

## DEPARTMENT OF LIFE SCIENCES

Dale F. Webber, BSc (Hons.), PhD UWI – Head of Department

### WORK OF THE DEPARTMENT

The Department of Life Sciences enjoyed a successful and productive year which started by the completion of the Quality Assurance Review in September 2006. All staff contributed to this valuable exercise and the emerging consensus is that of a cohesive vision for Biology not only on the Mona Campus but across the entire University. From this exercise, course, section, departmental and even three year objectives and plans have been crafted. Within the year the Department also assumed, by directive of Finance and General Purposes Committee (F&GPC) administrative responsibility for the Centre for Marine Sciences with the attendant Discovery Bay Marine Laboratory which brings all Marine entities under the administration of one department. The departure of Professor Emeritus Ivan Goodbody and the death of Dr. Peter Vogel placed additional demands on the department however redoubled efforts compensated through to the end of the year. Excellence in teaching continued to be the Department's major goal which was achieved at all levels while income generation was significant in facilitating the administration of such a large department on such a meager budget.



#### *The Centre For Marine Sciences*

Over the year August 2006 to July 2007 the Centre for Marine Sciences under the Directorship of Dr. Dale Webber began to function in its new role coordinating all marine activities within the Department of Life Sciences. The Discovery Bay Marine Laboratory (DBML), the Port Royal Marine Laboratory (PRML) and the Caribbean Coastal Data Centre (CCDC) which form the functional pillars of CMS all worked together to meet over 90% of the teaching, research and outreach goals identified in 2006. Staff changes have been initiated and three of the

managerial and academic positions have been advertised and appointments are expected early in 2007/08. The Strategic Transformation Team (STT) Ja\$12M upgrade and refurbishing of the DBML highlighted the operations at that facility while at the PRML the continuation of the mangrove biodiversity project and the development of plans for a Biodiversity Centre at PRML were of greatest significance with the receipt of a US\$53,000 Mainstream Adaptation to Climate Change (MACC) grant highlighting the CCDC operations. Managerially, the Finance and General Purposes (F&GPC) mandated re-introduction of the DBML Advisory Board and expansion of its terms of reference into the Advisory Board of the Centre for Marine Sciences signifies the completion of the reclamation of all aspects of the Centre within the operations of the Campus as the only tertiary institution in the island with Marine Biology field stations.

### **Undergraduate teaching**

The department achieved its goal of engaging the OurVLE as the delivery platform for 50% of its courses thanks primarily to the significant effort of the individual lecturers and the resourcefulness of the department's IT Manager Ms. Claudia Lewis. 93% of all courses were available electronically and 61% available on OurVLE. This no doubt contributed to the maintenance and improvement of the high standard of teaching and student centered approach of the department as was evidenced by the student assessment scores where no staff member received less than 3.2 while many received 4.8 for a departmental average of 4.3 marginally better than the scores for the 2005/06 academic year. Having completed the Quality Assurance Review the department through its curriculum committee headed by Prof. P. Coates-Beckford discussed, decided and will be implementing changes to its curriculum delivery over the next three years starting with the level one courses in 2007/08. Another such decision involves the implementation in 2008/09 of a Marine Biology Major which was one of the specified goals from the 2005/06 departmental report and also recommended in the Quality Assurance Review. Other review recommendations, especially in curriculum reform, tracking graduates, and the establishment of stronger links with industry and potential employers of our graduates have received consideration and are addressed in the Department's action plan submitted for review by Faculty, Campus and University.

### *Marine Science Undergraduate Training*

Teaching and training of undergraduate students was a major success of the Centre in the 2006 to 2007 academic year. The objective of teaching for fourteen courses (seven at each marine laboratory) on site was doubled at each laboratory with DBML hosting 14 UWI groups and 13 overseas groups for a total of 27 groups from 11 tertiary academic institutions. At the PRML 11 UWI groups were hosted and 4 overseas groups for a total of 15 groups from 5 tertiary institutions. This reflects a 97 % increase in UWI courses at DBML without a reduction in the overseas use of the facility which was a major objective of the year's operation. The success in teaching was further evidenced by the PRML provision of undergraduate course teaching materials to the main campus to facilitate the teaching of 15 courses or 45% of all Life Sciences courses. Within the CMS human resources were harnessed to participate in the teaching of marine related undergraduate courses with all three CMS scientific officers contributing to the delivery of courses ranging from Diving Technology for Aquatic Scientists to Marine Ecology, Coral Reef Ecology and Coastal Management.

### **Graduate programme**

With one of largest graduate schools of the Mona Campus the greatest difficulties of the department are in the throughput rate as identified in the goals set for 2006/07 and the functioning of the supervisory committees. In light of these difficulties the Department initiated a day meeting for all graduate students individually with the HOD and graduate coordinator. Throughput analysis and reasons preventing timely completion were examined and recommendations made for interventions. Committees have been modified and interventions at the Departmental level have resulted in graduate students and some committees regaining focus. Unfortunately the expected streamlining of the Department's two environmental programmes into one with a core and electives was not achieved and may impact the intake, viability and delivery of the programmes in the next academic year. The MSc. in Aquatic Sciences benefited tremendously from the visit of the External Examiner Professor William McDowell who reviewed all question papers, scripts, and met with both the students and staff involved in the programme.

### Marine Sciences graduate programme

The Centre for Marine Sciences participated in the delivery of three of the eight courses in the MSc in Aquatic Sciences mounted in Life Sciences and two graduate students were identified to reside for prolonged periods at the DBML thereby enhancing interaction between visiting groups and local researchers. Furthermore, the CCDC was instrumental in the provision of data and scenarios in the Integrated Coastal Management MSc. course where the availability of regional data and the historical contributions of management from 26 regional facilities over 10 years formed exercises for student research and project development.

### Research output

The goal of 1.5 referred publications is still widely held to be a reasonable and achievable goal however only 0.8 was achieved in 2006/07. Conference presentations and technical reports received less attention from the Department in the 2006/07 year however, the department was encouraged by the participation of staff and graduate students in conferences as we attempt to develop a culture of research.

### Marine Science Research and Research Output

The Centre achieved its first objective of having two major research grants operational within CMS, one at each marine laboratory in the form of the USAID Coral restoration project at the DBML, the Mainstream Adaptation to Climate Change project in the CCDC and the Environmental Foundation of Jamaica Mangrove Biodiversity Project at the PRML. These projects were complimented by smaller or short term projects which responded more to the local needs in areas surrounding the two marine laboratories, thereby achieving the second research objective. These projects include the installation of the Coral Reef Early Warning Station at the DBML which provides real time marine and oceanographic data for entire north coast of Jamaica while at the PRML the planned Palisadoes mangrove replanting exercise (Caribbean Cement Company and Royal Jamaica Yacht Club) will benefit from the Mangrove Nursery Project. The third objective of engendering a culture of research at both laboratories by the appointment of additional scientific and technical personnel was modified by a re-evaluation of the circumstances and the objective achieved by the appointment of senior administrative support for the entities thereby releasing the existing scientific officers to focus more on

scientific research. The final research objective of facilitating research to enable four peer reviewed publications from within CMS and another four from visiting scientists was partially achieved with three papers being published by CMS colleagues and another three facilitated by scientists working at the DBML.

#### Income generation

With the reduction in the number of MSc programmes, income generation from the remaining programmes is targeted to reduce to \$1.0 million. However, the growth of the summer school programme has indicated a new income stream \$3.9 million to which the Department resorted to offset its meager operational budget which still stands at less than 5 % of the total departmental budget.

#### Marine Science Income Generation

Funding continued for all CMS projects initiated in the previous year and the DBML secured sufficient funds to satisfy its operational needs of \$14.2 million and for the second consecutive year, a surplus in income over expenditure of at least \$0.6 million was achieved. Sources of funding for the 2006/07 academic year were varied with USAID funding at DBML, EFJ funding at PRML and MACC funding at CCDC being of significance.

#### Outreach

The CMS co-sponsorship of the Jamaica Institute of Environmental Professionals' biennial conference at the Pegasus Hotel was one of the most significant outreach activities of the centre, by providing organizational capacity, in the person of Mrs. Marcia Creary, the conference chairperson, as well as, 2 pivotal papers the University and the Department of Life Sciences received important national and regional recognition. This outreach was further improved by the attendance of over 1100 primary and secondary school children from over 53 educational institutions again surpassing the goals set in 2006.

Finally, an important outreach service provided by the CMS to the nation is the treatment of diving accidents in the only recompression chamber in the island stationed at the DBML. Fortunately only 9 cases were presented over the year and none related to the over 1000 man dives conducted at either DBML or PRML. Plans for the installation of a second chamber at Port Royal are ongoing and are being spearheaded by the Principal Scientific Officer at DBML Mr Peter Gayle.

## **Main DLS targets for 2007/08 academic year**

### **Research and Research Output**

- To maintain an output of 1.5 refereed publications per academic staff member.
- To encourage presentation of research findings of graduate students at local and international conferences.
- To maintain two major research grants operational within CMS, one at each marine laboratory.
- To engender a culture of research by the appointment of Administrative officers releasing existing scientific officers to conduct research.
- To facilitate research to enable four peer reviewed publications from within CMS and another four from visiting scientists.

### **Undergraduate Training**

- To consolidate teaching at level 1 by implementing and delivering two new courses to an expanded student intake.
- To review the structure of the remainder of the undergraduate programme with a view to widening the range of majors offered by the department.
- In the face of expansion in student numbers, to maintain internationally credible academic standards in assessment.
- 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 create opportunities for students to engage in research projects at both marine laboratories for credit.

### **Graduate Training**

To ensure that those students registered for research degrees produce work of sufficient scientific caliber which merits publication in peer reviewed scientific journals while at the same time maintaining a reasonable throughput time.

- To, as far as possible, provide the resources for the above while recognizing the constraints of a limited departmental budget.
- To continue to improve delivery of courses in MSc programmes while maintaining an acceptable academic standard.
- To facilitate 2 MPhil and 2 PhD graduate programmes at each marine laboratory.

### **Outreach**

To improve infrastructure at both marine laboratories to support the visit of 1000 students from 50 educational institutions.

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 two major research projects
- To, through good management, secure an income at DBML to satisfy operational costs
- To secure UGC funding status for the CMS (ie move from noncommercial operations)

### **Overall teaching achievement**

Overall teaching was again exceptionally good within the department with all courses being successfully taught, examined, and assessed by students. All lecturers but one scored greater than 3.5 on student assessment with departmental average of  $4.27 \pm 0.8$  (one of the highest in the Faculty). While this does not reflect an improvement over the 4.31 in 2004/05, it confirms maintenance of a high standard recognized by the Deputy Principal's letter of commendation to the Department. Average course satisfaction was rated as good ( $3.92 \pm 0.9$ ) with as many as 62% of students responding.

### **Research output**

In 2005/06 the Department of Life Sciences with 15 current staff was able to produce 7 publications in referred journals and a further 3 in

government reports and technical papers with 6 conference presentations. This resulted in a 0.9 per capita publication.

## **PAPERS PRESENTED**

- Aiken, K., Kumagai, N., Yasuda, T., & I. Jones. "The egg trace method of identifying diamondback squid (*Thysanoteuthis rhombus*) fishing grounds in Jamaican waters." 59th Annual Gulf & Caribbean Fisheries Institute Conference, Belize City, Belize, November 2006.
- Robinson R. D. "Epidemiology of soil-transmitted infections." Pan-American Health Organization Workshop: Kingston, Jamaica. May 2007
- Tennant , P. F. Revitalizing the Papaya industry through Biotechnology: The case of the ringspot virus resistance. Biotechnology Research Workshop, Nassau, The Bahamas, October 2006.
- Creary, M. "Climate change & Coral reefs" Department of Economics Conference on Climate Change and Investment and insurance. 2007.
- Gayle, P. "Reefs and their dependents – benefits of Environmental Stewardship", 3rd JIEP Conference on Environment. 2007.
- Webber, D. F., C.Campbell & D. Narinesingh. "Seagrass Replanting an Environmental Success." 3rd JIEP Conference on Environment. 2007.

## **PUBLICATIONS**

### **Refereed Journal Articles**

- \* Christensen, V., Aiken, K., & M.C. Villanueva. 2007. Threats to the ocean: on the role of ecosystem approaches to fisheries. *Social Sciences Information*, Vol. 46, No. 1: 67-86
- \* Abdulkadri, A., Pinnock, S., and Tennant P., F 2007. Public Perception of genetic engineering and the choice to purchase

genetically modified food in Jamaica. *Journal of Food, Agriculture and Environment*. 5: 8-12

- \* M Roye, A. Collins, M. Brown, C. Stewart, S. Turner, M. Chin, L. Fisher, P. Tennant, W. McLaughlin. 2007. Plant Virus and Phytopathology Research in Jamaica: A Review. *The Americas Journal of Plant Science and Biotechnology* 1: 36 - 45.
- \* Isaac, Wendy Ann P., Richard A.I. Brathwaite, Jane E. Cohen, Isaac Bekele. 2007 Effects of alternative weed management strategies on *Commelina diffusa* Burm. infestations in Fairtrade banana (*Musa* spp.) in Saint Vincent and the Grenadines. *Crop Protection* 26 1219-1225.
- \* Waugh CA, Lindo JF, Foronda P, Ángeles-Santana M, Lorenzo-Morales J & Robinson RD. (2006). Population distribution and zoonotic potential of gastrointestinal helminths of wild rats, *Rattus rattus* and *R. norvegicus*, from Jamaica. *Journal of Parasitology* 92(5): 1014-1018.
- \* Ranston E.R., D.F. Webber & J. Larsen. 2007. The first description of the potentially toxic dinoflagellate, *Alexandrium minutum* in Hunts Bay, Kingston Harbour, Jamaica. *Harmful Algae* Vol.6: 27-47.
- \* Azan, S. A. & D.F. Webber. 2007. The characterization and classification of the Black River Upper Morass using the 3 parameter test of vegetation, soils and hydrology. *Aquatic Conservation*. Vol. 17 (1): 5-23.

#### **Technical reports and Non-refereed Articles**

- \* Aiken, K.A., 2007. A really little fish story: an unusual fish phenomenon in the Yallahs River, St. Thomas. *Jamaica Journal*, Vol. 30, Nos. 1-2: 62-67; Institute of Jamaica, Kingston.
- \* Webber, M.K. 2007. Biodiversity of Jamaican Mangrove Areas. Volumes 1-6. EFJ Funded project Report
- \* Webber, M.K. 2007. Biodiversity of Jamaican Mangrove Areas. Interactive CD-Rom. EFJ Funded project.

## **INCOME GENERATION**

### **Large projects**

Chromalena	2,835,108.06
Ballast Water	3,449,000.06
Crocodile project	300,000.00
Mainstream Adaptation to Climate Change	3,710,000.00
Strategic Transformation Team	12,000,000.00
Total income from large research grants	JA\$22,294,108.00

### **Small projects**

\$720,800 from New Initiative Fund (UWI Research Fellowship Committee) for Survey, Characterization & Conservation of Jamaican Orchids; November 16, 2006.

\$56,414.40 from Postgraduate Research Fund for project Jamaican orchids: strategies for conservation and towards sustainable development; December 5, 2006.

## **INCOME FROM SELF-FINANCED PROGRAMMES**

Programmes	Income	Expenditure
MSc PPP	Ja\$ 600,000.00	Ja\$ 652,306.69
MSc TEAM	Ja\$ nil	Ja\$ 12,221.53
MSc Aquat. Sci.	Ja\$ 700,000.00	Ja\$ 966,571.53
Summer school	Ja\$ 4,222,946.98	Ja\$3,855,217.53
Rental	Ja\$ 172,200.00	
Consultancy	Ja\$ 2,248,449.46	

## **PUBLIC SERVICE**

Dr Karl Aiken

- Member, Board of Directors & Chairman, (Academic Sub-Committee), Caribbean Maritime Institute, Palisadoes Park, Kingston
- Member, CITES Scientific Authority of Jamaica, NEPA

Mr. Frederick Boyd

- External Examiner, Joint Board of Teacher Education

Dr. Jane Cohen

- Member, Scientific Authority of Jamaica
- Member, Alien Invasive Species Working Group of Jamaica
- Member, National Organic Agriculture Steering Committee, Research & Seed Production Sub-Committee
- Member, Consultation Group for Pest Risk Analyses of National Plant Protection Organization
- Member, Education & Research Sub-Committee of the Nature Preservation Foundation

Dr. Eric Garraway

- Member, Advisory Board , Natural History Division, Institute of Jamaica
- Advisor, Vincentian Student Association.

Dr. Kurt McLaren

- Member, The Blue and John Crow Mountains National Park Scientific and Technical Advisory Committee

Prof. Ralph Robinson

- Member, Board of Directors, Jamaica Agricultural Development Foundation
- Member, National Ad hoc Committee to Develop Guidelines for the Aquaculture Industry in Jamaica
- Member, Ministry of Agriculture Shrimp Aquaculture Policy Sub-Committee
- Executive Secretary, Bioethics Society of the English-Speaking Caribbean

Dr. Paula Tennant

- Staff Representative, National Environment & Planning Agency's Biodiversity Committee

Dr. Kisan Vaidya

- Member, Gene Bank Committee, Jamaica
- Member, Technical Committee, Jamaica Agricultural Development Foundation (JADF)

Dr. Dale Webber

- Secretary, National Environment Societies Trust (NEST)
- Chairman, CL Environmental Company Limited
- Member, Ministry of Education and Culture Overseas Examination Commission
- Chairman, National committee of RAMSAR international convention on Wetlands
- External Examiner, CASE Environmental Sciences programme
- Member, Board of Governors, Mona Preparatory School

Dr. Mona Webber

- Member of the National Environmental Education Committee
- Member of the Steering Committee for Sea Turtle Recovery Network
- Member of the Association of Marine Laboratories of the Caribbean
- Member, Caribbean Academy of Sciences, Jamaican Chapter
- Member, National Ramsar committee (NEPA)
- Member, UNESCO National Advisory Committee for Science and Technology

Dr. Byron Wilson

- Chairman, Jamaican Iguana Research and Conservation Group
- Member, Board of Directors, Windsor Research Centre
- Member, Working Group on Invasive Species, (NEPA)

Marcia Creary

- Member, Steering Committee, Caribbean Coastal Marine Productivity programme
- Council Member, Jamaica Institute of Environmental Professionals & Chairperson, Conference Committee
- 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

Loureene Jones

- Member, Jamaica Blue Flag Jury

Marlon Hibbert

- President, University Sub-Aqua Club

Camillo Trench

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

## CATEGORIES OF STUDENTS

### Undergraduate numbers:

Preliminary (Year 0)	-	107
Introductory (Level I)	-	250
Advanced (Level II)	-	100
Advanced (Level III)	-	64

Of the 64 final year students, 42 completed graduation requirements with the following distribution in performance.

First class Honours	-	4
Upper second Honours	-	9
Lower second Honours	-	25
Pass	-	5

The majors selected within the Department were:

Botany	-	30
Biology with Education	-	9
Environmental Biology	-	47

Experimental Biology	-	16
Microbiology	-	25
Zoology	-	84

### Postgraduate

	2006/07 registrations	2006/07 completions
MSc Tropical Ecosystem Assessment and Management	19	9
MSc Plant production and protection	7	0
MSc Aquatic Sciences	7	0
MPhil	63	5
PhD	20	2

### Prizes

The following students were formally recognized for quality academic performance.

Preliminary Biology	Camille Edwards
Introductory Biology	Janelle Kidd Gayann McLeod
S. Potluri book award	Laura Gooden
D.P. Devi-Prasad book award	Stacy-Ann Scott
Level II Zoology	Lana Lowe
L.B. Coke Plant Physiology Prize	Patricia Brooks
Vincent Hugh Wilson McKie Prize	Merrilyn Wallace