

In this issue

- Spawning Aggregation Expedition
- Program Coordinator Update
- BCCR Update
- eBird website launched

Highlights

- Kevin Brown wins award
- VI-EPSCoR goes to the St. Croix Agricultural Fair on Feb. 17-20
- VI-EPSCoR has new space

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Spawning Aggregation Expedition

The Virgin Islands

Experimental Program to Stimulate Competitive Research (VI-EPSCoR)

is supporting an exciting pilot study on the timing and behavior of red hind spawning aggregations. Under the direction of **Rick Nemeth**, researchers at the Center for Marine and Environmental Studies of the University of the Virgin Islands (UVI) are studying the reproductive behavior and spawning population characteristics of the red hind (*Epinephelus guttatus*), an important commercial fish in the eastern Caribbean. Every year during the week of the full moon between December and February, red hind migrate 10 to 30 km to spawning aggregation sites. Protecting these spawning aggregation sites is key to stabilizing fish populations and sustaining the regional fisheries industry.

The UVI researchers have been studying red hind spawning behavior for six seasons. Because of the synchronized timing of spawning aggregation, comparative studies at multiple sites are logistically difficult. This year for the first time, teams of divers are simultaneously sampling three sites off St. Thomas and St. Croix in the US Virgin Islands and Saba in the Netherlands Antilles. Sampling three sites will provide a regional picture of spawning aggregations in the eastern Caribbean and allow researchers to describe population size and health across a gradient of fishing pressure within the Caribbean region.

The purpose of the project is to identify factors determining synchronization of spawning behavior at spatially distant sites (e.g. 80 -120 km). An Acoustic Doppler Current Profiler (ADCP) has been deployed at each site to record current speed and direction. In addition, a conductivity-temperature-depth (CTD) meter is being deployed off the St. Thomas site to characterize the upper mixed layer.

This study will elucidate critical physical and biological factors that determine spawning success in this species and can possibly be used to model the spawning behavior of other Epinephelid groupers. If consistency is found among these spawning aggregations then similar management measures can be implemented broadly across the eastern Caribbean to protect red hind spawning aggregation sites.

The long term goal is to understand the population dynamics of economically important species (in particular, red hind) within the Caribbean region. Spawning aggregations are highly vulnerable periods within the annual cycle, and the success of the species during these spawning events dictate the success of the population, allowing for a stable population, and in turn a sustainable resource to the fisheries industry within the Caribbean region.

Funding for this project was provided by NSF VI-EPSCoR, NIH SCORE, the Nature Conservancy, and NOAA International.



Program Coordinator Update Dr. Meri Whitaker

VI-EPSCoR has moved! The new offices are located at Faculty East 3 on the UVI St. Thomas campus. Ms. Kaisa Prentice, Program Specialist, has a new phone number, 340-693-1428. Other phone and email remain the same.

The proposed Master of Arts program at UVI in teaching mathematics for secondary teachers will be presented to the UVI Board of Trustees in March 2006. The program is being developed by **Vanere Goodwin** and others in the UVI Division of Science and Mathematics, with support from VI-EPSCoR. The first cohort of approximately 16 teachers is expected to begin this summer.

Elizabeth Gladfelter has submitted her report on the feasibility of a new Master of Science program at UVI in marine and environmental sciences. She visited UVI in late January to discuss her findings. A VI-EPSCoR funded position of Graduate Program Coordinator is being recruited to lead program development and implementation. In the coming months the Coordinator will take the proposed program through the UVI approvals process. It is hoped that the first students could be admitted in autumn 2007.



Bio-complexity of Caribbean Coral Reefs Update Dr. Richard Nemeth



Kenny Turbe, a new breed of local fishermen in the US Virgin Islands. Turbe works with BCCR researchers studying commercially important fish resources. He is keen to support the development of a sustainable fisheries industry in Virgin Islands waters that will maintain his livelihood for himself and for his children.

Sandra Romano and undergraduate researchers **Tryphena Cuffy** and **Semoya Phillips** attended the annual meeting of the Society for Integrative and Comparative Biology in Orlando, FL Jan. 4-8. They presented a poster entitled "Utility of multilocus phylogenetic analysis for assessing species differences in scleractinian corals of Caribbean Porites". Romano also attended an National Science Foundation workshop Feb. 10-11 on preparing an NSF CAREER proposal.

Stuart Ketcham is working on the preparation of a grant proposal for the NSF Program in Biological Oceanography related to the Population Connectivity in Marine Systems Specific Theme of Emphasis.

Jennifer Carroll submitted a proposal to the National Science Foundation's Major Research Instrumentation Program for the acquisition of a high field nuclear magnetic

resonance spectrometer for use in education and research at UVI. This instrument is vital to the characterization of naturally occurring compounds found from marine organisms. It will also be used in research focused on new antifouling coatings and environmental cleanup of radioactive metals.

Andre Francis, undergraduate researcher working with **Dave Smith**, has created a detailed coastline map of the US and British Virgin Islands for use with graphic software ARPSPLT and NCARG. Smith hopes shortly to have ARPS and MM5 parallel weather forecast models producing full-scale real-time weather forecast runs. He is also preparing a proposal to the HBCU-UP Interdisciplinary Computational Science Curriculum Development program to develop a training module on ARPS for students.

Kwame Williams and **Kailah Davis**, undergraduate researchers working with **Marc Boumedine**, have been using data mining tools to relate the sweetness of papaya fruit to plant characteristics such as variety, length of fruit, width of fruit, weight, flesh thickness, color, sweetness, sex and height of the plant's first flower, using experimental data provided by Tom Zimmerman of the USDA Agricultural Experiment Station at UVI.

Tyler Smith has been studying this year's coral bleaching event. Anomalously warm water pool over the eastern Caribbean from August to November stressed coral symbioses, leading to 70-100% bleaching in reefs shallower than 30 meters. His research has revealed patterns of bleaching, mortality and

resiliency. Collaborative efforts are now underway to understand which symbionts of coral may be more resistant to bleaching, and how future bleaching events will impact local coral reefs. Smith presented his work at a NOAA regional conference on St. Croix in January. In February he presented results from his doctoral research at the National Ocean Science meeting in Hawaii, and initiated contacts with coral reef scientists and oceanographers to promote opportunities for research collaboration.

Paul Sikkell and **Donna Nemeth**, along with undergraduate researcher **Amber McCammon**, are examining the relationship between habitat and infestation by parasites in reef fishes. Loads of the parasitic monogenean *Neobenedenia melleni* have been quantified from two species of surgeonfish collected at four sites in the U.S. and British Virgin Islands. Habitat-related factors and species differences in habitat use were observed, along with differing rates of parasite infection. The team is currently examining habitat use of the two species in Brewer's and Lameshur Bays. They are also conducting laboratory studies to test differences in susceptibility to monogenean infection.

Kevin Brown, Research Analyst in the Center for Marine and Environmental Studies, was awarded the UVI Research and Public Service "Outstanding Employee of the Year for 2005" for the St. Thomas campus. Brown does an outstanding job of supporting BCCR research, providing expert technical assistance and support for

faculty, staff and students.

In the past year Brown secured a contract to assist the Department of Planning and Natural Resources's Division of Environmental Protection ambient water quality monitoring program. He took the lead in ordering and scheduling training for faculty in the use of the Acoustic Doppler Current Profilers, as well as downloading and analyzing ADCP data. He has also taken on the responsibility of managing and coordinating renovations at the MacLean Marine Science Center.



eBird website launched

Jim Corven has partnered with the Cornell Lab of Ornithology and the University of the Virgin Islands to develop the first eBird website in the Caribbean, with support from VI-EPSCoR. **Virgin Islands eBird** officially launched on Feb. 21 at:

<http://www.ebird.org/USVI/>

Creators of this website hope the US Virgin Islands eBird site will lay the groundwork for a more comprehensive bird monitoring network across the region. The site is a great tool for public outreach and education and for fostering "citizen science." Birdwatchers can use the site to keep records of birding observations, to participate in regional bird monitoring activities, and to accumulate valuable data for research.