Component 5: Coral Reef Monitoring for Climate Change

During the course of 2000 the national institutions responsible for coral reef monitoring and data processing and analysis, in the Bahamas, Belize and Jamaica, committed the resources and personal that, to a greater extent, ensured the coordinated monitoring of coral reefs and the processing and analysis of the resulting data.

The Centre for Marine Sciences (CMS) at the University of the West Indies, Mona Campus, and the CPACC RPIU, continued to develop the collaborative relationship that started in 1998. A sub-regional data management node for C5 was established and staffed within the CMS Data Management Centre (DMC). The Centre provided technical assistance in data processing and analysis to the Bahamas and Belize, as well as conducting progress evaluations in these countries in September 2000.

In keeping with the anticipated expansion of Component 5 activities to the eight remaining CPACC countries with coral reefs, the CMS DMS has changed its name and vision to the Caribbean Coastal Data Centre (CCDC).

In recognition of the level of collaboration between the CPACC Project and the CMS, and in anticipation of increasing role that the CMS will play in supporting C5 implementation, further discussions were held on the development of a memorandum of understanding (MOU) between the two entities.

During the reporting period consideration was given to the development of a funding proposal for the expansion of the CMS to support C5 activities to be carried out under the IMPACC Project.

Site Selection and Methodology

(a) The Bahamas

The Bahamas has carried out monitoring at two locations: New Providence and Abaco. At New providence video monitoring was carried out at the Sea Viking (Nov, 1999 and Sep, 2000) and the Ridge (Dec, 1999) sites while at Abaco the Man Jack Cay (Sep, 200) site was monitored. A third location has yet to be selected and monitored. One (Optic Stow Away) temperature data recovery. Another was deployed off New Providence and was retrieved in December 2000.

The Bahamas have been experiencing problems with regards to the availability of vessels and the cost of boat rental. In addition, there were problems associated with deploying staff members who already have a heavy workload, into the field for extended periods of time.

(b) Belize

Belize has carried out video monitoring in three locations Middle Caye at Gover's Reef Marine Reserve, Hol Chan Marine Reserve and South Water Caye marine Reserve. Belize had proposed to monitor additional sites during the latter part of the year (Hol Chan, Gallow point, Half Moon Caye and Babalar) but these were not done due to severe weather conditions.

(c) Jamaica

Jamaica has carried out video monitoring at three locations, Discovery Bay, Monkey Island in Portland and Southeast Cay at the Port Royal Cays.

P. Wilson-Kelly of the Natural Resources Conservation Authority (NRCA) presented a report to the UNFCCC Steering Committee meeting (July 6, 2000) on the video monitoring of the three sites in Jamaica. He at this time indicated that the NRCA were considering a second monitoring exercise for 2000. He was, however, advised to await the results of the initial monitoring exercise.

Data Processing and Data Analysis

Pilot Countries

(d) The Bahamas

Two CDs containing the dotted and undotted images from the sites monitored were received at the CCDC. Some amount of data processing and analysis has been carried out in the Bahamas but no data entry sheets have been sent to the CCDC.

(e) Belize

The CPACC computer at the Coastal Zone Management Authority and Institute (CZMA/I), Belize had to be reformatted and the required software reloaded. Jeff Miller provided Ms. Bood of the CZMA/I with a copy of the "Protocol for Video (data processing) Methods". Data processing and analysis for Hol Chan and South Water Caye were completed, however the exercise for south Water Caye had to be repeated because of problems associated with the random dot plotting process (see Quality Assurance /Quality Control section below). Images for Glovers Reef were captured and dotted in Jamaica and sent to Belize for processing and analysis.

(f) Jamaica

Data processing and analysis for Discovery Bay and Portland were completed. Port Royal was 50% completed.

Caribbean Coastal Data Centre (CCDC)

Modifications were made to the data entry sheets originally designed by Jeff Miller to better provide the information required for identifying and quantifying the trends of climate change impacts on the reefs. Changes were made to the substrate category codes to follow those employed by the CARICOM Productivity (CARICOMP) project. A revised data entry sheet template was also received from Jeff Miller and discussions on the modifications to the data entry sheet were held with him. The summary tables were updated to include more information about coral bleaching and coral diseases. An additional feature was include, that of the *Shannon Weaver* diversity index for each transect and well as for each site. It is anticipated that further refining of the CPACC data entry sheets, to include some of the new features developed by J. Miller and to make them more site/country specific, will take place after the first data sets are evaluated.

The information posted on the Internet about *PointCount'99* software was reviewed with a view to comparing it to the present method being utilized by CPACC. *PointCount'99 is* a Win95/98 based PC program developed for the US EPA's Coral Reef Monitoring Project (CRMP) to utilize the random point count method for accurately estimating percent coverage of corals, sponges, and associated substrate from digitally frame-grabbed underwater video images. Discussions with Jeff Miller indicated that this program does not entirely meet the needs of the CPACC's coral monitoring program.

Archiving Data

A list of CD's and tapes storage at CPACC/CMS is kept in the Archives. A comprehensive list of C5-data files is also kept.

Quality Assurance/Quality Control (QA/QC)

A draft QA/QC document was prepared in which captured frames were used to demonstrate correct and incorrect monitoring techniques that would ultimately affect the accuracy of the data. The final document will be useful to persons actually involved in video monitoring in the field.

A draft substrate identification manual was prepared with the assistance of Ms. Judith Mendes (Marine Biology Ph.D. candidate) to show how the different substrate categories appeared in the captured images. This document will be especially useful to those people conducting the data analysis, particularly if they did not conduct the video monitoring themselves.

All three pilot countries experienced problems with the *random plot dotting process* and were initially unable to fit the random plot exactly over the image. Considerable time was spent in resolving this problem, after which the captured images had to be redotted and in the case of Belize the data analysis repeated (for South Water Caye).

The latest draft of the document "*Using Videotape to Sample Coral Reefs*" by Jeff Miller (The US Geological Survey, Biological Resources Division, October 2000) was received. It includes modifications to the previous document and is available for posting on the CPACC website.

Internet-based Coordination and Information.

A new *e-group* entitled *C5-Monitoring* was established specifically to discuss issues related to C5. It is expected that this new *e-group* will be smaller than the *Climate Change-reefs (cc-reefs) e-group*, and that members will be more willing to openly share experiences and discuss problems associated primarily with C5.

Feedback and Recommendations

Participants from Jamaica and the Bahamas have expressed the desire to have a workshop to review the activities and challenges of the program with a view to refining the methodology and techniques for future monitoring. It was felt that the exchange of experiences and solutions would be beneficial to the pilot countries as well as the other CPACC countries that are expected to implement coral reef monitoring in the future.

It was suggested by the Bahamas that a meeting be held to coordinate activities between the related components of CPACC.

There was also the feeling that the communication between the pilot countries and the RPIU could be improved.

The *cc-reef e-group* should be used more a promotional tool to focus on the activities of CPACC within the Caribbean and to disseminate information related to the coral reefs and climate change.

An assessment of the merits of the video monitoring methodology as compared to the other commonly used coral reef monitoring techniques needs to be carried out. Data from the

Discovery Bay reef in Jamaica could be used to compare methodologies as both CARICOMP and CPACC use the same sampling sites.

Other Activities

(a) Meetings, Conferences and Workshops

UNFCC Project Steering Committee, Jamaica. The Coordinator represented CPACC at these meetings.

AGRAA 2000 Workshop, Jamaica. This workshop was held from August 1st to the 6th, 2000 in Discovery Bay. The aim of the workshop was to train persons in the Rapid Assessment Protocol (RAP) which was used to evaluate the condition of a large number of reefs even when no previous data are available. Site assessments took place during the two weeks following the workshop at various locations (Port Antonio, Negril, Ocho Rios and Montego Bay) around the island. Attendance at this workshop had to be cancelled due to scheduling conflicts.

C5 Presentation, World Bank, Washington, D.C., USA. On September 12, 2000, the DPM/CZMS made a presentation on C5 to an audience comprising representatives from the World Bank. The presentation was one of two given by CPACC Component Managers, the other being a C1 presentation given by Lee Chapin on September 11, 2001. Both presentations were organized by Walter Vergara, World Bank.

The 9th International Coral Reef Symposium. The Coordinator attended the 9th International Coral Reef Symposium, in Bali, Indonesia during October 23 to 27. Information packages, brochures and posters on CPACC were distributed at the symposium through the booth hosted by the Bahamas. Attempts were made to have the visit to the symposium covered in the local media but the timing of the information sent to the press resulted in only two short general article on the impact of climate change on coral reefs appearing in the Herald (Nov. 12) and the Observer (Nov. 20) newspapers. Highlights of the symposium were prepared and posted on the *cc-reef e-group*.

CRIS Database Design and System Maintenance Workshop, Barbados. The Coordinator attended two days (November 1-2) of the CRIS Database Design and System Maintenance Workshop in Barbados held during the period October 30 to November 3. The topics covered at the sessions attended were Relational Database Design and Using and Customizing the CRIS.

Workshop on Climate and Island Coastal Communities, November 6 to 8, 2000 East-West Centre, Imin Conference Facilities, Honolulu, Hawaii.

The Deputy Project Manager/Coastal Zone Management Specialist (DPM/CZMS) attended the three day workshop along with some 132 specialists representing government, business, scientific institutions, non-governmental agencies and communities throughout the islands of the Pacific (both independent and US territories) (118), the insular Caribbean (2) mainland United States (9), and New Zealand (2) were invited to participate in the Workshop on Climate and Island Coastal Communities.

The workshop was organized by the East West Centre as part of an 18-month Pacific Islands Regional Assessment Project funded by the National Science Foundation on behalf of NSF, NOAA, the National Aeronautics and Space Administration (NASA), and the U.S. Department of the Interior. The results will be included in the final report of the first National Assessment of the Consequences of Climate Variability and Change for the U.S., which is being organized by

the U.S. Global Change Research Program under the auspices of the White House Office of Science and Technology Policy.

The opportunity was taken to hold discussions with coral reef professionals attending the workshop. Networking activities included discussions with:

- Kevin Parnell, Visiting Colleague, Department of Geography, University of Hawaii (kparnell@hawaii.edu).

  Mr. Parnell has conducted research on coral reef hydrologics. He has agreed to send copies of his papers to the CPACC RPIU in December 2000. He will also attempt to get papers on reef crest hydraulics published by his colleague, Harry Roberts, at Louisiana State University. This information will be used to inform CPACC's coastal vulnerability scenarios, and to provide interpretive content for public awareness and education materials.

- Robert Richmond, Professor of Marine Biology, University of Guam Marine Lab, Guam:

  Arising from discussions on a universal classification system for defining coral reef health, Prof. Richmond offered to send a reef health checklist that he had developed.

  Prof. Richmond advised that a regional coral reef web site will be launched in December 2000, and suggested web links with the CPACC site.

  It was agreed that CPACC and entities involved with coral reef monitoring in the Pacific would adopt a collaborative approach to their work.

General:

Coral reef managers in discussions about coral reef monitoring and data processing methodologies pointed out the limitations of the Point Count coral reef data processing software application. The CPACC Project will be put in contact with individuals who have first hand experience of the problems with the Point Count software application. This information is useful because it has been occasionally suggested that Point Count be adopted by the CPACC Project to replace the custom made utility that has been developed with the assistance of Jeff Miller. These recommendations have been made on the non-stated assumption that Point Count is problem free.

CPACC will be provided with a CD on coral reef taxonomy as a possible guide for developing the format for the C5 coral reef taxonomy guide for CD and the web.

Follow-up Actions:

Establish and maintain collaborative working relationships between professionals and institutions involved in coral reef monitoring and management in the Pacific and their counterparts involved in C5 (DPM/CZMS, C5 Coordinator).

Perform a comparative review the Point Count software utility with the aide of information from users (DPM/CZMS, C5 Coordinator).

Establish web links between the CPACC website and web sites for coral reef research and monitoring in the Pacific (DPM/CZMZ, ISC).

(b) Regional Node for UNEP.

Discussions were held with Alessandra Vanzella-Khouri of UNEP concerning the next production of the "Status of the Coral Reefs of the World" book slated to be published in 2002, which will be presented at the next meeting of International Coral Reef Initiative (ICRI) to be held in the Philippines. UNEP is looking for an organization such as CPACC to be the Regional Node for the Northern Caribbean (Jamaica, Bahamas, Turks and Caicos, Cayman, Cuba, and the Dominican Republic) to track the monitoring activities in this region. She indicated that there was the possibility of funding to assist with meetings and training.

(c) C5 Media Profile

Discussions were held with Mr. Desmond Allen of Jampress with respect to getting articles on the activities of CPACC and information on climate change and its impact on coral reefs printed in the media. Mr. Allen was one of two Jamaican journalists who participated in the Regional Media Consultation hosted earlier this year by CPACC. In light of this an outline for a series of articles entitled “Coral Reefs in Peril” was drafted for review.

(d) Office Facilities

The furniture for the office has been fully installed. The technical difficulties associated with the computer have been overcome except for one error message, which keeps recurring. The CPACC computer has been connected to the UWI network and the Internet and email facilities established. The setting up of the phone system in the new office has undergone a number of setbacks but is now fully in place with the CCDC having a straight line and 2 dial-9 lines. Long distance overseas calls have to be done through the main office of the CMS.

Institutionalisation of Component 5

A draft Memorandum of Understanding (MOU) defining the collaborative relationship between the CPACC Project and the CMS at the UWI, Mona, Jamaica has been developed (Annex 5). Final approval and signing of the MOU is scheduled for March 2001.

A similar MOU will be developed between the CPACC Project and Eastern Caribbean institution (e.g., the Marine Resources Environmental Management Program (MAREMP) at the Cave Hill, Barbados Campus of the UWI, or the Coastal Zone Management Unit in Barbados) to provide a sub-regional node to provide technical support to the CPACC countries in the Eastern Caribbean during he expansion of C5 under the IMPACC Project.

Discussions regarding the role of the CMS in ongoing C5 activities under CPACC/IMPACC/CCCC took place at the CMS in Jamaica on October 5, 2000. Further discussions will take place in 2001 with the aim of clearly defining the role that the CMS will play in regional climate change research and adaptation planning for sustainable coastal ecosystem management.