

Progress Report 5

January – June, 1999

Caribbean:
Planning for Adaptation to Global Climate Change

A Joint Project of OAS-CARICOM-UWICED-World Bank-GEF

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Organization of American States
Unit for Sustainable Development and Environment
(USDE)
1889 F St., NW
Washington, DC 20006 USA
Tel: (202) 458 3228
Fax: (202) 458 3560

CPACC/RPIU
Regional Project Implementation Unit
CERMES Building
University of the West Indies
Cave Hill, St. Michael, Barbados
Tel: (246) 417 4579-82
Fax: (246) 424 4204

Acronyms

CARICOM Secretariat	Caribbean Community Secretariat
CDM	Clean Development Mechanism
CERMES	Center for Resources Management and Environmental Studies
CIHM	Caribbean Institute of Hydrology and Meteorology
CMS	Center for Marine Sciences
CORS	Continuously Operating Reference Station
CPACC	Caribbean: Planning for Adaptation to Global Climate Change
CZMS	Coastal Zone Management Specialist
DGPS	Digital GPS
DPM	Deputy Project Manager
FAO	Food and Agriculture Organization
GEF	Global Environment Facility
GHG	Greenhouse Gases
GIS	Geographic Information Systems
GPS	Global Position Systems
GS/OAS	General Secretariat of the Organization of American States
IMA	Institute of Marine Affairs
IPCC	Intergovernmental Panel for Climate Change
ISC	Information Systems Coordinator
NFPs	National Focal Points
NICUs	National Implementation Coordinating Units
OAS	Organization of American States
PAC	Project Advisory Committee
RFP	Request for Proposals
RPIU	Regional Project Implementing Unit
SA	Screening Assessment
SIDS	Small Islands Development States
UNDP	United Nations Development Program
UNEP	United Nations Environmental Program
UNFCCC	United Nations Framework for the Convention on Climate Change
US NOAA	National Oceanographic and Atmospheric Administration
UWI	University of the West Indies
UWICED	University of the West Indies Centre for Environment and Development
VA	Vulnerability Assessment

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Executive Summary

Project Implementation

The project reached its mid-life point during this period. Major accomplishments were achieved regarding project implementation, management and administration. All project components and activities are being executed as planned, with few exceptions. Discussions have continued on substantial initiatives to secure project sustainability: the idea of a Caribbean Climate Change Center was endorsed by several regional political organizations; the University of the West Indies has decided to endorse a Master's program on climate change; and the Government of Barbados has approved new facilities to house the RPIU. CPACC continues to be the only regional initiative out of the Small Islands Developing States (SIDS) Plan of Action in the Caribbean.

As required by the World Bank, the project has contracted several consultants to conduct the mid-term review of project implementation.

Project implementation advanced considerably in the last six months. Component 1 will soon install the second continuously operating GPS station for the CPACC network in Jamaica. The legal agreement to establish the Replacement Trust Fund at CIMH has been drafted. A meeting with regional and national experts on GIS was conducted in February under Component 2 to agree on the best way for CPACC to intervene in this issue in the region. Alleyne Planning Associates, Inc. of Barbados in association with ESSA Technology Ltd. of Canada were awarded the contract to develop coastal resources inventory systems for each of the twelve CPACC countries under Component 3. An implementation plan for Component 4 has been developed. While The Bahamas hosted a sub-regional technical workshop on protocols for coral reef monitoring under Component 5, Grenada hosted a sub-regional workshop on coastal vulnerability assessment as required by Component 6. Consultants have been identified and terms of reference have been developed for the implementation of Components 7 and 8. A first draft of the GHG inventory for St. Vincent and the Grenadines has been prepared as part of Component 9.

Due to conflict in dates, the NICUs and PAC meetings will be held in July 1999 instead of June as planned.

Next six months

The next six months, July through December 1999, will be very active for CPACC. The World Bank will carry out the project mid-term review. This review will provide an opportunity to assess project implementation against project objectives and establish guidelines for the second half of the project.

This report was prepared by Claudio R. Volonte, CPACC Technical Coordinator, GS/OAS and CPACC/RPIU staff members Ulric Trotz, Leslie Walling and Ian King. The report was presented and discussed at the Third Project Advisory Committee (PAC), July 8-9, 1999 in Barbados.

Financial Status

The table below shows a snapshot of expenditures cleared by the OAS Financial Services as of March 31, 1999 (this includes expenditures at UWI). The amounts presented include Application for Withdrawal #14, which is still under review by the OAS. An addition \$146,000 have been committed and will be expended by the end of June 1999. The difference between the Year 2 budget and actual expenditures can be explained by savings in the procurement of equipment in Component 2, the delay in awarding a large contract for Component 3, savings in consultant work in Component 5, and the decision not to start Components 4, 7 and 8 until the second part of the year.

Component	Year 1 reimbursed expenditures by World Bank to OAS Special Account (*)	Budgeted Year 2 (April 98 – March 99) (**)	Expended and cleared by OAS Financial Services April 98 – March 99 (***)	Cumulative since project effectiveness April 97 – March 99	Expenditures by June 99 not yet cleared by OAS or UWI Financial Services
Design /Establishment of Sea Level/Climate Monitoring Network	\$438,529	\$220,771	\$151,973	\$590,502	\$30,000
Establish Database and Information System	\$125,043	\$162,132	\$26,662	\$151,705	\$15,000
Inventory of Coastal Resources and Use	\$0	\$598,350	\$61,322	\$61,322	\$30,000
Policy Framework for Coastal and Marine Management	\$0	\$96,900	\$5,379	\$5,379	---
Coral Reef Monitoring	\$365	\$163,911	\$98,753	\$99,118	\$10,000
Coastal Vulnerability and Risk Assessment	\$0	\$41,700	\$36,517	\$36,517	\$5,000
Economic Valuation of Coastal and Marine Resources	\$0	\$18,000	\$6,919	\$6,919	---
Economic and Regulatory Proposals	\$0	\$18,000	\$4,951	\$4,951	---
Greenhouse gases inventory/agri-water resources assessment	N/A	\$45,000	\$36,376	\$36,376	\$6,000
RPIU	\$222,010	\$525,572	\$518,997	\$741,007	\$35,000
Executing Agency	\$133,168	\$140,889	\$187,550	\$320,718	\$15,000
Total Project	\$919,115	\$2,031,234	\$1,135,400	\$2,054,515	\$146,000

(*) Applications for Withdrawal #1 through 7.

(**) Includes undisbursed balances from Year 1 budget

(***) Application for Withdrawal #8, 9, 10, 11, 12, 13 and 14. Application #14 is under processing.

CPACC Administration

Executing Agency: Organization of American States

The GS/OAS continued to provide technical, management and financial oversight of project implementation. During the period under review, the GS/OAS has been involved in several activities, including:

(a) San Andres and CPACC

A meeting was organized between OAS, World Bank and a representative of the municipal government of San Andres, Colombia at the World Bank to discuss the participation of this archipelago in CPACC activities (March 1999). The World Bank/GEF representative explained that the GEF could not finance the incorporation of Colombia in CPACC since funding for this type of activity should have been included in Colombia's climate change Enabling Activity financed by GEF. On the other hand, the municipality is preparing a mid-size proposal for GEF funding to establish and monitor several marine parks that could include some features of CPACC. In principal, it was agreed that this proposal could include funding to cover the travel cost of technical persons from the municipality to participate in appropriate CPACC activities. In addition, CPACC would offer technical assistance, if necessary, mainly in the area of coral reef monitoring for climate change.

(b) Third World Bank supervision mission

Participated in the third World Bank supervision mission, February 1999. The mission was satisfied that project implementation performance continued to be highly satisfactory. In particular, the mission noted that most project components, with the exception of Component 3, were either on target or ahead of schedule at the time of the mission. In addition, the mission was also pleased to note that significant steps had been taken by the RPIU to enhance the sustainability of CPACC activities beyond the life of the project, including the preparation of a preliminary proposal to establish a regional Climate Change Center, the proposed establishment of a regional network for climate modeling, support for the establishment of a GIS course and processing center at UWI, and the proposed creation of a Master's program in climate change studies for the region.

(c) 1998 CPACC Audit

The Special Accounts established at OAS and at UWI were audited by the independent audit firm of Ernst & Young. Two reports were produced: "Financial Statements" and "Comments on Internal Accounting Controls and Other Matters" and forwarded to the World Bank as required by the legal agreement. The financial report concluded that no instances of noncompliance had to be reported under general accepted auditing standards. The second report provided specific recommendations to improve internal management procedures both at the OAS and at the RPIU.

(d) Guidelines from pilot components.

Guidelines were prepared for distribution to all CPACC countries from Component 6 on how to conduct a rapid assessment on climate change impacts on the coastal areas. These guidelines will enable CPACC countries not participating in Component 6 in strengthening their Initial National Communications to the UNFCCC.

(e) Contracts for Mid-term Review

The GS/OAS has contracted five consultants to conduct mid-term reviews of specific aspects of CPACC implementation (see Annex 1 for a summary of terms of reference):

- Dr. George Maul: Component 1/Regional Archiving Centers (CIMH and IMA);
- Mr. Carlos Fuller: Component 1/National institutional capacity;
- Dr. Malcolm Hendry: Component 5/review and recommendations on progress;
- Mr. Rashleigh Jackson: NICUs/communication, coordination and participation;
- Mr. Cletus Springer: NICUs/operational aspects of project implementation.

(f) Components 1, 6 and 9

GS/OAS provided direct technical and management assistance for the implementation of Components 1, 6 and 9 (see details on each component).

(g) Meeting of OAS missions

The GS/OAS organized a meeting of representatives of Caribbean countries to the OAS on CPACC and its implementation status. Also attending were representatives from US NOAA, US mission to the OAS and UNEP. CPACC Project Manager and ARNC gave the presentations. The main topic of discussion was the proposed Climate Change Center.

(h) CPACC Brochure

A project brochure has been completed and will be distributed in the July 1999.

(i) GS/OAS Financial responsibilities

As of January 1, 1999 the GS/OAS changed its accounting system to one based on the ORACLE software. Many of the routine procedures have been improved but as with any new system new procedures have been introduced and several of them are still been worked out. This has caused some delays in generating expenditure reports for the World Bank to replenish the project's account. As a consequence, in two occasions, there was no enough cash at the OAS account to replenish the RPIU account. Fortunately, in both occasions, this situation was resolved within a week.

(j) Continued technical and management supervision of Components 1, 6 and 9.

Regional Project Implementation Unit (RPIU)

Office Space

The Government of Barbados has agreed to provide CPACC with accommodation at the building, which housed the West Indian Commission. The Government has refurbished the building and it should be ready by the end of June 1999.

The University Principal has been informed, and CPACC is requesting certain considerations from the University to facilitate the move. A plan and cost estimates to make the building fully functional have been completed by the Information Systems Coordinator (ISC). The cost will be financed from the contingency line established in the budget of the project. Most of the quotations have been received and many of the necessary items to facilitate the occupation of the new building have been ordered.

RPIU Staffing

The Deputy Project Manager, Dr. Floyd Homer, has indicated that he will not be renewing his contract when the present one expires at the end of June 1999. A search process has been initiated to identify new candidates for the post.

Ms. Marquita Griffith assumed the duties as Executive Secretary on May 1, 1999 replacing Ms. Bernice Walcott who terminated her services with the RPIU at the end of February 1999.

A part-time consultant, Ms. Greta Payne, has been working in the RPIU setting the RPIU documentation center.

Financial procedures and reporting

A meeting was held with the University's Bursar's office to discuss a request addressed to Sir Keith, Principal of Cave Hill campus (Annex 2), about the University's modalities on accounting procedures. The topics discussed at the meeting included:

- RPIU access to University accounting system. The RPIU is still awaiting access to the University accounting system. The Bursar informed the RPIU that the system is being upgraded and that the RPIU will be given access when this is completed. Training will also be provided to RPIU Accounts Technician on use of the system. These two actions have been outstanding since the initiation of the establishment of the RPIU.
- Monthly expenditure reports. Although the University has informed the project that it could provide monthly expenditure reports at the end of the month, these reports will be incomplete since the necessary information from the bank is not available until mid-month. Although this will cause some delays in reporting expenditures, all expenditures will be eventually reported.
- General working relationships. Since the meeting there has been an improvement in the general working relationship between the RPIU and the University Bursary. There are still outstanding issues to iron out but the University has affirmed that they will be resolved satisfactorily in the near future.

Several of these issues have been discussed with University officials in previous meetings but no actions were taken.

Project Sustainability

(a) Endorsement by COTED meeting

During the reporting period, a presentation on CPACC was made to the CARICOM Council of Ministers responsible for Trade and Economic Development (COTED) on January 18th-20th in Guyana. The meeting endorsed the evolution of CPACC into a Regional Climate Change Center and urged the Member States to take necessary actions to give effect to the decisions arising from the November 1997 Caribbean SIDS Ministerial Meeting. It is expected that this endorsement will be presented to a meeting of CARICOM Heads of States for their final sanction.

The RPIU discussed the development of the Climate Center with the Minister of Trade and Industry from Trinidad and Tobago, Mr. Mervyn Assam who indicated his willingness to help bring the Trinidad and Tobago industrial sector on board. As a follow-up, CPACC undertook to write the Minister giving him information on exactly how his intervention could help to further CPACC's plans for the Center.

(b) Graduate Program on Climate Change

The University has decided to rationalize the graduate programs in environment by offering only one MSc. across the three University campuses starting in September 2000. This will consist in compulsory core courses, which will be taught at all campuses, and specializations peculiar to each campus. One specialization is in climate change earmarked for the Cave Hill campus where the RPIU is located. Cluster groups are now working out details on syllabus, hours, degree structure, etc. The entire process is being coordinated by UWICED and is financed by a grant from the Rockefeller Foundation.

(c) CPACC and Canadian Government

The RPIU Project Manager visited several government and academic institutions in Ottawa and Toronto to continue conversations about Canadian support to CPACC (May 3-7, 1999). CPACC made a proposal to request the Canadian government to play a role in providing the project with technical backstopping and capacity building from Canadian institutions working on climate change. Specifically, CPACC would be interested in receiving assistance in regional climate modeling capacity building, the establishment of the Regional Climate Change Center and with UWI's MSc. Program in Climate Change. Institutions visited during this trip included: Canadian International Development Agency (CIDA); Department of Foreign Affairs Climate Change and Energy Division (AEC); Environment Canada; Canadian Center for Remote Sensing; and Institute of Environmental Studies, University of Toronto.

Education and Public Awareness Program

The services of Environmental Solutions Limited, a private firm from Jamaica, were engaged to prepare the CPACC education and public awareness program. There has been a delay in receipt of the final report but it is expected by the end of June 1999.

A video on Global Warming and Coral Reef Monitoring was commissioned by CPACC and produced by a Bahamas based company, The Counsellors. The video was widely distributed to national focal points and other institutions including the Caribbean Broadcasting Union. The latter informed the RPIU that the video was distributed to regional stations and that several of them have aired it to mark World Environment day on June 7th, 1999.

Materials from these two consultancies should put CPACC in a stronger position to launch a more sustained and focused public awareness program in the region.

RPIU participation in international, regional and national workshops and conferences

(a) The Project Manager participated in the following meetings:

- CARICOM meeting on Council for Trade and Economic Development (COTED), Guyana, January 19-22, 1999.
- National Workshop on Coastal Vulnerability and Risk Assessment to launch Component 6 in Guyana, February 19-20, 1999.
- Final session of the ad hoc international working groups on the Clean Development Mechanism (CDM), France, March 11-12, 1999.
- National workshop on climate change for secondary school children, St. Vincent and the Grenadines, March 31, 1999.
- UNDP/GEF Workshop on Greenhouse Gases Inventories for the Caribbean region, Barbados, April 19-22, 1999.
- First National Communications workshop for Barbados, April 7-9, 1999.
- OAS Member States representatives meeting on CPACC, Washington, DC, May 12, 1999.

- UWI workshop to review UWI's graduate programs on the Environment, Tobago, May 20-21, 1999.
 - Caribbean Renewable Energy Development project Steering Committee meeting, Antigua and Barbuda, May 29, 1999.
- (b) The Deputy Project Manager participated in the following meetings:
- IOCARIBE Workshop and Intergovernmental Session, Costa Rica, April 22-28, 1999.
- (c) The Coastal Zone Management Specialist participated in the following meetings:
- Coastal GeoTools '99 Conference, Charleston, South Carolina, USA, April 5-8, 1999.
- (d) The Information Systems Coordinator participated in the following meetings:
- CPACC GIS Experts meeting, Barbados, February 3-4, 1999;
 - SIDSnets Trainers Workshop, Barbados, February 1999.
 - Caribbean Disaster Mitigation Project Hazard Mapping Workshop, St. Georges, Grenada, March 2-5, 1999.
 - Coastal GeoTools '99 Conference, Charleston, South Carolina, USA, April 5-8, 1999.

National Implementation Coordinating Units

There have been two changes in the National Focal Points:

- St. Lucia. Mr. Cornelius Fevrier has moved to the CARICOM Secretariat in Guyana. The Ministry of Agriculture will remain as the Focal Point institution and Ms. Anita James has been named interim National Focal Point.
- St. Kitts and Nevis. Mr. Randolph Walters has moved to FAO office in Barbados. Ms. June Hughes, Environmental Officer, Ministry of Environment, Culture and Tourism will carry on as an interim national focal point.

Capacity-building Activities

CPACC sponsored a series of training workshops during this period (for more details, see relevant component below):

Technical Workshops

- GIS regional practitioners and agencies meeting (Barbados, February 3-4, 1999).
- First Sub-regional workshop on coastal vulnerability assessment (Grenada, Component 6, March 1999).
- Training workshop on protocols for coral reef monitoring (The Bahamas, Component 5, March 1999).

Hands-on training

As in previous periods, hands-on training took place mainly during the installation of monitoring systems under Component 1. The CPACC team conducted training on equipment operation and maintenance and on GPS techniques.

Commitments and Replenishments

Withdrawals from CPACC account	Expenditures incurred during	
Initial advance:	Advance	\$500,000
Withdrawals 2 through 6	April 97- Dec. 97	\$781,182
Withdrawals 7 through 12	Jan – Dec. 98	\$869,001
Withdrawals 13 and 14	Jan. – May 99	\$403,449
Commitments	May – June 1999	\$200,000
Total	April 97 – June 99	\$2,753,632

Expenditures by Component and Year replenished by World Bank to OAS project account

Component	1997	1998	1999 (*)	Total
1	\$420,363	\$135,275	\$34,866	\$590,505
2	\$120,790	\$20,780	\$10,809	\$152,379
3	---	\$48,345	\$13,004	\$61,349
4	---	---	\$5,379	\$5,379
5	---	\$48,800	\$50,470	\$99,270
6	---	\$15,219	\$21,298	\$36,517
7	---	\$6,919	---	\$6,919
8	---	\$4,951	---	\$4,951
9	---	\$26,566	\$9,811	\$36,376
OAS	\$99,440	\$149,118	\$71,192	\$319,750
RPIU	\$167,431	\$441,113	\$169,040	\$777,584
Total	\$808,025	\$897,085	\$385,868	\$2,090,978

Note: (*) expenditures up to May 1999.

CPACC Technical Activities

Component 1: Design and Establishment of Sea Level/Climate Monitoring Network

Station Configuration and Equipment Installation

A list of spare sensors and parts has been prepared. Purchasing of new equipment will take place in July. The spare parts will be used to start building-up the replacement stock at CIHM.

A Dutch vessel seriously damaged the monitoring site in Barbados. The government of Barbados is presently negotiating with the Dutch government and an insurance company for the replacement cost of the damaged equipment.

CPACC has created a database of information for each monitoring station including the following variables (see Annex 3 for an example):

<p style="text-align: center;">Information per site</p> <p>Station number, name and location</p> <p>Installation date</p> <p>Description, configuration and location of monitoring site</p> <p>Facility owner information</p> <p>Local contact information</p> <p>Data Collection Platform Information</p>	<p style="text-align: center;">Sensors</p> <p>Sea Level, wind, relative humidity, air temperature, barometric pressure, sea temperature, precipitation.</p> <p>Information per sensor</p> <p>Manufacturer and type; calibration offset; installation date; removal/exchange date; DCP address; units of measurement; datum reference.</p>
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In addition, each monitoring station has a set of documents including:

	Station Report	Sensor Levels	BM Desc	BM Drawing	Datum Drawing	DCP Variable	Equip Measure	Elev Dwg
Antigua, Parham	*	W	*	*	*	ND	*	*
Bahamas, Gr. Inagua,	*	*	W	ND	ND	*	*	*
Bahamas, Nassau	*	*	*		*	ND	*	
Bahamas, Lee Stocking Is.	*	*	*	*	*	*	*	*
Barbados, Bridgetown	Incom	W	W	*	*	ND	*	*
Belize, Belize City	*	*	ND	*	SK	*	*	*
Dominica, Rosseau	*	*	ND	*	*	ND	*	*
Guyana, Parika	*	*	ND	*	*	*	*	*
Guyana, Rosignol	*	*	W	*	*	*	*	*
Grenada,	*	W	W	*	*	*	*	*

	Station Report	Sensor Levels	BM Desc	BM Drawing	Datum Drawing	DCP Variable	Equip Measure	Elev Dwg
Prickley Bay								
Jamaica, Discovery Bay	*	*	*	*	*	ND	*	*
Jamaica, Kingston	*	*	W	*	*	ND	*	*
St. Kitts, Basseterre	*	*	W	*	*	*	*	*
St. Lucia, Castries	*	*	W	*	*	*	*	*
Trinidad, Port of Spain	*	W	W	*	*	ND	*	*
Trinidad, Guayaguayare	*	W	W	*	*	ND	*	*
Tobago, Charlotteville	*	W	W	*	ND	ND	*	
St. Vincent, Kingston	*	*	W	*	*	ND	*	*

* = Complete

W = in written form not yet converted to digital form

ND = not done, site must be visited to complete task

SK = sketch in field book not yet converted to digital form

BM = bench mark

DCP = Data Collection Platform

Operation, Maintenance and Calibration

The ARNC conducted a series of site visits to several of the CPACC monitoring sites at the request of the counterpart institutions. In addition to the activities described in the table below, the ARNC, in each country, checked the Internet data dissemination and data retrieval procedures with local technical staff.

Country	Purpose and output of visit
Barbados	Final adjustments to equipment, prior to this the equipment had been installed as a training site.
Antigua and Barbuda	Reinstallation of monitoring site equipment with staff of the national meteorological office. The equipment was removed during hurricane Georges.
The Bahamas	Conducted training of national meteorology personnel; corrections to software at monitoring site.
St. Kitts/Nevis	Repairs were made to equipment damaged during hurricane Georges.
St. Vincent and the Grenadines	Review of monitoring site software with national meteorological office personnel.
Guyana	Installation of a monitoring site at the Demerara River in Georgetown. Additional training was provided to personnel from the Hydrometeorological unit on data retrieval and data reporting preparation. GPS re-survey of both monitoring sites.
Trinidad and Tobago	Checked Guayaguayare and Port of Spain monitoring sites.

Calibration equipment has been installed and finalized at CIMH. A rotation schedule for equipment calibration has been established.

An agreement has been drafted to establish the Replacement Trust Fund at the CIMH and will be forwarded to the World Bank for their approval in the next month. The Fund is intended to provide funds for replacement of the gauges as a result of normal wear-and-tear or for major repairs to them as a result of loss or damage caused by hurricanes. It will be established within an existing mechanism at the Institute, the Caribbean Meteorological Foundation and will cover the following costs and functions:

- shipping costs between CIHM and CPACC countries;
- equipment repairs by manufacturers;
- purchasing replacement system components for an amount not to exceed 20% of the total amount remaining in the fund at any given time;

Data Acquisition, Archiving and Dissemination

A CPACC operator account was established at NOAA for the operation of the satellite data collection system. Prior to this, the account was operated under a temporary Vitel/ARNC account.

Geocentric Fixing of Benchmarks

Installation of the second CORS station in Jamaica continued during this period. The ARNC traveled to Jamaica to install the station's tower, antenna and its cable at the Jamaica Meteorological Office – Upper Air Monitoring Facility located at Manley Airport in Kingston, Jamaica. In addition, the telephone line and local Internet ISP accounts were tested. The site is now ready for final equipment installation.

The Jamaican government saw the installation of the CORS as an opportunity to enhance the country's GPS capability and requested CPACC for assistance. CPACC suggested Differential GPS (DGPS) and the government proceeded to purchase it (approx. \$10,000). DGPS consists of radios that broadcast "correctors," so that surveyors and marine navigators, who have DGPS receiving capabilities, can determine very accurate GPS positions in real-time. To use this service the user must have an optional receiving unit (radio & antenna) added to the GPS unit. These DGPS receiving units are widely available from commercial retail sources and most GPS units today are "DGPS ready," even the inexpensive handheld units.

The installation of the CORS has been delayed until the end of July since the government of Jamaica is in the process of receiving the DGPS through the US National Geodetic Services (NGS) which is testing it.

Component 2: Establishment of Databases and Information Systems

Assessment and System Design

The ISC organized and convened a meeting of regional GIS practitioners and agencies involved in GIS development and implementation in February 1999. The purpose of the meeting was to review ISC's assessment of GIS capability in CPACC countries; address regional needs for GIS development and application; and to make specific recommendations to the CPACC on the utilization of GIS in different components. The proceedings of the meeting are available on the CPACC web site and a summary in Annex 4.

Coordination of SIDSnet National Workshops

CPACC signed a Memorandum of Understanding with the UNDP's SIDSnet on June 1999. The purpose of the agreement was for CPACC to coordinate 10 national workshops addressing Internet use and information management. A technical assistant has been identified to support the ISC in this activity and is expected to commence work in mid-July. SIDSnet will meet the costs of the assistant and the workshops. A draft workplan will be formulated by the end of June.

System Procurement

The computer equipment for St. Vincent and the Grenadines national focal point was purchased in December 1998 and delivered in February 1999.

Training Program

Mr. Ron Leslie, CIMH technician, traveled to Vitel, Inc. headquarters in February to receive technical training on the equipment used for the CPACC monitoring sites. The training included both hardware and software of the monitoring equipment and the data dissemination system.

Ms. Shelley-Ann Jules, technical staff of IMA, received training to improve understanding of the requirements of this institution as an Regional Archiving Center for CPACC with responsibilities for sea level data (May 1999; see Annex 5 for back to the office report). The training was executed in two modes: hands-on observations and formal training. Ms. Jules visited the following institutions:

- Department of Marine Science, University of South Florida.
- Vitel, Inc., Virginia, USA.;
- Organization of American States, Washington, DC.
- US National Oceanic and Atmospheric Administration, Washington, DC.
- University of Hawaii

System Implementation, Maintenance and Upgrading

The second and third editions of RPIU Update were produced during this period. These publications can be obtained through the CPACC web site (<http://www.cpacc.org/infown.html>).

A local consultant was hired to review the CPACC web site and updated it as necessary. Another consultant was hired to assist the RPIU to catalog and organize its print and electronic documents and media into an information center.

A year 2000 audit was commissioned of the RPIU equipment. This audit indicated that the RPIU's computer hardware and most software only required software patches or fixes that were readily available. This information was also important for the National Focal Points as the computers received from CPACC were the same as two in the RPIU office. The ISC will advise the NFPs of an appropriate course of action regarding the CPACC computers.

Component 3: Inventory of Coastal Resources and Use

GIS installation and upgrade: Collaboration with CERMES and Engineering Institute

National Focal Points and executive ministries/agencies for the CPACC project were requested to identify the national repositories for the CPACC generated spatial, attribute and catalog databases. The countries were requested to respond by mid June 1999. To date only one country has formally responded, although several others have done so informally.

All of the GIS equipment which CPACC agreed to purchase for the Center for Resource Management and Environmental Studies (CERMES) building was delivered during the reporting period.

Coastal Inventory Design

(a) Selection of consultants

A Request for Proposals (RFPs) was prepared and sent out in December 1998 to 10 firms that had previously expressed interest in participating in implementation of this component. The main objective of the consultancy is to assess and catalogue existing coastal resources and uses information in each of the 12 participating countries, according to three phases: (1) information assessment, cataloguing and database design; (2) training in cataloguing and digitization of coastal resource information; and (3) preparation of spatially referenced coastal resource inventories.

Technical and financial proposals were received from five firms by the deadline of 31st January 1999. Following World Bank guidelines, a technical evaluation team was formed comprised of three technical specialists at the RPIU and two professional staff from the OAS.

The criteria for evaluation of the proposals included: caliber of personnel, proposed methodology, and support and specific experience from technical personnel. Alleyne Planning Associates, Inc. of Barbados in association with ESSA Technologies, Ltd. of Canada was selected. A list of the project team is provided in Annex 6 while the structure and division of labor is presented in the figure below. The firm signed the contract during this period and will begin work in July.

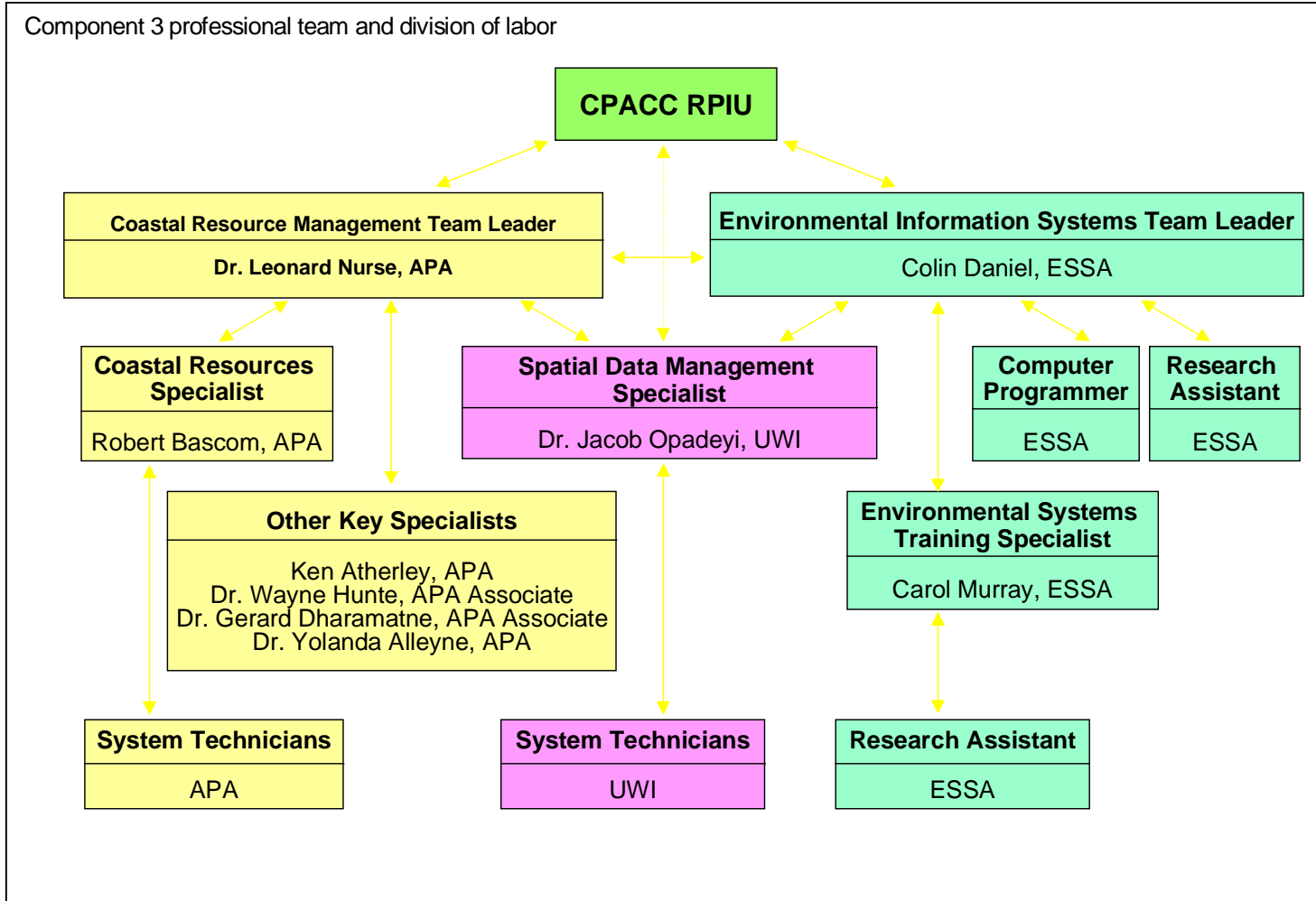
(b) NICUs preparation for C3 implementation

RPIU staff traveled to most of the participating countries to meet with NICUs to outline the work to be carried out by the consultants, detailed the NICUs and NFPs responsibilities and discuss implementation of C3 in general.

Component 4: Formulation of a Policy Framework for Integrated Coastal and Marine Management

A plan for the implementation of the component has been drafted. Terms of reference for the first task were also prepared. About 10 firms and individuals have approached CPACC with an interest in working in this component. For this reason, it has been decided that a request for proposals will be sent out in the next six months.

Component 3 professional team and division of labor



Component 5: Coral Reef Monitoring for Climate Change

Monitoring Activities

(a) Equipment

Digital Video Equipment

Each pilot country received one Sony DRC VX1000 digital video camera with accessories, and one underwater housing for coral reef monitoring. Arrangements to procure the camera equipment were initiated in October 1998 with the intention of effecting delivery to each pilot country's NFP in January 1999. It was decided that the procurement of the equipment would be done from the OAS in Washington given the shortage of funds at the RPIU and procurement problems at the University. Due to unforeseen problems with the new accounting system at the OAS, the camera equipment for the pilot countries was not delivered until March 1999. The delays prevented the camera equipment from being available for the training workshop in the Bahamas in early March. This limited the amount of hands on training with the camera equipment that could be provided to workshop participants. The absence of the CPACC camera equipment also limited the amount of hands on data analysis training. Fortunately, a set of equipment was provided by one of the attending experts.

Temperature-Data loggers

Onset Computer Optic Shuttle temperature data loggers, data shuttles and data software were delivered to the NFPs in Jamaica and Belize through the local OAS office (the equipment was delivered to the OAS office in the Bahamas but not yet delivered to NFP). The data loggers will be used to continuously monitor seawater temperatures at the selected monitoring sites.

Data analysis and archiving equipment for the Center for Marine Sciences (CMS), Jamaica

Brief confirmatory discussions were held with Dr. Woodley about the CMS's equipment needs for archiving and analyzing the data generated by Component 5 activities in the three pilot countries. It was agreed that the CPACC would wait for the testing of the Point Count application to be completed before committing to provide specific types of equipment for the CMS. However, it was anticipated that the CMS would receive a computer, a CD writer and funding for a part-time person responsible for the analysis of the digital video tape records of the coral reef transects.

(b) Training Workshop on Protocols for Site Selection, Monitoring and Data Analysis (New Providence, The Bahamas, March 7-14, 1999)

The CPACC/RPIU and the Government of the Bahamas successfully hosted the Component 5 Sub-regional Training Workshop on the Protocols for Site Selection, Monitoring and Data Analysis. Participants to the workshop included representatives from the three pilot countries: The Bahamas, Belize and Jamaica, and observers from Barbados and The Turks and Caicos Islands.

The objectives of the workshop were to:

- Train the participants to use the equipment and to execute the protocols for the coral reef monitoring for climate change impacts;

- Train the pilot country representatives to train the members of their monitoring teams in their respective countries;

The first objective was achieved during the course of the training workshop. The second objective is expected to be achieved by the workshop participants shortly after they return to their respective countries.

The intense training program comprised:

- class room session on the protocols;
- operation, maintenance and handling of the Sony DCR VX-1000 digital video camera and the Light and Motion Stingray Under water DVC housing.
- site selection;
- monitoring;
- data analysis;
- field session on the applied aspects of protocols; and

The practical nature of the training workshop contributed to refinements in the site selection and data analysis protocols. It also helped the participants to appreciate the problems that would be faced if they attempted to monitor coral reefs without employing the logical steps set out in the site selection protocol.

The Bahamas was chosen as the venue for the sub-regional training workshop because it was considered to have the least institutional experience among the pilot project countries in monitoring or surveying coral reefs. As the host country, the Bahamas was able to have two additional technical officers participate in the workshop.

(c) Component 5 List Server

A list-server “cc-reefs” was established through the Internet, at E-group, to provide the participants with a forum in which to continue discussions started at the workshop, to discuss implementation problems, and to exchange ideas and experiences with each other, and with other interested professionals. The list server has also been used for the dissemination of Component 5 documentation.

(d) Public Awareness: Global Climate Change/Component 5 Documentary

The CPACC/RPIU contracted the services of The Counsellors, a private firm from The Bahamas, to produce one ten minute and one three minute documentary on the Component 5 Training Workshop. The CZMS and DPM served as executive directors for the production of the documentary. The script include the following:

- A brief introduction to the global climate change phenomenon.
- The implications of global climate change for the wider Caribbean.
- The role of the CPACC Project in addressing global climate change in twelve CARICOM countries;
- CPACC Project Components;
- Component 5: Coral Reef Monitoring for Climate Change Impacts; and
- The training Workshop aims and objectives.
- Opening Ceremony (remarks by NFP, Workshop Coordinator, and Minister of Agriculture and Fisheries);
- Footage of participants in the workshop setting;
- Underwater footage of participants establishing monitoring sites;
- The future of Component 5;

On June 3 1999 the Caribbean Broadcasting Union (CBU) up-linked the documentary to its affiliated stations in the Wider Caribbean for World Environment Day on June 5 1999. Stations that immediately acknowledged showing the documentary included:

- Channel 5, Belize
- ATV, Surinam
- CBC, Barbados
- St. Maarten Cable, St. Maarten
- ZIZ TV, St. Kitts, Nevis
- GTV, Guyana
- Little Rock TV, Guyana
- SVG TV, St. Vincent.

The documentary has been shown in other territories in the region, although formal acknowledgement has not been received via CBU.

Component 6: Coastal Vulnerability and Risk Assessment

Refinement of Methodology

(a) Sub-regional Workshop – Grenada, March 29-31, 1999

A sub-regional workshop involving representatives from the three pilot countries (Barbados, Grenada and Guyana) was held in Grenada, March 29-31, 1999 with the following objectives:

- provide an update on CPACC implementation and linkages between component 6 and other components;
- review existing models for coastal vulnerability and risk assessment from climate change impacts;
- present a CPACC methodology for the region; and
- begin the process to identify sites for implementation.

The following was agreed at the workshop:

- an agreement on a coastal vulnerability and risk assessment methodology suitable for the region;
- a plan of action for component implementation;
- a list of criteria for selection of potential national sites for implementation; and
- a list of national requirements and needs for component implementation.

Agenda	
Day 1, Monday, March 29, 1999	<ul style="list-style-type: none">• CPACC update and linkages between components;• Climate change and impacts on coastal areas: sea-level rise;• Concepts and examples on coastal vulnerability and risk assessments• Proposed methodology
Day 2, Tuesday, March 30, 1999	<ul style="list-style-type: none">• Screening assessments: countries presentations• Breakout sessions by country
Day 3, Wednesday, March 31, 1999	<ul style="list-style-type: none">• Plan of action for implementation

Methodology adopted

The methodology adopted for CPACC regarding coastal vulnerability and risk assessment can be summarized in the following steps:

- Stage 1. Problem definition and scope of the analysis.
- Stage 2. Scenarios for coastal vulnerability assessment.
- Stage 3. Impact assessment.
- Stage 4. Autonomous adaptation.
- Stage 5. Planned adaptation.

This workshop was part of Stage 1 and included discussions on the levels of analysis, delineation of the study area, and the likely magnitude and impacts of sea-level rise. Three levels of analysis, on increasing difficulty and effort, are defined within the methodology: Screening Assessment (SA), Vulnerability Assessment (VA) and Planning Assessment (PA).

Prior to the workshop, the three countries received guidelines on how to conduct a SA, which by its quick nature, primarily focuses on the susceptibility of today's coastline to sea-level rise. Countries presentations were based on these guidelines. The results of SA can be used to plan how VA might be most effectively implemented (the next step), including selection of study areas and other scenarios to be considered (see Annex 7 for a summary of presentations).

Next Steps

During the last day of the workshop, participants discussed and agreed on a series of tasks, milestones and timetable required for the completion of Component 6.

- (1) Refinement of Methodology. The final version will be edited by OAS and then printed for distribution under CPACC logo.
 - (2) Sub-regional workshop. Completed (Grenada, March 1999).
 - (3) Country screening assessments. First draft prepared and reviewed by country teams (June 1999).
 - (4) National consultations. The three countries suggested that before a final decision on site selections could be made they will have at least one meeting with other national agencies to discuss the outputs of the sub-regional workshop and agree on the sites.
 - (5) Terms of reference for local consultants. It was agreed that CPACC will provide funding to support a national component coordinator for Grenada and Guyana (Barbados explained that the Coastal Zone Management Unit will be the focal point for this component and that one of its staff will be assigned as the coordinator). Draft terms of reference have been prepared. The national focal points will provide CPACC and the OAS with two or three potential candidates.
 - (6) Vulnerability assessment. Several tasks for the VA will be completed under Component 3 (i.e., evaluation of existing data, identification of gaps and acquisition of new data) in coordination with C6 consultants and national focal points. In addition, during the execution of VA, additional technical assistance, equipment, training and new data will be provided. Several national workshops will be organized to keep national institutions informed on the progress of the component. The timeframe for this task will extend from May 1999 to January 2000.
 - (7) It is expected that a draft VA for each country will be completed by January 2000.
 - (8) National workshop to present results. February 2000.
 - (9) Final VA. April 2000.
 - (10) National training workshop on VA exercise (February-May 2000)
 - (11) Regional workshop to transfer knowledge and experience from the three participating countries to the rest of CPACC countries. May-June 2000.
- (b) UNDP/GEF Global Support for Initial National Communications to the UNFCCC

This project will sponsor a Caribbean regional workshop on Vulnerability Assessment and Adaptation next July in Trinidad and Tobago. The main purpose of this workshop is to present UNEP's handbook on vulnerability and adaptation. One of the sectors to be

discussed is the coastal zone. Since Component 6 has begun its implementation, it was agreed with UNDP that CPACC will be responsible for conducting the training on coastal areas by presenting the screening assessment methodology and two case studies, Barbados and Grenada.

Component 7: Economic Valuation of Coastal and Marine Resources

Terms of reference for the initial phase of the implementation of this component have been finalized and consultants to carry out this task are being identified. This phase of the work involves a critical review of relevant methodologies for economic valuation being utilized in the region, and the development of a draft methodology for use in the pilot project. The consultant in cooperation with the pilot countries will also identify the sites in each country where the economic valuation activities will be carried out.

Component 8: Formulation of Economic/Regulatory Proposals

Terms of reference for the preliminary activities under this component have been finalized and are being discussed with consultants. The initial activity involves a comprehensive review of the use of economic instruments in the region and the identification of opportunities for the introduction of economic instruments in the policy framework of the two pilot countries.

Component 9: Greenhouse Gases Inventory/Agriculture and Water Resources Vulnerability Assessment

This component is behind scheduled due to complications with the technical implementation of the GHG inventory. Local consultants were contracted to gather information required by the IPCC GHG inventory guidelines. Information had to be adapted to the requirements and was subsequently input in spreadsheets provided with the guidelines.

(a) GHG Inventory

Energy. The aggregate tables for what IPCC refers to as the Reference Approach is complete for the years 1990, 1994 and 1997. Government figures as well as information from Texaco and Shell, the two fuel importers on St. Vincent, and Vinlec, the electrical utility provider, were compiled. Disaggregated tables by sector are still under preparation.

Industry and Construction. Personal interviews have been conducted with the largest industrial establishments to obtain energy use and production information. By far electricity is the primary energy source with limited diesel generation on site. Further information in terms of bread/grain and rum production is necessary to fulfill the non-methane volatile organic compounds (NMOVCs) requirements.

Agriculture. The agriculture sector is nearly complete. Some questions existed as to the conversion of inorganic fertilizer applications to nitrous oxide emissions as the IPCC guidelines were not well written in this section, but this issue was resolved. Biomass conversions from crop residue remain to be completed but crop production figures were compiled.

Waste. No wastewater treatment exists. Without wastewater treatment, the impact of raw human sewerage remains to be calculated although per capita estimates are available.

Animal waste was calculated under agriculture. On the issue of solid waste management there is no scales or volumetric measures although per capita estimates were used.

(b) UNDP/GEF Greenhouse Gases Inventory and mitigation workshop

St. Vincent and the Grenadines National Focal Point, Dr. Reynold Murray, participated in the Central American workshop on GHG inventory and mitigation held in Guatemala, March 1-5, 1999. Although the workshop was designed specifically for Central American countries, this was an opportunity for Dr. Murray to receive training and information on the national communications report to the UNFCCC and GHG inventories. In addition, he was able to discuss progress on his country's study with country representatives and international experts.

A representative of St. Vincent and the Grenadines also presented an update of the work on the GHG inventory at the first Caribbean "thematic workshop" sponsored by the UNDP/GEF project. The workshop was held in Barbados, April 19-21, 1999 as a technical training on GHG inventories and the IPCC guidelines.

Annexes

Annex 1. CPACC Mid-Term Reviews

As CPACC reaches its mid-point the World Bank will conduct a mid-term review of project implementation (late 1999 summer). A team of staff and consultants from the World Bank will travel to Barbados to visit the RPIU to assess progress against objectives, to estimate potential long-term impacts of the project within and provide constructive recommendations in several areas of project implementation. In preparation for the mid-term review, five consultants have been contracted with the following terms of reference:

Component 1

- (a) Regional Archiving Centers: Caribbean Institute for Meteorology and Hydrology (CIMH) and Institute of Marine Affairs (IMA). Expert contracted: Dr. George Maul. Topics: transfer of responsibilities from ARNC to CIMH and IMA; establishment of ground station within regional institutions; access, analysis and dissemination of data from stations; review and recommendations. Dr. Maul will visit CIMH and IMA (June 7-16, 1999)
- (b) National institutional capacity. Expert contracted: Mr. Carlos Fuller. Topics: capacity of national agencies for maintenance and operations of monitoring stations; capacity, understanding and ability to promote use of the data; training program. The Consultant will conduct a survey, followed-up by e-mails and phone calls to the 12 focal point institutions for Component 1. In addition, Mr. Fuller will travel to two countries to conduct case studies (St. Vincent and the Grenadines and Trinidad and Tobago).

Component 5

Review and recommendations on component implementation. Expert contracted: Dr. Malcolm Hendry. Topics: status of coral reef monitoring in pilot countries; institutional arrangements and participation of national agencies. The Consultant will travel to the three countries to conduct field studies.

National Implementation Coordinating Units (NICUs)

- (a) Communication, coordination and participation. Expert contracted: Mr. Rashleigh Jackson. Topics: extent the present institutional mechanism of the NICUs and their respective modus operandi supports and contributes to the long-term sustainability of climate change related activities in the national/regional agenda (desktop review and interviews by phone and e-mails).
- (b) Operational aspects for project implementation. Expert contracted: Mr. Cletus Springer. Topics: functioning of NICUs to coordinate in-country project activities. Mr. Springer will travel to two countries (to be determined) to conduct case studies.

Annex 2. Letter to University Principal regarding financial and management procedures at RPIU

30 March 1999

Sir Keith Hunte
Principal
University of the West Indies
Cave Hill Campus
BARBADOS

Dear Sir Keith:

You will recall that at our last meeting during the recent visit of the World Bank appraisal team, I informed you that I would submit for your consideration a set of recommendations re the financial management systems now employed by the Bursary for the CPACC Project.

We have had some time to assess the suitability of the financial procedures now in place, and are convinced that adjustments need to be made if we are to effect the successful implementation of this project. We now have two independent assessments of the financial systems that are in place. One was an audit carried out by a local auditing firm Price Waterhouse Coopers which specifically examined the financial management procedures in place and made recommendations on adjustments that are needed to facilitate efficient project implementation. The other was the mandatory audit of accounts required by the World Bank carried out by the Washington based firm of Ernst & Young LLP. Both auditors' report have now been submitted and are attached for your information.

Both reports from the auditors highlight some areas of concern with the systems in place and reinforce each other in identifying some adjustments that need to be made by UWI, the RPIU and the OAS. As far as the University is concerned the following measures need to be adopted urgently.

- On line access to the UWI accounting system (immediate)
- Timely bank reconciliations (monthly) to be performed by the bursary and monthly expenditure reports to be available at least ten days after the end of the month.
- Monthly reports from the Bursary should include the following:
- Reconciliation of the bank balance shown in the accounts to the amount shown on the bank statement along with a copy of the bank statement

A Cash Advance Status report, that discloses the following balance at the end of the period:

- cumulative project revenue
- cumulative project expenditure, including encumbrances
- encumbrances
- cumulative project expenditure, net of encumbrances
- net available cash balances being the cumulative project revenue
- net of cumulative project expenditure (less encumbrances)
- A reconciliation of the net available cash balance to the bank balances, if the amounts are not in agreement (immediate)

- Utilizing the present UWI fund accounting system, create ~~an~~ separate entity that will allow for a chart of accounts reflecting the project's sub-components and activities according to the World Bank's Categories. (as early as possible).
(This latter requirement is intended to facilitate the timeliness of the RPIU project financial reporting as it eliminates the need to reformat the WI reports into that required for project reporting to the World Bank through the OAS).
- Establish specific procedures as to the payment and reimbursements of the VAT.
- Establish a fixed and agreed time frame for timely payment of CPACC invoices.
- Narrative descriptions of transactions need to be precise to enable documentation to be traced.

These steps should be implemented as early as possible so as to avoid the current serious impact on our ability to satisfy the criteria for overall project implementation as set out by the World Bank. Given the implications that such shortcomings may have for future World Bank projects under the umbrella of the University. I would appreciate your full support in helping us to collectively address the issues, which I have highlighted here.

We will be willing to meet with the relevant personnel from the Bursary at any time to work out an appropriate modus operandi for the financial management of the project. I am confident that working together we can come to a satisfactory arrangement which ensures that CPACC is provided with the support that facilitates the efficient and timely implementation of this regional project.

Yours sincerely

Ulric O'D Trotz
Project Manager

CC: Bursar, UWI Cave Hill Campus
Professor Al Binger, UWICED
Mrs. Gloria Barnett Sobers, Registrar, UWI, Mona, Jamaica
Mr. Jan Vermeiren, OAS Office

Annex 3. Example of CPACC Monitoring Station Report

Station Number: 971-002
Station Name: Lee Stocking Island, The Bahama's
Station Location: 23^o 46.4' N – 76^o 06.4' W
Time Meridian: 75W

Original Installation Date: 4/25/98
Date of Present Visit: 4/24 – 4/29/98
Purpose of Present Visit: Installation

Description of Location: Monitoring Station is located at the Caribbean Marine Research Center (CMRC) on Lee Stocking Island, Bahamas. Located in the tidal monitoring canal located southeast of the Lobster Lagoon Wet Lab building.

Facility Owner: Caribbean Marine Research Center
Facility Contact: Paul Thomas, Island Manager
Facility Numbers: Phone: (242) 358-4557, Fax: (242) 345-6039

Govt. Contact: Godfrey Burnside
Bahama's Department of Meteorology
Nassau International Airport
Nassau, The Bahama's

Govt. Contact Numbers: Phone: (242) 377-3701, Fax: (242) 377-3314

Local Contacts: Caribbean Marine Research Center staff; Judy Tryzbiak, Admin. Assist.; Ray Mojica, Sc. Coord.; Elizabeth Cowie, Ed. Coord.; Brian Kakuk, Dive Officer

Contact Numbers: Phone:(242) 358-4557, Fax:(242) 345-6039,
E-mail: leestock@cob.edu.bs

Data Collection Platform Information

System SN: WX9790182
DCP Mfg. & Type: Vitel VX1100G
SN: 9709148
GOES Transmitter Mfg. & Type: Vitel VX1004PA
SN: PA97091388
Platform ID: 14025484
Channel: 015 East
Transmit Time: 01:41:00
Transmission Interval: 180 minutes
GOES Antenna Mfg. & Type: Vitel V2TH
SN: 2T97091406
Azimuth: 177^o
Elevation: 62^o
Aquatrak Controller: 70243
Battery Mfg. & Type: 12VDC – 24AH Gel Cell
Solar Charger Panel Mfg. & Model: Solarex 18 watt SN-JP97C1000005

Description of Monitoring Site Configuration:
DCP is mounted on the lower section of a Rhon tower located on the south side of a concrete block tower structure. Meteorological sensors are mounted on the upper section of the tower; 4" PVC protective well is attached to the north face of the concrete structure

w/anchor bolts at 2 levels, the well extends down into the tidal canal; SST sensor is attached to sounding tube 0.5ft. above bottom end; all wiring in Flexitite PVC conduit, all hardware is stainless steel.

Sensor Information

Sea level

Sensor Mfg. & Type: Bartex 3100-NG-XCR Acoustic
SN: 1561-3788
Calibration Offset: -107mm
Installation Date: 4/25/98
Removal/Exchange Date:
DCP Address: 1
Terminations: #20
Datum Reference: 10.000m (arbitrary)

Wind

Sensor Mfg. & Type: R.M. Young - 05103 - Wind Monitor
SN: 28466
Installation Date: 4/25/98
Removal/Exchange Date:
DCP Address: 3
Terminations: CTR1
Units: meters/sec (WS); Degrees (WD)
Mult: 98 (WS); 360 (WD)
Div: 100 (WS); 32767 (WD)
Offset: 0 (WS); 0 (WD)
Dec. Pt.: 1 (WS); 0 (WD)

Relative Humidity & Air Temperature

Sensor Mfg. & Type: Viasala HMP45A
SN: S3350009
Installation Date: 4/25/98
Exchange Date:
DCP Address: 6 (Air Temp); 7 (RH)
Terminations: A7+ (Air Temp); A7- (RH)
Units: °Celsius (Air Temp); Percent (RH)
Mult: 2500 (Air Temp); 250 (RH)
Div: 32767 (Air Temp); 32767 (RH)
Offset: -400 (Air Temp); 0 (RH)
Dec. Pt.: 1 (Air Temp); 0 (RH)

Barometric Pressure

Sensor Mfg. & Type: R.M. Young
SN: BP00889
Installation Date: 4/25/98
Exchange Date:
DCP Address: 9
Terminations: A6+
Mult: 300 (millibars)
Div: 32767
Offset: 800
Dec. Pt.: 0

Sea Surface Temperature

Sensor Mfg. & Type: YSI
SN: na
Installation Date: 4/25/98
Exchange Date:
DCP Address: 2
Terminations: A8- (Molex)
Mult: -500
Div: 9313
Offset: 1417
Dec. Pt.: 1

Precipitation

Sensor Mfg. & Type: Jarek Tipping Bucket
SN: 2017
Installation Date: 4/25/98
Exchange Date:
DCP Address: 8
Terminations: CTR2
Units: Inches
Mult: 1
Div: 1
Offset: 0
Dec. Pt.: 2

Benchmark Information

Number of Tidal Benchmarks: 3
Primary BM Designation: 002A - 1998
SRM Designation: 002A - 1998
GPS BM Designation: 002A - 1998
Designation of other BM's: 001B-1998; 001C-1998
BM Descriptions Published In: CPACC
Were all BM's recovered during this visit? yes
Were any BM's destroyed since last recovery? no

Abstract of Levels

Tide Station Name: Lee Stocking Island
Country: Bahama's
Station Number: 941-002
Chief of Party: L. Chapin
Observer: L. Chapin
Level: Zeiss Ni-2
Rod: K&E Centimeter
Order: 2nd Class: 1
Date: June 2, 1998
Datum Offset (LP above Datum 0) = 10.000m

F/B	Diff. of Elev Each Run	Mean Difference	Designation of Section	Field Elev. Above Datum	Remarks
	-0.599		Sensor LP		10.000m
	+0.599	-0.599	002A - 1998	9.401m	
	-1.195		002A - 1998		
	+1.193	-1.194	002C - 1998	8.207m	
	+0.296		002C - 1998		
	-0.296	+0.296	002B - 1998	8.503m	

Administrative Office: 1501 Northpoint Parkway Suite 101
West Palm Beach, FL 33407
(561) 471-7552
Fax: (561) 471-7553
E-mail: cmrc@gate.net

Laboratory Office: 805 East 46th Place
Vero Beach, FL 32963
(561) 234-9931
Fax: (561) 234-9954 E-mail: cmrc@gate.net

Annex 4. Summary of GIS expert meeting, Barbados, February 3-4, 1999

The two day meeting of Caribbean GIS practitioners reviewed the status of GIS development and application in the region and was based on the report, *Review of GIS Capability and Needs in CPACC Partner Institutions* prepared by Mr. King (CPACC/ISC). The meeting identified training as an important issue of GIS development and application and reviewed general training needs in the region.

The focus of the meeting then shifted to the CPACC project and in particular, Component 3, Inventories of Coastal Resources and Uses. It was noted that CPACC recommended a GIS data repository for each country through the previously mentioned report. The meeting reinforced this recommendation by specifying key characteristics and criteria for data repositories. The agency which functions as the data repository should have at least:

- A related function and/or related data base;
- The capacity to administer data and availability of personnel and experience;
- Basic hardware/software including Internet connectivity;
- Financial resources for upgrade of hardware/software, supporting physical structure and general maintenance.

Training needs and approaches to support data repositories were also identified. The former consisted of nineteen points including database design, development and integration as well as the adaptation of interfaces to user specifications. Establishing training guidelines with core courses and the development of manuals and self paced courses were among the training approaches noted.

The meeting concluded with specific recommendations for the CPACC project to facilitate the effective and efficient application of GIS technology in the region, particularly within the project's activities. These recommendations included:

- 1) Capacity building in the collection and management of geographic information and training and technical support, metadata, standards workshops, acquisition and production of base data;
- 2) Utilization of remote sensing along with training;
- 3) Addressing data gaps, including seeking better rates from data/information gathering services.
- 4) Ensuring that data meets target organization's objectives, including through the use of appropriate technology;
- 5) Purchase the most effective package when buying satellite services even if it extends beyond the pilot area; and
- 6) CPACC to point out that regional resource people must be utilized to facilitate technology transfer. The national focal points should be informed of the expertise sought for particular activities to support this goal.

Annex 5. IMA training (May 3rd to May 14th, 1999)²

The following is an outline report of the training received by Shelley-Ann Jules-Moore, Institute of Marine Affairs (IMA) for the period May 3rd to May 14th, 1999. The training was recommended to improve the understanding of the requirements of an Archiving Center with responsibility for sea level data. The training was executed in two modes, hands on observations including rapport with staff and formal training.

- (a) Department of Marine Science, University of South Florida, Tampa, May 4th, 1999

The stint in Tampa involved a visit to the Department of Marine Science, University of South Florida, a national oceanographic data collection center. A meeting was held with Dr. Meredith Haines, Data Manager, Coastal Ocean Monitoring & Prediction System. Dr Haines provided useful insight into the data managing portfolio as well as practical advice about scripting tools to facilitate queries to the database.

- (b) Vitel, Inc. Washington DC., May 5th, 1999

The Washington DC. stay involved a visit to Vitel Inc. The makers of the equipment used in the climate monitoring stations and the present home of the Satellite Earth Station used to download all of the data from the 18 sites. Discussions were held with Mr. Fred Bechert, Principal Engineer. Initial discussions involved physical viewing of the components of the Satellite Earth Station, including computer linkages. Mr. Bechert further explained the connectivity requirements. The later part of the visit involved the practical examination of the MS Access Database currently used to store the data from the monitoring sites. Ms. Jules and Mr. Lee Chapin, CPACC ARNC took the opportunity to outline concerns with respect to the current parsoning of the sea level data fields. Ms. Jules highlighted the difficulty experienced by the IMA staff in filtering the data in the format it is currently delivered in and processing format requirements. Mr. Bechert ensured that the developer of the database would be informed and improvements would be made. In addition it was demonstrated that the current query facility does not facilitate downloading of multiple entity fields even though the web site indicates that this type of query can be facilitated. Mr. Fred Bechert indicated that this would also be addressed.

- (c) National Oceanic and Atmospheric Administration, Washington, DC., May 6th, 1999

The National Oceanic and Atmospheric Administration (NOAA) is a National Oceanographic Data Centre that is recognized worldwide. Ms. Jules met with the staff of the Information Systems Division. Discussions were held with respect to what IMA was hoping to achieve as a CPACC RAC. NOAA staff provided a tour of the facilities and the equipment used to carry out their functions. Additional attention was paid to possible software requirements, in particular software associated in with the querying of databases via a web page. Additionally software associated with the GIS tools was also identified.

- (d) Organization of American States, Washington, DC., May 7th, 1999.

The IMA representative met with the OAS staff involved in the CPACC project including Mr. Jan Vermeiren, Principal Specialist; Mr. Claudio Volonte CPACC Technical Coordinator and Mrs Beatriz Ferro-Santos CPACC Junior Coordinator and discussed the current capabilities at the IMA.

² Submitted by Ms. Shelley-Ann Jules-Moore, Manager, Information Technology Department, Institute of Marine Affairs, Trinidad and Tobago.

(e) University of Hawaii, May 9th-14th, 1999

This portion of the trip involved the formal training aspect. Mr. Pat Caldwell Oceanographic Liaison, National Oceanographic Data Center, University of Hawaii, the creator of the DOS based software used to carry out the quality control processing on the raw data conducted the training. The training concentrated in the execution of the following areas of sea level data processing:

- Tidal analysis
- Gap analysis
- Filtering
- Tidal Predictions
- Quality Control testing in association with the errors that the data may possibly contain (i.e. Timing errors, spikes, gaps and datum shifts).
- Creation of products.

In addition to the operations of the software Mr. Caldwell also outlined the data conventions that should be used to store each individual file used in the Quality Control exercise. Practical examples were examined and the officer was required to carryout quality control operations on sample data given. Data products produced by other organizations were identified and possible web contact for additional information was also outlined. Ms. Jules received a copy of the processing software and associated manual so that the capabilities will be available at IMA.

In addition to the new capabilities obtained from the training, valuable contacts were made. These contacts can only facilitate the execution of the responsibilities that come with being a Sea level Archiving Center. Ms. Jules and IMA would like to take this opportunity to express her gratitude for this training opportunity provided by the CPACC project.

Annex 6. Professionals in APA and ESSA for implementation in Component 3

Dr. Leonard Nurse
C/o Coastal Zone Management Unit
Bay Street
St. Michael, Barbados
Tel: (246) 228-5955
Fax: (246) 228-5956
e-mail: lnurse@coastal.gov.bb

Mr. Colin Daniel
C/o ESSA Technologies Ltd.
Suite 308, 9555 Yonge Street
Richmond Hill, Ontario
Canada L4C 9M5
Tel: (905) 508 0860
Fax: (905) 508 0863
e-mail: cdaniel@essatech.com

Dr. Jacob Opadeyi
Department of Surveying & Land Information
Faculty of Engineering
The University of the West Indies
St. Augustine, Trinidad and Tobago, West Indies
Tel: (868) 645 3232 ext. 2108/2109
Fax: (868) 662 4414
e-mail: jopedeyi@eng.uwi.tt

Mr. Robert Bascom
C/o Allyene Planning Associates, Inc.
BAMP Complex
Spring Garden Highway
St. Michael, Barbados
Tel: (246) 228-1341
Fax: (246) 228 1270
e-mail: rbascom@apa.com.bb

Ms. Carol Murray
C/o ESSA Technologies Ltd.
Suite 308, 9555 Yonge Street
Richmond Hill, Ontario
Canada L4C 9M5
Tel: (905) 508 0860
Fax: (905) 508 0863

Dr. Yolanda Alleyne
C/o Alleyne Planning Associates
BAMP Complex
Spring Garden Highway
St. Michael, Barbados
Tel: (246) 228 1341
Fax: (246) 228 1270
e-mail: alleyney@apa.com.bb

Dr. Gerard Dhamaratne
12 Warrens Terrace
St. Michael, Barbados
Tel: (246) 438 1601
Fax: (246) 424 4204
e-mail: gerardd@sunbeach.net

Ms. Shahiba Ali
Department of Surveying and Land Information
Faculty of Engineering
The University of the West Indies
St. Augustine, Trinidad and Tobago, West Indies
Tel: (868) 645 3232 ext. 2108/2109
Fax: (868) 662 4414.

Annex 7. Summary Presentations on Screening Assessments from Component 6 sub-regional workshop (Component 6, Grenada, March 1999)

(a) Barbados.

The representatives of Barbados exhibited an excellent presentation on the potential impacts of sea level rise on the Bajan coast followed by a proposed plan action for the implementation of this component. As with other Caribbean countries, the coastline is heavily used and therefore, any increase in sea-level will affect the basis of the country's economic and environmental sustainability. Some of the potential adaptation options could include relocation of activities and renourishment of beaches. Salt water intrusion is another potentially severe problem since all water supplies for Barbados comes from wells located on the coastal zone. From a national prospective, the Bajan representatives concluded that any further vulnerability assessments should concentrate on three sectors: tourism, human settlements and water supplies. Potential sites for conducting the VA include Maxwell/Hastings/Worthing/Dover; Oistins; Holetown; Spring Garden and Bridgetown.

(b) Guyana.

Guyana's representatives also made an excellent presentation. Although Guyana is a continental country with vast extensions of highlands, about 90% of the population live within the coastal plain. The coastal plain of Guyana is about 0.5 to 1 meter below high water level making it highly vulnerable to any increase in sea level. The coastline is presently protected by a sea wall (about 100 miles) and drainage system that needs much maintenance work and a natural line of mangroves which is under exploitation with no sustainable management practices. Georgetown, with 70% of the country's population, is flooded on a daily basis due to clogging of the poor maintained drainage system that works only during low tide. Agriculture along the coast is a major source of foreign exchange and highly vulnerable to future salt water intrusion that could impoverish the soils and contaminate the freshwater reservoirs used for irrigation. Potential sites to conduct the vulnerability assessment include Georgetown, Leguan, West Coast Berbice, Lusignan and Essiquibo coast.

(c) Grenada.

The delegates from Grenada presented a very good analysis of the potential vulnerability of this country's coast to future sea-level rise. Most of the country's infrastructure and human settlements are located along a very narrow coastal plain with steep topography backing it up. Grand Anse and St. George's were considered as the two sites with greatest economic importance to the country and with the highest vulnerability risk to sea level rise due to tourism activities. The coastal highway along the west coast of the country was mentioned as potentially vulnerable to any sea level rise given that is presently located very close to present sea level. Potential sites for the vulnerability assessment include the Grand Anse, the southwest peninsula, St. George's, Grenville area, the western and the northern coast, including the towns of Sauteurs, and the islands of Carriacou and Petit Martinique.