their chosen careers". Work with UVI to

expand and strengthen “bridge” programs that facilitate transition of underrepresented students from high school to college and from undergraduate to graduate programs.

Dr. Kim Waddell was recruited to lead VI-EPSCoR research and educational outreach, including activities to strengthen K-18 science and math education. Mr. Nicolas Drayton was recruited as VI-EPSCoR Program Coordinator; his responsibilities also include educational outreach. A faculty recruitment and retention plan was submitted to the NSF EPSCoR office in March 2009 along with the VI-EPSCoR strategic plan. In the first year of the new grant VI-EPSCoR participated in three successful proposals to strengthen K-18 STEM education. The Virgin Islands received a \$300,000 two-year MSP-Start proposal to strengthen K-12 STEM education, in a partnership between the University of the Virgin Islands and the VI Department of Education with VI-EPSCoR playing a facilitating role. UVI has received an S-STEM award (\$276,000 over four years) to enable underrepresented students in the MMES program to succeed and advance towards environmental leadership opportunities. VI-EPSCoR also received a \$55,000 grant from the Lana Vento Charitable Trust including a \$10,000 MMES student research support fund.

A draft background and plan of action document has been developed for recruiting science and technology celebrities. Schools will be given the option of hosting the celebrity of their choice, or participating in a “rally” type of event where they will share the experience with other schools at a central location. We have made initial contact with a number of potential presenters who have confirmed their interest in being a part of our science celebrity tour. These include local celebrities, Andre Webber (Submarine Pilot, Atlantis Submarine), Dr. LaVerne Ragster (President, UVI), Dr. Caroline Rogers (Coral Reef Ecologist), and Dr. Cecil Jennings (V.I. Native, Fisheries Biologist, Univ. Georgia). National celebrities include Dr. David Guggenheim (Deep Sea Explorer - “Ocean Doctor”) and Dr. Peter Schultz (Fiber optics co-inventor).

We have initiated plans to offer free, Science Summer Bridge programs on the St. Thomas campus of UVI. This program will be targeted at 12th grade students planning to enter UVI in the fall. It will be designed to enhance the preparedness of college-bound students who are interested in pursuing careers in science. University professors will be teaching these courses. Students will also participate in field trips and receive an orientation to university life and services.

Tools

Provide UVI faculty with additional marine and environmental science curriculum and courses.

VI-EPSCoR has been actively involved in the recruitment of new faculty for the MMES program. VI-EPSCoR has hired a new Coordinator for the MMES program, Dr. Anthony D’Andrea. Dr. D’Andrea, as a visiting professor this past academic year taught in the MMES program and has a sound understanding of the needs, opportunities and goals of the program. We are also finalizing the hire of the Natural Resource Management (NRM) faculty member who will assume the teaching of the existing NRM graduate course and will be teaching an elective course tentatively titled “Environmental Science Communications” that will be an intensive writing and literature review course designed to introduce students to the range of literature and communication methods that can effectively reach diverse audiences. VI-EPSCoR has committed support to our new hire for further course development in a concerted effort to develop the NRM track of the MMES program. With our anticipated visiting scholar program, we also expect to have at least one additional course offering for our students in the upcoming 2009-2010 academic year. With our new hire and the visiting scholar, we expect to create opportunities to team-teach new courses and expand themes within existing courses for our current UVI faculty.

R&D Capacity

Support exposure of young Virgin Islanders to national and international peer-appropriate science fairs / forums / competitions. Provide opportunities for K-18 teachers and students to engage in marine and environmental research. Develop breadth and financial sustainability of

MMES program. Incorporate professional development opportunities within undergraduate curricula and MMES program that prepares students for careers in the environmental and marine sciences. This past year, VI-EPSCoR was able to sponsor a science team from Central High School in St. Croix by sending them to the “Science Olympiad” national tournament. The Science Olympiad 2009 was held in Atlanta, Georgia at Emory University on April 4th 2009. It is an annual event that promotes higher-level thinking in science and engineering. Students are required to build projects and investigate organisms with their hands and manipulate and utilize materials. They also solve problems using pragmatic and novel approaches. For the first time in history, a USVI High School participated in the Science Olympiad as guests. Five students from 9th to 11th grade at the St. Croix Central High School participated - three girls and two boys, comprising 2 African Americans, 2 Hispanic/Latinos, and one Middle Eastern student. At the Olympiad, the USVI students competed with peers from Atlanta, making their way to the semifinals and outperforming some of the more experienced teams in their debut involvement.

Experiences like these, help VI students to foster a sense of “yes we can” in the fields of science, technology and engineering, and will ultimately help to promote intellectualism in our territory's schools. The ultimate objective in this initiative is to establish a regional competition in the Virgin Islands among the elementary, middle and secondary schools in the territory, with the winners qualifying to participate in the national competition on the mainland. Central High School and the University of the Virgin Islands have now taken an elevated interest in the Science Olympiad. The director of the Science Olympiad was very supportive and is expecting the Virgin Islands to establish a territory-wide competition. The promise of the Virgin Islands participation as a regional competitor in the National Science Olympiad will contribute tremendously towards a higher standard of appreciation of science, mathematics and engineering in our education system. It will be a rewarding and progressive academic accomplishment, made real by VI-EPSCoR's support of the initiative.

As mentioned earlier, we are expecting to host VI-EPSCoR's first visiting scholar this fall that will expand research opportunities for our MMES students and faculty alike. VI-EPSCoR was also pleased to help sponsor the travel expenses for two of our MMES students this summer. Christine Settar, who is also the first graduate of the MMES program, was able to present a poster of her thesis research at the AMLC (Association of Marine Laboratories of the Caribbean) annual meeting in Dominica in May. Our other student, Eddie Parish, won a NSF fellowship to take a short course in advanced Phycology at the Pan American Advanced Studies Institute (part of the Smithsonian Tropical Research Institute) in Panama this summer. VI-EPSCoR, along with UVI's Division of Science and Mathematics and the Office of the President of UVI, provided travel support for Mr. Parish.

Management

Establish community partnerships to link research with policy and decision-making, education, and outreach. Linked to B.2.5. Outreach and Communication - see the description of the one-day Coastal Habitat Restoration Workshop co-sponsored by VI-EPSCoR, the NOAA Restoration Center and the Gulf of Mexico Foundation, and UVI Center for Marine and Environmental Studies, to discuss the various resources available for coastal habitat restoration projects in the USVI.

B.2.4. CYBERINFRASTRUCTURE

Goal: Establish the necessary cyberinfrastructure to support marine and environmental research, policy and decision-making, education, and outreach activities.

People

Develop technical support structure for management and storage of project data. Establish partnerships to guide local and regional information sharing. The VI-EPSCoR-funded position of network engineer was opened in December 2008. An applicant was hired on a temporary contract in February 2009 for three months. UVI Information and Technology Services is currently in the process of working with the UVI Research and Technology Park (RTPark) to meet the ongoing salary requirements of the temporary employee. By sharing the engineer with the RTPark, UVI will be able to have access to the position beyond the current VI-EPSCoR funding. Negotiations are in process and expected to be complete by September 2009.

Funding for coordination of cyberinfrastructure investments supported an external assessment of requirements for the establishment of the project data repository, including user needs and system requirements specifications. The assessment was conducted by the Council for Information and Planning Alternatives, Inc.

Facilities

Develop cyberinfrastructure for broadband connectivity and Internet2 at UVI and partner institutions. UVI is in the final stage of connection Internet2 to the St Croix campus. New equipment was purchased for both campuses (via VI-EPSCoR) to provide redundancy to the University's Internet routers and to allow peering between each of the Internet providers and the UVI microwave – including Internet2. Deployment was completed in May 2009. In June, microwave technicians are scheduled to be on campus to perform maintenance on the UVI microwave that will significantly increase its current capacity. Routing changes will be made so that the St. Thomas campus will be able to access Internet2 via the Inter-island microwave by August 2009. In addition the RTPark, on behalf of the University, is negotiating with CHOICE Communications to provide at least a 45 mb Internet pipe to the STT campus that will carry Internet2 traffic and additional commodity Internet. It is expected that this will be implemented by September 2009. The new inter-island microwave system will be purchased by January 2010; deployment should be complete by July 2010.

Tools

Create environmental web portal for data sharing. Develop web resources to support data sharing for integrated research, policy and decision-making, education, and outreach. The VI-EPSCoR-funded external assessment of requirements for the establishment of a project data repository provided the planning for implementation of a network accessible storage system expected to be in place by January 2010. An initial plan for the new environmental web portal is under development as part of on-going revisions to the VI-EPSCoR website, and will be complete by August 2009. UVI Information and Technology Services is pursuing a million dollar grant through CampusEAI to fund the implementation of a university web portal. The portal will provide one stop access for most University technology services including the environmental web portal. The grant, if awarded, would provide hardware, software, project management and technical skills for the full implementation.

Management

Establish community partnerships to link research with policy and decision-making, education, and outreach. Linked to B.2.5. Outreach and Communication.

B.2.5. OUTREACH AND COMMUNICATION

Goal: Strengthen partnerships between researchers, decision-makers, educators, and the public, to address local and regional marine and environmental issues activities.

People

Recruit Partnerships and Outreach coordinator. Recruit Natural Resource Management faculty. Dr. Kim Waddell was recruited to lead VI-EPSCoR research and educational outreach, including development of community research partnerships. Mr. Nicolas Drayton was recruited as VI-EPSCoR Program Coordinator; his responsibilities include public awareness, education, and outreach. As mentioned earlier, we have successfully recruited a new faculty member for the position in Natural Resource Management. We expect to have this person teaching in the Fall of 2009.

Tools

Develop mechanisms for effective communication between researchers and stakeholders, including real and cyber-forum for dialogue. Develop specialized capacities for data distillation and conversion into “user-friendly” versions and formats. Develop tools to support data sharing for integrated research, policy and decision-making, education, and outreach. As mentioned under Cyber-infrastructure, planning for a new environmental web portal to support cyber-communication between researchers and stakeholders will be complete by August 2009.

Management

Develop long term sustainability plan for multi-interest partnerships in the V.I. context. Develop Environmental Working Group linking researchers with stakeholders, policy and decision makers. Assess the most effective public communications (marketing) strategies within the V.I. context. VI-EPSCoR is currently in discussion with UVI’s Conservation Data Center and territorial government partners about combining funding support for an aerial mapping effort by the Army Corps of Engineers that will provide high-resolution maps of the Virgin Islands including the offshore cays and shallow water reefs, mangroves and seagrass beds.

We are collaborating with Alaska EPSCoR in developing a tropical version of their very successful **“Living on Earth, the NSF EPSCoR Social-Ecological Systems (SES) Workshop”**. The purpose of the workshop will be to bring together researchers from the USVI, the nation and the region to share information on the current state of integrated and interdisciplinary research addressing social-ecological systems, with coral reefs and associated systems as the areas of primary focus. The conference will engage researchers on questions of how to make social-ecological systems research relevant and accessible to policymakers and resource managers, and will provide opportunities for brainstorming on how to foster the spread of new paradigms, opportunities and techniques in integrated research, both at the inter and intra-jurisdictional levels of collaboration. One of the key objectives of the workshop will be to share strategies for integrating SES topics into EPSCoR research and outreach efforts. This includes an emphasis on involving members of underrepresented groups in SES techniques and in disseminating SES results to communities. We have initiated collaborations with the Alaska EPSCoR office, and will be developing our proposal over the next few months.

VI-EPSCoR has partnered with the UVI’s Seagrant Outreach Program (formerly the Virgin Islands Marine Advisory Service –VIMAS) in the printing of **“Waves of Change: A Resource for Sustainable Development Solutions in the US Virgin Islands”**. This reference document represents the collaborative efforts of dedicated environmental professionals in government, education, marine biology, conservation, and resource management across the USVI, and features nine environmental topics that are of particular relevance locally. **Waves of Change** is a collection of briefing statements that provides information on some of the important environmental issues affecting the Territory. This book is meant to be a source of information to assist in making environmentally sound decisions in higher-level policy, legislation, and management arenas. Each of the topics covered, contains a background section, followed by general recommendations of ways in which legislative officials can support initiatives to redress some of the negative environmental impacts affecting the Territory’s ecological integrity and quality of life. Launch issues of the 500 copies of

“Waves of Change” will be formally presented to the members of the VI senate at a reception in July of this year. The remainder will be distributed as a teaching and information resource to MMES students, V.I. libraries, local NGO partners, legislators, Government Department heads, fishermen, boat operators and the Virgin Islands Network of Environmental Educators (VINE).

VI-EPSCoR, along with the NOAA Restoration Center and the Gulf of Mexico Foundation, and UVI Center for Marine and Environmental Studies co-sponsored a one-day Coastal Habitat Restoration Workshop to discuss the various resources available for coastal habitat restoration projects in the USVI. This workshop was open to all coastal habitat restoration practitioners, non-profit organizations, educational institutions, government agencies, and private sector entities. The goal of the workshop was to provide greater awareness and understanding of available planning tools, resources, and funding opportunities for coastal habitat restoration projects in the USVI. It focused on connecting practitioners with the resources needed to implement habitat restoration projects to benefit fisheries habitats such as wetlands, mangroves and coral reefs.

The workshop had approximately 50 individuals registered, and began with an overview and discussion of regional coastal restoration priorities and strategies. Highlights of ongoing habitat restoration efforts in the USVI were presented, existing partnerships were outlined, and discussions were held on future restoration opportunities. Additionally, restoration-funding opportunities available through VI –EPSCoR, the NOAA Restoration Center and restoration partner, the Gulf of Mexico Foundation were presented to the participants. Tips on writing project proposals and proposal submission in general, were shared with the attendees, as well as quick overviews on what to do after funding is received, project monitoring requirements, and the technical expertise available during the planning, implementation, and completion stages of restoration projects.

In addition to the day’s proceedings, participants were given an opportunity to comment on a conservation priority setting work-in-progress, led by The Nature Conservancy, and to identify gaps in the draft information. It is expected that the final Nature Conservancy product will be used by partners to leverage research and conservation priorities across the USVI.

As part of a celebration of the USVI’s East End Marine Park’s official inauguration, on St. Croix, VI-EPSCoR gave a presentation on the importance of marine and coastal research within the East End Marine Park, for a greater understanding, and potential regional leadership in coral reef dynamics, for adaptive and effective management of the Marine Park itself, and for revenue generation, as visiting scientists choose to conduct their research within the marine protected area.

B.2.6. EVALUATION AND ASSESSMENT

Barbara Kimbell Consulting and Minnick and Associates

October 2008 – May 2009

The monitoring team familiarized themselves with the VI-EPSCoR program and prepared for the November 2008 strategic planning session by reviewing VI EPSCoR RII1 and 2 proposals, RII2 NSF RFP, and documents describing modifications to RII2, and followed up with discussions and email with M. Whitaker. They reviewed all background documents provided M. Whitaker and researched and reviewed strategic planning strategies as applicable to assessment and monitoring practice. Kimbell and Minnick participated in the November 2008 strategic planning meeting in St. Thomas, and followed up with a review of the meeting proceedings via email and phone conversations with VI EPSCoR staff.

Kimbell returned to UVI in January 2009 to participate in an intensive strategic planning session with the VI EPSCoR staff and faculty. The monitoring team reviewed drafts of the strategic plan and provided guidance and comment as requested via conference calls and email correspondence. Kimbell then

mapped the strategic plan to a draft logic model format as the first step in the development of a monitoring plan. The draft logic model was distributed to the VI administrative team for comment and review. Kimbell attended the NSF EPSCoR PD/PA meeting in Washington, DC in May 2009 on behalf of the VI EPSCoR, where further progress was made on completing the logic model in collaboration with the VI team.

Minnick began working with the VI EPSCoR and UVI administrative staff to develop a data structure for programmatic, monitoring, and NSF required data while in the VI in November 2008. He continued development in close collaboration with the VI, incorporating the new NSF guidelines in May 2009. The offline data collection system is in Beta test in the VI now.

B.2.7. SUSTAINABILITY AND PROJECT OUTPUTS

Proposals/Grants/Contracts

In the first year of the new grant, VI-EPSCoR's Incubator Grant program received a total of 23 proposals for consideration. These covered a wide range of research topics, and represented a wide variety of collaborations from both EPSCoR and non-EPSCoR Jurisdictions. Final decisions on Incubator awards will be made by the end of July 2009.

In the first year of the new grant, researchers submitted 15 proposals (\$7,210,158) for external funding. Nine new grants were funded for \$3,617,210. Five proposals (\$2,519,378) are pending.

Publications

In the first year of the new grant, VI-EPSCoR researchers produced 16 publications (15 peer-reviewed papers and one book, Waves of Change) with primary RII support.

New faculty

Two new CMES faculty members are under recruitment, with start date expected to be August 2009 or before. The two faculty will be selected from the following disciplines: physical oceanography with expertise in general circulation modeling and experience working with biologists in biophysical coupled models; coastal geomorphology with experience on source to sink sediment dynamics and watershed modeling; natural resource economics or social science with experience working with natural scientists on coupled natural and human systems; microbiology, epizootiology of marine diseases, or phytoplankton ecology.

As mentioned earlier, we have a new MMES program coordinator in place, and as of June 2009, we are final stages of negotiations with our choice for the Natural Resource Management faculty position. The Division of Science and Mathematics is interviewing their finalists for a Terrestrial and Plant Ecologist position and for a Molecular/Microbiologist position. These hires are expected to be in place and teaching in the fall semester of 2009.

VI-EPSCoR developed a policy on start-up funding for new faculty. As of June, start-up funding discussions were underway with incoming faculty including the new Natural Resource Management faculty and the new MMES Program Coordinator.

VI-EPSCoR has several staff hires in progress. The hire that is closest to being completed is for our Boat and Facilities Technician. We have completed the interview process and our Office of Human Resources is finalizing the contract. We also have two positions (an Ecology Lab Technician and a Spatial Lab Technician) that VI-EPSCoR has committed 50% support for. Candidates for both

positions have been recruited and identified and interviews are expected to be completed this summer.

VI-EPSCoR Graduate Programs

Four teachers graduated from the Master's in Mathematics for Secondary Teachers program during these reporting period. Of these, two were female and four were under-represented minorities.

The first Master's in Marine and Environmental Science cohort graduated one student in May 2009 (white, female); and four additional students are expected to graduate in the Fall semester 2009.

Sustainability

VI-EPSCoR is working to ensure that human and fiscal resources will be available to sustain the VI-EPSCoR ICCE research thrust beyond the current RII grant. In building and strengthening programs, VI-EPSCoR carefully considers sustainability. Its philosophy is that no activity should be continued long term on a subsidized basis. New positions, originally funded by VI-EPSCoR, have been shifted to regular University funding. New graduate degree programs have been developed with attention to short, medium and long-term financial sustainability. VI-EPSCoR funds have been leveraged with university operating funds and funding from other external sources to sustain innovations created by VI-EPSCoR.

Some new activities, such as physical infrastructure upgrades, are, by their nature, of finite duration; when the task is completed, the activity ceases. Some new activities (such as incubator projects) represent venture investments. Applicants for VI-EPSCoR seed funding are required to explain their plans for seeking competitive funding upon successful completion of the incubator phase, and VI-EPSCoR works closely with the researcher and the UVI Office of Sponsored Programs to help them secure funding. It is expected that some new thrusts will succeed and obtain support through competitive grants, and others will not be continued.

In the case of VI-EPSCoR-funded faculty and staff positions, with the exception of core VI-EPSCoR staff, funding for these positions will be transitioned to University funding over the life of the new grant.

VI-EPSCoR's support for educational initiatives is similarly structured. The University's own procedures for approval of new programs requires the development of a business plan showing the program to quickly become at least revenue-neutral. VI-EPSCoR can provide assistance for a brief period to provide time to reach stability, but this assistance is usually stepped down gradually. This approach encourages activity leaders to work hard to achieve self-sufficiency.

VI-EPSCoR's approach is that it will provide appropriate funding and non-monetary support during the incubation phase of new initiatives, but long-term viability of any activity will ultimately depend on its ability to attract funding in the competitive arena. To the extent that research activity successfully competes for funding, the growth of direct and indirect cost dollars will provide the resources needed to maintain healthy infrastructure without requiring continuing subsidies.

Building on the foundation of the first RII grant, in the new grant VI-EPSCoR is pursuing a range of non-EPSCoR funding opportunities to support growth in research, strengthen STEM education, and further enhance the Territory's scientific infrastructure. These include:

- **National Science Foundation.** The primary Directorates for future research funding include **BIO** (including Research in Undergraduate Institutions (RUI), Assembling the Tree of Life (ATOL), Research Initiation Grants and Career Advancement Awards to Broaden Participation in Biology (RIG CAA BP), **OCE** (Biological Oceanography, Physical Oceanography), and other programs

such as CAREER, Major Research Instrumentation (MRI), Research Experiences for Undergraduates (REU), and CISE.

- **National Institutions of Health.** MBRS-SCORE program.
- **NOAA.** These include National Marine Fisheries Service's Saltonstall – Kennedy grant program which provides funding for Fisheries Research and Development, National Marine Fisheries Service Marine Fisheries Initiative (MARFIN) provides funding for applied fisheries, habitat and conservation research, Coral Reef Conservation Programs provides funds for coral reef research, habitat conservation and restoration and education and outreach, Puerto Rico Sea Grant College Program provides grants for applied research in the US Caribbean, education and outreach, Coastal services center provides funding for Coastal Resource Managers, and National Centers for Coastal & Ocean Science of the National Ocean Service provides funding for coral reef monitoring programs in the Caribbean and Pacific.
- **USGS.** State Partnership Program; Virgin Islands Water Resources Research Institute.
- **OTHER.** Other research funding sources include: Virgin Islands Department of Planning and Natural Resources, Environmental Protection Agency, the Ocean Conservancy, the Nature Conservancy, and the Office of Naval Research.
- **Synergistic collaborations.** A new collaboration between UVI and Texas A&M University (TAMU) and the University of Miami (UM) will leverage VI-EPSCoR RII funding with significant private funding to pursue research and education initiatives of common interest. This collaboration offers opportunities to utilize the capacities of the three institutions to address critical research needs in the area of management of local and regional marine natural resources, as well as building local and regional technical capacity in marine and environmental science.
- **GK-12.** UVI will submit a GK-12 proposal in 2009. This project will be a collaborative effort primarily involving the UVI Master's in Marine and Environmental Science program, the Division of Science and Mathematics, the Division of Education, and the VI Department of Education. VI-EPSCoR will facilitate with collaboration, with the assistance of the Education Advisory Board.
- **LSAMP.** UVI receives funding under the AGEP program through the University of Florida's SEAGEP grant. UVI intends to submit a proposal to LSAMP in Fall 2009.
- **IGERT.** UVI will pursue partnerships with other universities to gain IGERT funding in support of the MMES graduate program. MMES partnered with Dr. Andrew Baker from the University of Miami (UM) last year in an IGERT proposal on "Coral Reef Ecosystem Science and Management." Although the team was not invited to submit a full proposal in 2007, there are plans for resubmission. The program would fund an MMES student stipend and enable MMES students to enroll in UM courses, while providing access to UVI facilities and field sites for UM faculty and students, and would enhance educational and research contact between students and faculty at UM and UVI.
- **ADVANCE.** UVI is eligible to receive funding from the NSF ADVANCE program. Given UVI's STEM student demographics, and given that UVI is receiving generous funding from the NIH MARC and MBRS-RISE programs, there are no immediate plans to pursue ADVANCE funding.
- **CREST.** UVI does not currently have doctoral programs, so it is not eligible to apply for CREST funding either as a Center or under the HBCU-RISE program.
- **HBCU-UP.** UVI has a very active program funded by the NSF HBCU-UP program. This is part of UVI's Emerging Caribbean Scientist alliance, and VI-EPSCoR works closely with the program.
- **Math and Science Partnership.** The Virgin Islands received an MSP-Start proposal in 2008, in a partnership between the University of the Virgin Islands and the VI Department of Education, with VI-EPSCoR playing a facilitating role.

As mentioned above, UVI also receives generous support through the MARC and MBRS-RISE programs at NIH. Students participating in these programs have numerous opportunities to participate in research related to ICCE. VI-EPSCoR works closely with the coordinators of these programs to maximize undergraduate research opportunities, especially for students from underrepresented groups.

B.2.7.i. Seed Funding and Emerging Areas

The VI-EPSCoR incubator grants program creates opportunities for ICCE researchers to advance pilot projects to the point where they can attract competitive funding. VI-EPSCoR offers incubator research grants annually to develop new research directions related to the ICCE research thrust. The first incubator grants competition is underway; awards will be announced in June 2009. The goals of the 2009 incubator program are to stimulate research of priority to the ICCE research thrust and research collaborations that build strong interdisciplinary research teams. The inclusion of thesis research opportunities for UVI Master in Marine and Environmental Science students is encouraged, as well as research opportunities for Virgin Islands undergraduate and high school students.

Over the course of the new grant, the incubator program will be developing aspects of the following research areas of local and regional importance -- biodiversity, coral reef ecosystems, fisheries ecology, dynamic ocean modeling, pelagic connectivity, marine geology, human and ocean health, watershed processes, ecological modeling, and economics of natural resource management.

VI-EPSCoR, working with the UVI Office of Sponsored Programs (OSP), uses the incubator grants program to strengthen researchers' skills in project design, proposal writing, and grants management. OSP provides technical support and training for incubator researchers in the process of acquiring and managing grants, and also provides liaison with the UVI Grants Accounting Office to help VI-EPSCoR create a realistic simulation of post-award grants management for the successful incubator proposals. These activities enhance faculty researchers' abilities to seek, obtain and manage externally funded grants.

B.2.7.ii. Human Resource Development

VI-EPSCoR is investing in development of human resources to support the ICCE research thrust by recruiting new faculty researchers, by increasing the participation of existing faculty in research, by strengthening the new graduate program in marine and environmental science, and by creating student research opportunities. VI-EPSCoR is also contributing to university efforts to strengthen the organizational environment for growth in research volume, increase involvement of faculty in research, and integrate research into the student learning experience.

VI-EPSCoR has partnered with the University to recruit five new faculty positions supporting the ICCE research thrust and the University's STEM teaching needs. Recruitment is currently underway for two of the new positions, for a start date of August 2009. The two new faculty are being selected from four disciplinary areas: physical oceanography with expertise in general circulation modeling and experience working with biologists in biophysical coupled models; coastal geomorphology with experience on source to sink sediment dynamics and watershed modeling; natural resource economics or social science with experience working with natural scientists on coupled natural and human systems; and microbiology, epizootiology of marine diseases, or phytoplankton ecology. The new faculty will be teacher-scholars based in the Center for Marine and Environmental Studies with joint appointments in the Division of Science and Mathematics. They will have initial research support from VI-EPSCoR to enable them to establish external grant funding; long term we expect them to carry between 75:25 and 50:50 teaching and research duties. We are seeking faculty who have the capacity to develop significant research portfolios.

The University has committed itself to integrating teaching and research faculty in a teacher-scholar model as a part of its current strategic plan Vision 2012, and with VI-EPSCoR assistance, the Division of Science and Mathematics is playing a leading role in this transition. Recruitment of DSM faculty is now in the teacher-scholar model; and faculty members with compatible research interests are eligible for research start-up funds. The future model of DSM faculty is one of greater specialization; we expect this to

further increase faculty participation in the ICCE research program. For example, in the last two years, the Division of Science and Mathematics hired a marine biologist working on marine mammals, a chemist working on marine natural products, and an ecologist interested in watershed processes, who received VI-EPSCoR incubator/start-up funding. The newly recruited MMES coordinator, a coastal biologist, has received VI-EPSCoR funding to enable him to continue work on an EPA funded project begun at his previous institution; he is also preparing a request for start-up funding to begin collaborative research with other ICCE researchers.

The regular presence of 15-20 Master's students in marine and environmental science, due to the new UVI MMES graduate program, has significantly enhanced ICCE research capacity.

Graduate students can be recruited for research assistantships. They are participating in research and resource management internships with local agencies. They act as mentors to undergraduate students, strengthening the pipeline of marine and environmental scientists. After they graduate, many will take up local positions in research and resource management.

ICCE research capacity is also significantly enhanced by the availability of undergraduate students to participate in research. The Division of Science and Mathematics is committed to undergraduate engagement in research. The VI-EPSCoR program provided research opportunities for 46 UVI undergraduates in the first grant; incubator researchers are strongly encouraged to include undergraduate research opportunities in the new grant. With the new MMES program, the involvement of undergraduates is being strengthened through aspirational peer mentoring by Master's students both in the classroom and in the research lab.

VI-EPSCoR is working within University academic and administrative units to strengthen research infrastructure, faculty research competitiveness, and academic programs related to the ICCE research thrust. For example, VI-EPSCoR was actively involved in an *ad hoc* Indirect Cost Review Committee to evaluate existing policy on indirect cost recovery and distribution of indirect cost funds. With participation from the University's Vice Provost for Research and Public Service and Vice President for Business and Administration, as well as representatives of key administrative units, the faculty, and VI-EPSCoR, the Committee successfully produced a new set of policies, including distribution of some indirect cost funds to project PI's and to their administrative units.

B.2.7.iii. Leveraging NSF programs

In response to an identified need arising from a reverse site visit in 2007, VI-EPSCoR joined the Emerging Caribbean Scientists program at UVI in an effort to strengthen its linkages with other HBCU programs at the University in the area of student strengthening. This is being further addressed in the new RII grant:

Because of the predominance of underrepresented groups in the Virgin Islands population and among the UVI student body, VI-EPSCoR educational investments have a particular impact on enhancing recruitment and retention of minority students. VI-EPSCoR is a member of the Emerging Caribbean Scientists (ECS) program, an umbrella under which various federal grants that encourage minority participation in STEM careers are managed at UVI. ECS offers a comprehensive model for recruitment and retention of minority students, including funding for research opportunities at UVI and at other universities, mentoring, tutoring, travel, presentation, and workshop experiences.

In the current grant, two new efforts will focus on strengthening the ECS model for recruitment and retention of minority students in STEM. Although excellence in faculty instruction is paramount, peer mentoring is an important tool in the recruitment and retention of STEM undergraduates, especially of those from underrepresented backgrounds. With the presence of MMES graduate students as well as increasing numbers of post-doctoral scholars, a new model of research teams of faculty, post-docs, graduate, and undergraduate students will enable undergraduates to be motivated and guided by

graduate students, and graduate students to be inspired and mentored by post-docs and faculty. In addition, the presence of graduate TA's in undergraduate science laboratories will provide peer mentoring in the classroom.

VI-EPSCoR will also work with the ECS program to develop the existing annual undergraduate research symposia at UVI into an annual student research conference within the VI-EPSCoR annual conference. The conference will showcase the work of both undergraduate and graduate students. Initially the research conference will be focused on US Virgin Islands students, with efforts to expand its reach within two to three years to regional student presenters. A career and recruitment component is also planned, where potential employers will have the opportunity to recruit UVI STEM students. This will also serve to inform students of the varied careers available to them upon graduation.

B.2.8. MANAGEMENT STRUCTURE

The VI-EPSCoR management structure consists of the Project Management Team, a Governing Committee with territory-wide representation, a Research Advisory Board for the thrust on Integrated Caribbean Coastal Ecosystems, and an Education Advisory Board for K-12 STEM education.

B.2.8.i. VI-EPSCoR Governing Committee

The VI-EPSCoR Governing Committee represents the greater Virgin Islands community as well as the broadest interests of the University in advising the Project Director and in garnering community support for the objectives of VI-EPSCoR. The Governing Committee meets semi-annually and serves to educate the Virgin Islands community about the immediate and potential impact of VI-EPSCoR, especially as it pertains to economic growth. Committee members represent an array of Territorial offices including the Virgin Islands Senate President, the Delegate to Congress, the Commissioner of the Department of Planning and Natural Resources, the Commissioner of Education, and the Chair of the Virgin Islands Economic Development Authority, as well as the President of the University of the Virgin Islands, the VI-EPSCoR Director, the Principal Investigator of the VI-EPSCoR research thrust, and representatives of the private sector, the UVI faculty, and other EPSCoR jurisdictions.

The current demographics of the Governing Committee are 6 African-American and 8 White members; 3 female and 11 male committee members.

The Governing Committee meets on a quarterly basis.

B.2.8.ii. VI-EPSCoR Management Team

The Program is directed by Dr. Meri Whitaker (PI/PD). Dr. Whitaker led VI-EPSCoR during the previous RII grant, works full time on the Program, and is responsible for all aspects of the work, including strategic planning, implementation, and program management. The PI/PD reports to the VI-EPSCoR Governing Committee, and within the University administrative structure, reports to the Vice Provost for Research and Public Service.

The VI-EPSCoR Management Team includes new hires Dr. Kim Waddell and Mr. Nicolas Drayton. Dr. Waddell leads VI-EPSCoR research and educational outreach, including development of community research partnerships, strengthening K-18 science and math education, and enhancing diversity. Mr. Drayton provides grant administration and overall program coordination, as well as public awareness, education, and outreach. These are full time positions reporting to the PI/PD.

The scientific program is led by Co-PI Dr. Richard Nemeth, who is Director of the University's Center for Marine and Environmental Studies (CMES). Dr. Nemeth also led the scientific program during the previous RII grant. Dr. Nemeth has been on sabbatical during the first year of the grant, with Dr.

Nasseer Idrisi standing in as Acting CMES Director. Dr. Nemeth returns from sabbatical on 15 August 2009.

VI-EPSCoR relies on support from a variety of University offices, including the Vice Provost for Research and Public Service, Grants Accounting, the Office of Sponsored Programs, the Campus Executive Administrators, IT and Library Services, and the Public Relations Office.

The VI-EPSCoR Management Team meets on an ad-hoc basis about once a week.

B.2.8.iii. Advisory Boards

ICCE Advisory Board

The ICCE Advisory Board assists in strategic planning and provide guidance for the research thrust on Integrated Caribbean Coastal Ecosystems. Board members include local and national researchers of international repute in tropical coastal ecosystems. The ICCE Advisory Board consists of persons with expertise in 1) coral reef conservation at national or international level, 2) graduate programs in marine science, 3) implementing informal education and outreach programs linked to research activities, 4) writing major grant proposals, 5) local coral reef research and 6) setting up and/or directing a marine biological laboratory. Institutional affiliations include University of Georgia, University of Miami, University of South Florida, University of Hawaii, University of North Carolina Wilmington, Woods Hole Oceanographic Institution, US Geological Survey, Virgin Islands Division of Fish and Wildlife, and UVI.

The Advisory Board meets quarterly.

The current demographics of the Advisory Board are 2 African-American and 10 White members; 6 female and 6 male members.

VI-EPSCoR Education Advisory Board

In 2006 VI-EPSCoR, the President and the Provost of UVI, and the Virgin Islands Commissioner of Education constituted a new education advisory board. Members include representatives of the University, the Department of Education, and VI-EPSCoR, potential employers in the private and government sectors, and parents of secondary students. The Education Advisory Board is charged with identifying priority areas where K-12 STEM education can be strengthened, developing a plan of action, promoting collaboration and the formation of strategic alliances to make optimal use of existing and potential resources, and promoting private sector and community involvement.

The Advisory Board meets quarterly.

The current demographics of the Advisory Board are 8 African-American and 3 White members; 8 male and 7 female members.

B.2.8.iv. Technical Assistance by Outside Consultants

Monitoring and Evaluation Consultant Services. In September 2008 the University issued an RFP for external monitoring and evaluation consultant services for the VI-EPSCoR program. The firm Barbara Kimbell Consulting was selected and a Professional Services Contract was issued in October 2008. See above

Cyberinfrastructure Review. Because of significant investments being made in cyber-infrastructure at UVI, the University and VI-EPSCoR are interested in targeting these investments most effectively. In the first year of the grant, VI-EPSCoR funded an external review of the University's existing and

planned cyberinfrastructure by the firm CGNET. The goals of the study were to determine the extent to which the present infrastructure - including the University's network, the devices attached to it, and its connections to the Internet – is stable and has the best design, maintenance, security and redundant elements to support existing functions. The study also assessed UVI's readiness for future development, including wireless systems, increased Internet and Internet2 capacity with failover capabilities from use of multiple ISPs, and expanded data storage and management capabilities. The review found that *"the Information technology infrastructure investments made in the past years have resulted in a stable system, with upgraded local area network speeds and upgraded servers. These efforts have built an excellent foundation to support current services and future expansion. Further work needs to be done in some areas, however, particularly Internet access, communications between the University's campuses, and wireless connectivity."*

Data Facility Assessment. VI-EPSCoR is creating a project data facility to significantly strengthen management of research data and to develop capacity in spatial analysis and applied statistics. In the first year of the grant, VI-EPSCoR funded an external assessment of requirements for the establishment of a project data repository, including user needs and system requirements specifications. The assessment was conducted by the Council for Information and Planning Alternatives, Inc. The recommendations are being used in on-going development of staffing plans and implementation of a network accessible storage system for the data repository.

CMES Strategic Planning Services. Because of significant investments being made at UVI's Center for Marine and Environmental Studies, UVI and VI-EPSCoR are particularly concerned that its growth be appropriately managed. In the first year of the grant, VI-EPSCoR funded a comprehensive strategic planning process to develop CMES growth and sustainability plans, including implications for staffing, management, and facilities. The external panel of Elizabeth Gladfelter, Christopher D'Elia, and Peter Ortner, was selected to advise UVI, and CMES in particular, on planning growth and sustainability over the next 5 and 10 year horizon. The panel's report offered recommendations addressing growth in terms of management, staffing, and facilities; integrating research, education, and outreach in an academic research center; stimulating competitive research in the natural sciences; and enhancing collaborative efforts, both nationally and internationally.

B.2.9. JURISDICTIONAL AND OTHER SUPPORT

Existing jurisdictional resources that enhance the Virgin Islands EPSCoR program include:

- Two existing marine research facilities, the MacLean Marine Science Center on St. Thomas and the Virgin Islands Environmental Resources Station on St. John, enhanced by the recent renovations, research vessels, and equipment funded by the first RII grant, and to be further enhanced by planned University upgrades of boat dock, ramp, and storage facilities
- VI-EPSCoR offices provided by the University on the St. Thomas campus
- New University-funded natural resource management faculty position supporting the MMES program
- University-funded CMES staff (Director, Administrative Assistant, and Dive Captain)
- University-funded science librarian on St. Thomas campus
- University-funded Conservation Data Center technical staff
- Division of Science and Mathematics teaching labs equipped with new chemistry and biology equipment purchased in the last two years with Department of Education Title III funds
- UVI Information and Technology Services facilities, equipment, and staff
- Collaborations with federal agencies in the territory, in particular National Park Service, US Geological Survey, US Fish and Wildlife, and NOAA, including joint fieldwork and other research activities. A NOAA Resident Scientist in spatial ecology is based at CMES. Collaborations with territorial agencies, in particular Department of Planning and Natural Resources, Coastal Zones

Management, Environmental Protection, Fish and Wildlife, and Waste Management, as well as the Department of Education, including joint research, educational, and outreach activities. (More details in Collaborations section)

- Collaborations with territorial outreach groups including the SeaGrant Virgin Islands Marine Advisory Service and the Virgin Islands Network of Environmental Educators, including joint outreach activities in informal marine and environmental education

B.2.10.UNOBLIGATED FUNDS

B.2.10.i. Unobligated funds:

Funds expected to be unobligated at the end of the current support period are \$853,890. This is 34% of the current year award amount of \$2,500,000.

A plan and timetable for expenditure of those funds is attached in Appendix J.

B.2.10.ii. Budget details:

The budget details reported in Appendices F, G, and H are best estimates as of 30 June 2009 of expenditures in grant year 1 of the new RII grant. All estimates include both direct and indirect costs.

As indicated in Appendix F, approximately 28% of the funds were budgeted for research activities; 20% on education and human resources; 17% on experimental and computational facilities; 20% on cyberinfrastructure; 3% on evaluation and assessment; and 12% on RII administration.

As indicated in Appendix G and H, VI-EPSCoR does not receive cost sharing funds in the new grant.

B.3. JURISDICTION-SPECIFIC TERMS AND CONDITIONS

As per the Award Letter for the RII grant:

The strategic plan must include a hiring plan for new researchers including hiring strategy, anticipated dates for individuals to join the team, mentoring and retention plan, and time commitment to the project (percent effort). An update on progress must be submitted to NSF quarterly during Year 1.

Progress report (May 2009)

- The Virgin Islands EPSCoR Strategic Plan was submitted to the NSF EPSCoR office in March 2009.
- Submitted with the Strategic Plan was a Hiring Plan for New Researchers and the March 2009 progress report. The Hiring Plan included:
 - o Hiring Strategy,
 - o The text of the signed MOU between VI-EPSCoR, CMES, DSM, and the Provost, setting out the hiring strategy and plan,
 - o Retention Strategy,
 - o Mentoring Plan for New Researchers.

These documents included the anticipated dates for individuals to join the team and time commitment to the project.

- The first two faculty positions are currently being recruited; the anticipated start date is August 2009.

Within three months of the effective date of the award, a formalized Visiting Scholar/Visiting Scientist program must be submitted to NSF via email to the cognizant program officer. The program must describe the anticipated outcomes, partnering institutions, teaching or research plan, and anticipated duration. An updated plan must be submitted to NSF with the annual report and must detail plans for the next performance period.

- The Virgin Islands EPSCoR Strategic Plan was submitted to the NSF EPSCoR office in March 2009.
- Submitted with the Strategic Plan was a formalized Visiting Scholar/Visiting Scientist plan. The plan included the anticipated outcomes, partnering institutions, teaching or research plan, and anticipated duration.
- Attached below is an updated plan including plans for the next performance period.

Updated Plan: Visiting Scholar/Visiting Scientist Program

Summary

An important component of building research capacity in the Virgin Islands is the development of collaborations with researchers at other institutions through a variety of mechanisms, including support for visiting scholars. A visiting scholar program has been developed for faculty on sabbatical leave from other institutions.

VI-EPSCoR will provide housing and office space for a Visiting Scholar in Spring Semester of each year. Visiting Scholars will be selected based on research and teaching interests and potential for development of collaborative research. Visiting Scholars will be affiliated with the Center for Marine and Environmental Studies, and will teach a seminar in the Master of Marine & Environmental Science program.

Anticipated outcomes

- Access to a broader range of research expertise through research collaborations between faculty at UVI and partner institutions
- Enhanced Master in Marine and Environmental Science program
- Development of pipelines for UVI students to graduate educational opportunities

Partnering institutions

Woods Hole Oceanographic Institution. A Memorandum of Agreement has been signed between WHOI and UVI, regarding cooperation in research and education, including exchange of personnel.

RSMAS/University of Miami. A Memorandum of Understanding has been signed regarding cooperation in research and education, including exchange of personnel.

USGS EROS. A Memorandum of Understanding has been signed regarding cooperation in research and education, including exchange of personnel.

Texas A&M University. A Memorandum of Understanding is under development, regarding cooperation in research and education, to include exchange of personnel.

Yale University School of Forestry and Environmental Studies. A Memorandum of Understanding is under negotiation regarding cooperation in research and education, to include exchange of personnel.

As UVI develops additional institutional partnerships in marine and environmental research and education, these institutions will be encouraged to participate.

Research and teaching plan

Visiting Scholars will develop a research and teaching plan, approved by the Director of the Center for Marine and Environmental Studies. This will typically include teaching a seminar in the MMES program and participating in research as a member of an ICCE research team.

Timing

Proposals will be solicited in January for Spring Semester of the following academic year.

Anticipated duration

Given the modest cost to the institution, and the significant expected benefits to the institution, it shouldn't be difficult to find the resources to keep this program going once its value has been demonstrated. The larger issue will be to determine to what extent the program can be ramped up to support a larger number of visiting scholars; it will be necessary to strike a balance between cost and benefit.

Plans for the next performance period

Negotiations are underway with Dr. Raymond Torres, Associate Professor and Graduate Director in the Department of Geology at the University of South Carolina, to spend his sabbatical as the first Visiting Scholar at UVI in Spring 2010. Dr. Torres will spend a week in early summer 2009 at UVI developing his research and teaching plan. Dr. Torres' research interests include coastal hydrology and geomorphology and watershed management. He hopes to collaborate with several UVI faculty.

Within three months of the effective date of the award, the Project Director must meet with members of the Social, Behavioral, and Economic (SBE) Sciences Directorate to discuss potential enhancements to the project by strengthening or adding SBE components to the project. Project changes must be submitted with the strategic plan with appropriate budget revisions.

- The Virgin Islands EPSCoR Strategic Plan was submitted to the NSF EPSCoR office in March 2009.
- Submitted with the Strategic Plan were project plans to incorporate social science into the ICCE research thrust, based on the meeting of Dr. Meri Whitaker, VI-EPSCoR Program Director, with Dr. Judith Sunley of the SBE in July 2008. The project plans included a brief summary of expected social science components and details of changes to strengthen social science participation in the new grant, including:
 - o Plans for a diagnostic / gaps analysis workshop linking social and natural science researchers and stakeholders in early 2010, possibly as an EPSCoR cross-jurisdictional workshop. This was discussed earlier regarding Alaska EPSCoR.
 - o Expectations of relevant new faculty/staff hires, including the recent hire of two biologists with extensive policy backgrounds in VI-EPSCoR senior management

positions, imminent hire of a geographer for a natural resource management faculty position, and a VI-EPSCoR-funded social scientist in natural resource economics to be recruited in yr 2.

B.4. EXPERIMENTAL/COMPUTATIONAL FACILITIES

Key infrastructure improvements are building capacity to support and sustain the ICCE research thrust. VI-EPSCoR investments in the first year of the new grant include:

An Astoria-Pacific autoanalyzer for chemical analysis of seawater was purchased for the Environmental Analysis Lab Facility.

Redundant and upgraded routers were acquired and deployed by Information and Technology Services on each campus to handle the fail over of services and the capacity increase to handle both Internet2 and the inter-island microwave upgrade.

B.5. PUBLICATIONS AND PATENTS

This information may be found in FastLane.

B.6. HONORS AND AWARDS

As mentioned earlier, a first year MMES student Eddie Parish was awarded a NSF sponsored scholarship for advanced Phycology.

C. HIGHLIGHTS

Three Virgin Islands EPSCoR highlights are attached separately.

A. FACULTY SUPPORT

Include detail regarding support for all faculty and equivalent listed for the RII project during the current year.

Provide information for faculty at all institutions in a single table.

For each faculty entry, enter months of support in the "Effort" column and the support in \$K in the corresponding "Funds" column.

[illegible]

B. RII PARTICIPANTS

Enter number of participants in appropriate cells

<i>Institution or RII Totals</i>	<i>Category</i>	<i>Total individuals in category</i>	<i>Male</i>	<i>Female</i>	<i>Blacks or African Americans</i>	<i>Hispanics</i>	<i>Other Ethnic ¹</i>	<i>Persons with Disabilities</i>
<i>University of the Virgin</i>	Faculty participants (or equivalent)	5	4	1	1	0	0	0
	Technical support staff	2	2	0	1	0	0	
	Nontechnical suport staff	4	0	4	4	0	0	
	Postdocs	0	0	0	0	0	0	
	Graduate students	0	0	0	0	0	0	
	Undergraduate students	0	0	0	0	0	0	0
	RII Leadership Team	4	3	1	2	0	0	
<i>RII total</i>		15	9	6	8	0	0	
	Advisory Board(s)	30	17	13	17	0	0	

Notes:

- 1) Other Ethnic includes Alaska Natives, Native Americans, Native Hawaiians, and other Pacific Islanders as defined by NSF [nsf_frameworkforaction_0808.pdf].
- 2) Enter the institution name in the cell to replace the italic label. Add lines and sections as needed for the institutions engaged in the RII.
- 3) Add more columns and/or footnotes to report any additional categories to describe participants.
- 4) The data in this table may be based on self-reporting.

C. COLLABORATIONS

Enter number of relationships in appropriate cells.

Category	<i>Jurisdictional</i>	<i>External</i>	<i>International</i>
Academic Research Institutions	0	29	3
Academic Research Institution Collaborators	0	58	4
Primarily Undergraduate Institutions	0	1	
Primarily Undergraduate Institution Collaborators	0	1	
Historically Black Colleges and Universities	0	0	
HBCU Collaborators	0	0	
Hispanic Serving Institutions	0	2	
HSI Collaborators	0	19	
Tribal Colleges and Universities	0	1	
TCU Collaborators	0	4	
National Laboratories	0	2	
National Lab collaborators	0	4	
Industry groups	0	1	
Industry collaborators	0	1	

Notes:

1) To report international collaborations include an additional column.

D. OUTREACH

Enter number of institutions or persons in appropriate cells.

Category	Total in category	Male	Female	Under-represented minority¹
Academic Research Institutions				
<i>Faculty</i>				
<i>Students</i>				
Primarily Undergraduate Institutions	1			
<i>Faculty</i>	5	4	1	1
<i>Students</i>	0			0
Minority Serving Institutions	1			
<i>Faculty</i>	5	4	1	1
<i>Students</i>	0			0
K-12 Institutions				
<i>Faculty</i>	8	3	5	8
<i>Students reached directly</i>	40	15	25	40
<i>Students via teacher training</i>				
Other	100	65	35	45

Note:

¹Underrepresented minorities include Alaska Natives, Native Americans, Blacks or African American, Hispanics, Native Hawaiians and other Pacific Islanders, and Persons with Disabilities [nsf_frameworkforaction_0808.pdf].

E. OUTPUTS

Show units for table entries.

Category	Total for Current Year	Cumulative Total for the Award
Patents		
Awarded	0	0
Pending	0	0
Licensed	0	0
Proposals/ Grants/ Contracts		
Submitted (include \$\$ requested)	15 (\$7,210,158)	15 (\$7,210,158)
Awarded (include \$\$ awarded)	9 (\$3,617,210)	9 (\$3,617,210)
Pending	5 (\$2,519,378)	5 (\$2,519,378)
Publications		
Primary RII Support	15	15
Partial RII Support		
New Faculty Hired	0	0
Female	0	0
Underrepresented minority	0	0
Disabled	0	0
VI-EPSCoR Graduates		
<i>Total Postdocs</i>	1	1
Female	0	0
Underrepresented minority	0	0
<i>Total Master's graduated</i>	8	8
Female	4	4
Underrepresented minority	7	7
<i>Total Undergraduates graduated</i>	26	26
Female	11	11
Underrepresented minority	16	16

F. EPSCoR RII Budget

Category	Current award period (\$K)	% of annual budget	Cumulative (\$K)	% cumulative budget
<i>Integrated Caribbean Coastal</i>	706202	0.28	706202	0.28
Total Research	706202	0.28	706202	0.28
Human Resources	290017	0.12	290017	0.12
New hires including start ups	130894	0.05	130894	0.05
Fellowships	0	0.00	0	0.00
Educational Activities	14671	0.01	14671	0.01
Knowledge Transfer	43692	0.02	43692	0.02
Other (Library)	10000	0.00	10000	0.00
Total Education and Human Resources	489274	0.20	489274	0.20
Experimental and Computational Facilities and Equipment	422664	0.17	422664	0.17
Cyberinfrastructure	524883	0.21	524883	0.21
Evaluation and assessment	70000	0.03	70000	0.03
RII Administration	286977	0.11	286977	0.11
Other (specify)	0	0.00	0	0.00
Total	2500000	100	2500000	100

Notes:

sharing.

2) For each entry in the Table, include indirect costs. Column totals must equal the total NSF budget for the award period.

3) Include major capital equipment under experimental facilities. Please distinguish between computational facilities (mostly hardware) and cyberinfrastructure (networking, storage, shared software, personnel).

4) Support for graduate students should normally be included under research if students work in a research group. Individual merit based student fellowships should be reported under Fellowships. Support for graduate and undergraduate students should be reported under education and human resources if students are primarily responsible for education related activities.

5) Please note that the total budget must equal to 100% of NSF provided RII funds.

G. Cost Sharing and Cost Contributions

Category	<i>Cost Sharing (\$K)</i> <i>(reported on line M)</i>	<i>Cost Contributions (\$K)</i> <i>(not included on line M)</i>
State		
Local		
Foundation		
Industry		
International		
Other (Univ. of Virgin Islands)		
<i>Total</i>		

Notes:

1) Discuss cost sharing explanation in narrative report: List the cost sharing support of the NSF EPSCoR RII for the current year from each of the following sources (the total must equal line M in the respective Total Budgets). Please note that all amounts reported on line M are subject to NSF audit. In the narrative section of the report, include a brief list of cost sharing allocations (i.e., how cost sharing funds were spent: faculty salary, student support, equipment, etc).

2) Discuss cost contribution explanation in narrative report: Cost contributions; i.e. complementary support for RII activities not listed on line M in the budget. The RII effort can be augmented by other sources, which may include cash contributions, sponsored projects, equipment donations, laboratory renovations, etc. Note: Do not include sponsored projects to the individual faculty members, even if they are related to the core mission of the RII. In the narrative section of the report, include a brief list of cost contributions (i.e., how cost sharing funds were spent: faculty salary, student support, equipment, etc). Do not include buildings.

3) Cash and In-kind contributions may apply to both categories.

H. EPSCoR RII Leveraged Support

Designation	NSF RII support (\$K)	Cost sharing (\$K)	Cost contributions (\$K)	Total all sources of Support (sum of 3 columns)
<i>Integrated Caribbean Coastal</i>	706202			706202
Total Research	706202	0	0	706202
Human Resources Development	290017			290017
New hires including start ups	130894			130894
Fellowships	0			0
Educational Activities	14671			14671
Knowledge Transfer	43692			43692
Other (Library)	10000			10000
Total Education and Human Resources	489274	0	0	489274
Experimental and Computational Facilities and Equipment	422664			422664
Cyberinfrastructure	524883			524883
Evaluation and assessment	70000			70000
RII Administration	286977			286977
Other (specify)	0			0
Total	2500000	0	0	2500000

Appendix J. Plan and Timetable for Expenditure of Funds Unobligated at the end of the current support period

Cyberinfrastructure

Because of delayed local funds supporting the acquisition of new inter-island microwaves, we expect to carry forward about \$140,000 of cyberinfrastructure funds for the microwave to year 2 of the grant, as well as about \$150,000 (salary, fringe, and indirect costs) for the network engineer to deploy the new microwaves. Acquisition and deployment of the new inter-island microwave system will begin as soon as the FUVI funds are received. Deployment should begin by January 2010 at the latest and be complete by July 2010.

\$290,000 carried forward (\$140,000 for microwave equipment; \$150,000 (9 months salary, fringe, IDC) for network engineer to deploy microwave system)

Sept 2009

Network engineer funded to deploy inter-island microwave system

Sept or Dec 2009

Acquisition of microwave equipment as soon as additional funds are disbursed by Foundation of the University of the Virgin Islands

Renovations and equipment for lab facilities

VI-EPSCoR funded improvements sea table system at the MacLean Marine Science Center on St. Thomas, including installation of new seawater tables close to the land-sea interface, upgrading the security of the area, and repositioning seawater intake pipes, requires Coastal Zone Management (CZM) permitting. We have been working with University personnel and CZM staff to establish what permits already exist, in order to determine whether new applications have to be prepared for CZM review and approval, rather than the less rigorous procedure of applying for amendments to existing permits. Once the permitting requirements have been resolved, we will be able to move quickly to identify a Civil Engineer to prepare drawings so that we can prepare and submit the permit request paperwork to CZM. Assuming a fairly efficient turnaround on the permitting review process, we will at this point secure a construction contractor. We expect to purchase materials for the concrete slab, retaining wall and drainage system before the end of the first grant year, as well as the seawater pump, intake pipes, and sand filters. We expect to acquire and install tanks and troughs, awning, two tier tank system and associated plumbing, work benches and cabinets, and improved electrical and lighting system in Fall 2009, and have the work done by the end of 2009.

Upgrades of the seawater system at VIERS on St. John are planned for year 2 after Dr. Rick Nemeth returns from sabbatical. Dr. Nemeth was the PI on a recent NSF-FSML award "Strengthening the Research and Educational Capabilities of the US

Virgin Islands Environmental Research Station, St John US Virgin Islands”, which, leveraged with funding from VI-EPSCoR, USGS and private donations, enabled extensive renovations of VIERs. Dr. Nemeth will oversee the upgrades of the VIERs seawater system beginning in August 2009.

\$84,000 carried forward for expansion and upgrade of seawater systems at MacLean Marine Science Center (MMSC) on St. Thomas and at VIERs on St. John

Sept-Dec 2009

Acquisition and installation of seatables, tanks and troughs, awning, two tier tank system and associated plumbing, work benches and cabinets, and improved electrical and lighting system, and relocation of seawater intake at MMSC (\$64,000)

Sept-Dec 2009

Acquisition and installation of larger seawater pump and associated plumbing and additional sea tables and plumbing at VIERs (\$20,000)

Recruitment of new positions

Applications for two CMES research faculty positions are under review, with an expected start date of August 2009. Three technical positions are also being recruited, and expected to start by September 2009. These positions include a boat and facilities technician, an ecology lab technician, and a spatial analysis lab technician.

\$100,000 carried forward (3 months salary, fringe, IDC) for two new VI-EPSCoR funded research faculty positions currently under recruitment

August 2009

Salary support for two research faculty

\$160,000 carried forward (salary, fringe, IDC) for three new technical staff positions currently under recruitment

Sept 2009

Salary support for three technical positions (boat and facilities tech, ecology lab tech, and spatial analysis lab tech)

Research Incubators

The incubator grants competition in year 1 was delayed by the shortage of VI-EPSCoR administrative personnel. Incubator proposals have been received and are undergoing external review. Decisions will be announced by 31 July 2009. Because the year 1 incubator grant funds will be spent largely in grant year 2, the funds for year 1 are being combined with year 2 funds. It is expected that the next incubator

competition will occur in early 2010, with expected start dates for the next round of incubators of summer / fall term 2010.

\$120,000 carried forward for research incubator funds (release time, minor equipment, materials and supplies, travel etc) to support incubator competition (decisions announced by 31 July 2009)

August 2009

Year 1 and year 2 research incubator funds expended in year 2

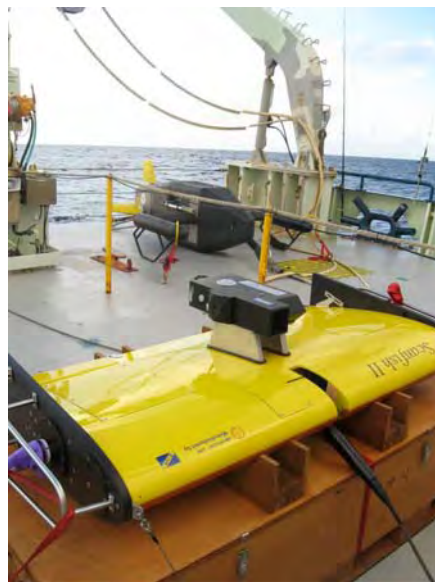
Cancelled Red Sea Exploration Results in Treasure Chest of Data for USVI

Dr. Nasseer Idrisi, University of the Virgin Islands –Center for Marine and Environmental Studies

(*The author gratefully acknowledges EPSCoR support through the NSF Award No. 0814417, without which, this research would not have been possible)

When security clearance was denied at the last minute for an expedition in the Red Sea VI-EPSCoR, under the leadership of Dr. Nasseer Idrisi, VI-EPSCoR successfully negotiated a rerouting of the *KAUST Oceanus* and its research team to the USVI. The team included scientists from Woods Hole Oceanographic Institution, King Abdullah University of Science and Technology and the University of the Virgin Islands, and completed a preliminary characterization of the oceanographic conditions within USVI territorial waters. From December 1 to 10, 2008, a program of high-resolution physical, optical, and biological sampling was carried out from the R/V *Oceanus*. These observations form part of an ongoing effort to investigate the mechanisms responsible for the exchange of biota between the coral reef environment and the open ocean. A primary objective of this cruise was instrument testing and methodology development. The cruise provided an opportunity for the science party to become familiar with new technologies and techniques that will be applied in future collaborative research cruises.

The primary method of investigation was done by towing two robotic profiling platforms: Scanfish and the Video Plankton Recorder (VPR) towfish. Both platforms were outfitted with equipment to measure Conductivity, Temperature, Depth and levels of chlorophyll. Scanfish also measured turbidity and dissolved oxygen. Each instrument platform was towed in accordion-type survey patterns just offshore of the coral reefs to the south of St. Thomas to the north of St. Croix, and then just offshore of the prehistoric reefs to the north of St. Thomas. In addition to basic physical and bio-optical sensors, each platform carried a state-of-the-art optical plankton counting and characterization instrument.



Observations from the Scanfish survey showed for the first time, several high-chlorophyll patches corresponding to regions with high concentrations of small (<0.5 mm) particles, however, a thin, warm, high-chlorophyll layer toward the eastern edge of the survey area coincided with a higher concentration of larger particles. Future analysis of the VPR data from the repeat occupation of the survey track will likely distinguish between the organisms responsible for these varying organism signatures.

Virgin Islands Students Perform Creditably at Their Debut Participation in the Science Olympiad

Andre Francis, St. Croix Central High School

The *Science Olympiad 2009* was held in Atlanta Georgia at Emory University on April 4th 2009. It is an annual event that promotes higher level thinking in science and engineering. Students are required to build projects and investigate organisms with their hands and manipulate and utilize materials. They also solve problems using pragmatic and novel approaches. It is a predominately hands-on, competitive experience for the students, which emphasizes their ability to design and construct with their hands. Approaching science in this manner creates a heightened level of passion for the sciences among students, and encourages them to yearn for science education.

For the first time in history, The St. Croix Central High School in the USVI was invited to participate in the *Science Olympiad 2009* as guests. The school has 1,200 students, and reflects the wide socio-economic and ethnic diversity of the St. Croix community. The student body comprises approximately 80% African American, 15% Hispanic/Latino, 5% Caucasian. Five students from 9th to 11th grade were selected; -Three girls and two boys, comprising 2 African Americans 2 Hispanic/Latinos and one Middle Eastern student.

At the Olympiad, the students competed with peers from Atlanta, making their way to the semifinals and outstripping some seasoned groups in spite of their relatively poor preparation for this, their debut involvement.



St. Croix Central High School students Chiersten Lucas, Emileysha Rodriguez and Jameel Williams assess the density of a novel, unknown material, using innovative methods at the *Science Olympiad*

Experiences like these, help in due course to foster a sense of “yes we can” in the fields of science, technology and engineering amongst Virgin Islands students, and will ultimately help to promote intellectualism in our territory’s schools. The ultimate objective in this initiative is to establish a regional competition in the Virgin Islands among the elementary, middle and secondary schools in the territory, with the winners qualifying to participate in the national competition on the mainland.

Central High School and the University of the Virgin Islands have now taken an elevated interest in the *Science Olympiad*, and many are now excited about bringing the event to the Virgin Islands, citing the power of such competitions to engage and excite students about science. The director of the *Science Olympiad* was very supportive of a USVI event and is expecting the Virgin Islands to establish a regional competition. The promise of the Virgin Islands participation as a regional competitor in the National Science Olympiad will contribute tremendously towards a higher standard of appreciation of science, mathematics and engineering in our education system. It will be a rewarding and progressive academic accomplishment, made real by V.I. -EPSCoR’s support of the initiative.

The students and faculty of the St. Croix Central Complex gratefully acknowledge the contribution of the V-I Experimental Program to Simulate Competitive Research (EPSCoR) in making our participation in the Science Olympiad a reality, through funding from the NSF Grant No. 0814417.

Spawning Aggregations of Groupers and Snappers in Protected Marine Reserves

Dr. Richard Nemeth, and Elizabeth Kadison, University of the Virgin Islands -Center for Marine and Environmental Studies (*The authors gratefully acknowledge the support of VI- EPSCoR, through the NSF Award No. 0814417, and the contribution it has made to this research*)

Many coral reef fishes, including commercially important groupers and snappers, form large aggregations at specific sites each year in which spawning is concentrated within a couple of months. These spawning aggregations may be the primary source of larvae that replenish local fish populations. Many spawning aggregation sites around the Caribbean are still vulnerable to fishing. In the late 1970's and early 1980's unregulated fishing on grouper spawning aggregation sites throughout the U.S. Virgin Islands led to the extirpation of the Nassau grouper and brought the red hind grouper population to the verge of collapse.

In an effort to document the dynamics of spawning aggregations and to better understand how exploitation by fishing affects these dynamics, The Center for Marine and Environmental Studies at the University of the Virgin Islands conducted research on protected and unprotected spawning aggregation sites off St. Croix, and St. Thomas. Research focused on defining population characteristics of aggregating species, and identifying and documenting behavioral changes associated with courtship and spawning, as well as delineating migration to and movement on aggregation sites.



A portable ultrasound is used to sex fish non-invasively

Methodology included estimating spawning population size using underwater visual surveys and both point counts and transects; defining population characteristics by measuring and determining sex ratios of spawning fish; defining movement with traditional external tags.

Comparative studies of red hind (*E. guttatus*) spawning aggregations with different management regimes have indicated that year-round protection is much more effective in sustaining regional fish stocks than no or even seasonal protection. Reports and recommendations have been made to the respective fisheries management agencies to consider different management strategies.