

## CENTRE FOR MARINE SCIENCES

Dale F. Webber BSc (Hons.) PhD *UWI* - Director



### WORK OF THE DEPARTMENT

**I**n August 2005, **Dr. Dale Webber** was appointed the Director of the Centre for Marine Sciences (CMS) following the retirement of Dr. George Warner. Dr. Webber continues as Head of Department of Life Sciences (DLS) thus this new appointment brings the DLS and CMS under one leadership. With the CMS now operationally functioning within the DLS, all marine related activities of both entities will now fall under

the direction of the CMS. It is envisaged that this new arrangement will facilitate improved collaboration, coordination and implementation of marine teaching, research and outreach within the Faculty. The Discovery Bay Marine Lab, the Port Royal Marine Lab and the Caribbean Coastal Data Centre will all be considered as a part of the restructured CMS within DLS. New staffing arrangements are being implemented to facilitate the revised organizational structure.

#### (a) Department's performance during 2005/06

##### Research and Research Output

The CMS completed its two-year study on the health of relocated corals and reef specimens moved during the dredging of **Rackhams Cay** undertaken by the Port Authority in 2001. The results of the long-term survival of the relocated coral specimens were submitted to the Environmental Foundation of Jamaica (EFJ), which funded the project.

The CMS received funding from REEF CHECK to conduct an assessment of the extent of **bleaching** and the subsequent recovery of corals in the coastal waters of Jamaica, following the global bleaching event that took place in September 2005. The CMS partnered with the Jamaica Coral Reef Monitoring Network and other volunteers to assess

sites in Port Royal and Portland Bight on the south coast and Portland and Discovery Bay as well as other north coast sites.

**The Jamaica Coral Reef Monitoring Network (JCRMN)** continued to be coordinated through the Caribbean Coastal Data Centre. They continued, through the use of volunteer divers, to carry out monitoring in a number of locations around the island and to assist in the coral bleaching assessment carried out by the CMS. Through regular meetings, the JCRMN seeks to extend its training and monitoring activities and will be targeting the areas of St Thomas, Portland and Westmoreland in the coming year. The CMS, through the CCDC continued to process and archive data on coral reefs and other coastal ecosystems throughout the Caribbean region under the CARICOMP Project and the GCRMN initiative.

The National Oceanographic and Atmospheric Administration (NOAA), facilitated through the Mainstreaming Adaptation to climate Change (MACC) project, have commenced the installation of a **Coral Reef Early Warning System (CREWS)** meteorological and oceanographic monitoring station in Discovery Bay. The CREWS technology incorporates artificial intelligence software to analyze *in situ* measurements of the atmospheric and oceanic conditions at strategic coral reef locations. The CREWS stations provide near real-time information products for use in coral bleaching alerts, and verify sea-surface temperatures from NOAA satellite products used for coral bleaching predictions.

The CMS was also this year successful in signing an MOU with the **Jamaica Institute of Environmental Professionals (JIEP)**. This MOU facilitates the work of JIEP Conference Committee Chairperson (Mrs. Marcia Creary) out of the offices of the CMS in exchange for the CMS being named a major sponsor for the conference.

**Mrs. Marcia Creary**, Environmental Data Manager was selected along with 24 other international professionals to take part in the Swedish International Development Cooperation Agency (SIDA) sponsored “Sustainable Coastal Development COAST 2005. Advanced International Training Programme” held in Sweden, Sept 9–Oct. 14. The course covered a wide range of topics related to the coastal zone such as coastal and oceanographic issues, coastal and marine ecology, fisheries and resource management, international organizations and conventions, spill risk assessment, environmental management, physical planning, public participation and political will, environmental impact assessment and strategic environmental assessment. The programme included

lectures, workshops, project work, practical exercises, and study visits and was conducted in different cities in Sweden, mainly in Gothenburg, Stockholm, Kalmar, and Karlskrona.

Mr Peter Gayle, Principal Scientific Officer at the Discovery Bay Marine Lab attended the American Society of Limnology and Oceanography Conference as well as the Conference on Coral Reef Restoration and frameworks for rehabilitation, while Dr. Norman Quinn attended the 17<sup>th</sup> Global Warming Conference and the 58<sup>th</sup> Gulf and Caribbean Fisheries Institute, Conference. Dr. Quinn also coordinated a workshop at DBML in Fish Energetics which was conducted by James Peterson (Fullbright Senior Fellowship) from Columbia River Research Lab in the USA.

Seven overseas teams of researchers utilized the DBML while another five local researchers were facilitated, three of these with multiple visits. There was one referred publication from the Centre in 2005/06 in the form of a book chapter by Dr. N. Quinn, however there were 7 conference presentations, 9 non-referred publications and 2 technical reports. The research output of referred material was therefore 1.0 per person (since there was only one academic) and 4.5 per person for all published materials. An additional two peer referred publications authored by visiting scientists, emanated from research conducted at DBML.

### **Undergraduate training**

Four UWI undergraduate courses were facilitated at the Discovery Bay Marine Laboratory over the 2005/06 academic year. One course came from the Department of Geography and Geology and three from the Department of Life Sciences. Although only four courses visited the lab, and only for weekends, over 160 UWI undergraduate students benefited from the DBML experience. Another four UWI related groups also used the lab exposing 75 young minds to the experiences to be had at the Discovery Bay Marine Laboratory. However, it was amongst the non-Jamaican undergraduates that the lab experienced greatest use with fifteen undergraduate groups and over 200 students using the facility some for as long as 27 days.

The Port Royal Marine Laboratory plays a major role in the undergraduate teaching of the Department of Life Sciences with seven courses, each averaging 23 students, using the laboratory weekly for the entire academic year and another seven courses, at various time of the year, receiving specimens supplied from the PRML to satisfy a campus demand of 930

students. Thus over 1500 undergraduate students benefited directly or indirectly from undergraduate training facilitated by the Centre for Marine Sciences.

### **Graduate Training**

The Centre continued to facilitate research graduate training with its eight students (six MPhil and two PhD) in an advanced stage of preparation with two being awarded their degrees and another two submitted. At the Discovery Bay Marine Laboratory, three UWI graduate students conducted occasional research and ten graduate students from five Universities in three different countries (Brussels, Canada & USA) conducted short term (5 to 15 day) research with two being awarded their degrees based on the graduate research conducted at the DBML. Seven graduate students used the Port Royal Marine Laboratory as a research base or platform over the 2005/06 academic year and another 2 MSc. research projects utilized the facilities. Thus over 30 graduate students benefited from training facilitated in some way by the Center for Marine Sciences.

### **Outreach**

The Discovery Bay Marine Laboratory continued its outreach activities with 680 students from 25 schools across the island (from Petersfield Primary in Westmoreland to Wolmer's Boys in Kingston) visiting and using the facilities over the 2005/06 academic year. DBML outreach service in the treatment of diving accidents was fortunately limited to a total of 6 divers (5 locals and 1 tourist) being treated and calls taken on another 3 cases which fortunately did not arrive for treatment. The Port Royal Marine Laboratory outreach centered around the visit of 364 students from 16 schools and colleges over the year, a further 250 students on Feb 2<sup>nd</sup>, 2006, World Wetlands Day and facilitation of two workshops on Mangrove Monitoring and wetland awareness. The contribution of a marine aquarium with live specimens on Research Day was also an outstanding outreach component of the Labs activity.

### **Income Generation**

The Centre's ability to generate income lay in two areas. The first of grant applications and projects continues to provide funding for the research conducted within the Centre in its plan to provide information and data on

Jamaica's marine resources. The second area is the income generation potential of the Discovery Bay Marine Laboratory as a commercial operation. Careful on the ground management in the 2005/06 year enabled an income of \$17.5 million and for the first time in over three years a surplus in income over expenditure of between \$1.5 and \$1.9 million. The DBML also underwent a Management and Financial Audit which is hoped will provide management and financial recommendations towards the improvement of the facility.

**(b) Main targets for 2006/2007 academic year**

**Research and Research Output**

- to have two major research grants operational within CMS, one at each marine laboratory;
- to facilitate smaller short term research projects to respond to questions and needs of the proximal communities of both marine laboratories;
- to engender a culture of research by the appointment of additional scientific and technical personnel at both marine laboratories; and
- to facilitate research to enable four peer reviewed publications from within CMS and another four from visiting scientists.

**Undergraduate Training**

- to facilitate on site teaching for fourteen courses (seven at each marine laboratory);
- to provide teaching materials for undergraduate courses taught at the main campus (PRML);
- to harness the human resources resident in the CMS and have those resources participate in teaching existing marine related undergraduate courses; and
- to create opportunities for students to engage in summer research projects at both marine laboratories for credit.

**Graduate Training**

- to participate in the delivery of the MSc in Aquatic Sciences mounted in Life Sciences;

- to have graduate students reside either permanently or for prolonged periods at DBML conducting ongoing research and receiving training; and
- to have the CCDC contribute to the training of graduate students in marine sciences by providing access to various data sets vital to resource assessment and scenario building.

### **Outreach**

- to improve infrastructure at both marine laboratories to support the visit of 1000 students from 50 educational institutions;
- to play a more active role in the field of data acquisition and manipulation with partners such as National Environment and Planning Agency, Fisheries Division, Port Authority, Shipping Association, St. Ann Bauxite, Jamaica Hotels and Tourist Association and ENGO's; and
- at the DBML, to continue to offer the essential 'chamber service' in responding to the needs of diver accidents and assist in the installation of a similar chamber on the south coast associated with the PRML.

### **Income Generation**

- to secure and maintain funding for the two major research projects identified above.
- to examine the feasibility of the CCDC generating an income; and
- to, through good management, secure an income at DBML to satisfy operational costs (\$16 million).

### **PAPERS PRESENTED**

- **Creary, M.** "The Jamaica Coral Reef Monitoring Network - A Case Study". Sustainable Coastal Development: COAST 2005. SIDA Advanced International Training Programme. Sept 9 – Oct. 14, 2005, Sweden.

- **Creary, M.**, M. Webber. “Mangrove Biodiversity”. Institute of Jamaica – Natural History Division: Biodiversity Symposium, May 22, 2006, Kingston
- **Quinn, NJ**, BL Kojis & A Bowden-Kerby. “Assessing the potential for natural recovery and coral restoration techniques for enhancing coral habitat in Jamaica”. Oceans 2005, 18-23 September 2005, Washington, D.C.
- **Quinn, NJ** & BL Kojis. “Evaluating artificial means to increase *Acropora* coral populations and increase associated fish communities in Jamaica”. 58<sup>th</sup> Gulf and Caribbean Fisheries Institute. San Andres Island, Columbia, 7-11 November 2005.
- **Quinn, NJ**. “Sustainable Development versus the Preservation of the Environment – Case Study of Essential Fish Habitat and the Planning of the North Coast Highway”. The Planning Institute of Jamaica 50<sup>th</sup> Conference on Economic and Social Development Planning. Kingston, Jamaica, 23 – 24 November 2005.
- **Quinn, NJ** & BL Kojis. “Assessing enhancement techniques to increase *Acropora* populations and fish biodiversity in Jamaica”. Society for Integrative and Comparative Biology Annual Meeting, Orlando, Florida, 4 - 8 January 2006.
- **Quinn, NJ** & BL Kojis 2006. “Assessing the potential for natural recovery and restoration of Scleractina coral after the 2005 coral bleaching event on Jamaica’s reefs”. 17<sup>th</sup> Global Warming Conference, Miami, Florida, 20-21 April 2006.
- **Gayle, A.M. Greenaway , B. H. J. Charpentier** A different perspective on the status of Jamaica’s north shore reefs is there a silver lining? 32<sup>nd</sup> Scientific Meeting of the Association of Marine Laboratories of the Caribbean; Curacao Sea Aquarium; June 13 - 17, 2005

## PUBLICATIONS

### Books and Monographs

- \* **Quinn, NJ** & BL Kojis 2006. Natural resilience in coral reef ecosystems. pp 79-92 In: Precht, WF (ed) Coral Restoration Handbook. CRC Publications. Boca Raton, Florida

### Non-Refereed

- \* **Quinn, NJ** 2005. Assessing pelagic fish stocks off Jamaica using game fishing tournament results. Proc. 56<sup>th</sup> Annual Meeting of the Gulf & Caribbean Fisheries Institute. Tortola, British Virgin Islands. 56: 241-252
- \* Kojis, BL & **NJ Quinn**. 2006. A census of the US Virgin Islands commercial fisheries at the start of the 21st century. Proc. 10<sup>th</sup> International Coral Reef Symposium. pp 1333- 1341
- \* **Quinn, NJ** 2006. Working to stem the tide of cultural erosion through the documentation of local aquatic knowledge and fishing practices by Melanesian youth. Proc. 10<sup>th</sup> International Coral Reef Symposium. pp 1936 -1941
- \* **Quinn, NJ** & BL Kojis 2006. Invertebrate recruitment patterns inside and outside Discovery Bay, Jamaica. Proc. 10<sup>th</sup> International Coral Reef Symposium. pp 83 - 90
- \* **Quinn, NJ** & BL Kojis 2006. Subsurface variation on an offshore reef during a period of heavy rainfall at St. Thomas, U.S. Virgin Islands. Proc. 10<sup>th</sup> International Coral Reef Symposium. pp 406 - 409
- \* **Quinn, NJ**, BL Kojis & R. Sammuell. 2006. Empowering Papua New Guineans with environmental monitoring skills through participation in a Reef Check survey. Proc. 10<sup>th</sup> International Coral Reef Symposium. pp 953 - 960
- \* **Quinn, NJ**, D Gochfeld, M. Hamann, M Slattery, L Walker & BL Kojis 2006. Documenting and conserving biodiversity on Jamaican coral reefs while exploring for pharmacologically interesting natural products. Proc. 10<sup>th</sup> International Coral Reef Symposium. pp 807 - 816
- \* **Gayle, P. M. H., Wilson-Kelly, P., Green, S. (2005)** Transplantation of benthic species to mitigate impacts of coastal development in Jamaica. Revista de Biología Tropical 53 (suppl 1) p105-115.

#### **Technical Reports**

- \* Warner G.F., **M. Creary**, P.E. Edwards, M. **Hibbert**, L. Jones, and M. McNaught. 2005. "Monitoring of transplanted Corals at Rackhams Cay, Kingston Harbour". Prepared for the EFJ Project 02/06/329 - PL480. 38 pp.

- \* **M. Creary, L. Jones**, I. Kenny, P. Wilson-Kelly, J. Smith, and S. Green. "Coral Reef Monitoring for Climate Change Impact - Jamaica 2001 - 2003". Prepared for the MACC Project. Strengthening of Climate and Coral Monitoring Network. CARICOM Secretariat. 32 pp

## **INCOME GENERATION**

### **Grants**

#### **Caribbean Coastal Marine Productivity programme (CARICOMP)**

US\$15,000 was received in support on the activities of the Caribbean Coastal Data Centre in the processing and archiving of data for this project.

#### **REEF CHECK funding for bleaching studies**

The CMS has received US\$ 3000.00 to conduct assessments of the extent of bleaching and the subsequent recovery of corals in the coastal waters of Jamaica for the period October 2005 to April 2006.

#### **Mainstreaming Adaptation to Climate Change (MACC) Project**

US\$3500 was received to conduct a review of the coral reef video monitoring protocol and to develop a training manual for the expansion of the coral monitoring into eight countries in the Eastern Caribbean.

#### **United States Agency for International Development.**

Restoration of coral reefs in Jamaica, West Indies; Practicing novel measures for reef management. PIs: B Rinkevch (Institute of Oceanography Haifa, Israel), D Webber, J Mendes. Duration June 2005 – May 2009. Amount: US\$102,000 (Jamaican Component)

#### **Commercial operation DBML**

The Discovery Bay Marine Laboratory secured an income of \$17.5 million over the 2005/06 academic year which surpassed expenditure by approximately \$1.5 for the first time in over five years.

## **PUBLIC SERVICE**

### **Marcia Creary**

- Member, Steering Committee, Caribbean Coastal Marine Productivity programme

- Council Member, Jamaica Institute of Environmental Professionals
- Member, International Society for Reef Studies
- Member, Caribbean Academy of Sciences
- CMS Representative, National Council for Ocean and Coastal Zone Management

**Peter Gayle**

- Member, Diving sub-group of the working group on Fisheries Management and related matters of the National Council on Oceans and Coastal Zone Management.

**Lourene Jones**

- Member, Jamaica Blue Flag Jury

**Marlon Hibbert**

- President, University Sub-Aqua Club

**Camillo Trench**

- Life Sciences/CMS representative, National Ramsar Committee (NEPA).
- Member, Communication, Education and Public Awareness (CEPA) sub committee of National Ramsar Committee.

**CATEGORIES OF STUDENTS**

Postgraduate 2005/06 registrations 2005/06 completions

MPhil	6	2
PhD	2	0