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*IKONOS image of Buccoo Reef and adjacent land, Tobago (2004)*

## World Environment Day, 5 June 2007: Melting Ice – A Hot Topic for Caribbean SIDS!

The February 2007 report of the Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2007: The Physical Science Basis* notes the increase in average Arctic temperatures, the resulting decline in both mountain glaciers and snow cover and their contribution to sea level rise. The last time that the polar regions had extended periods of warmer temperatures was approximately 125,000 years ago. At that time the melted polar ice resulted in a 4 to 6 metre rise in sea level. If you consider that currently, global sea level rise is estimated at 2 mm a year, you begin to realize that these levels will rise. What implications does this have for Caribbean Small Island Developing States (SIDS)?

First, some background: Research by the British Antarctic Society (BAS) indicates that the melted ice in the Antarctic Peninsula had served as a vital

*(Continued on page 5)*

**Feature Article:**

### Land-Use Planning and Watershed Restoration in the Courland Watershed and Buccoo Reef Area, Tobago

*The IWCAM National Demonstration Project for Trinidad and Tobago: Land-Use Planning and Watershed Restoration in the Courland Watershed and Buccoo Reef Area, on the island of Tobago, is one of the more advanced GEF-IWCAM demonstration projects. In this article Sandra Timothy, Demonstration Project Manager, gives some background to the project and shares their experience so far.*

Tobago has been awarded the title of "World's Best Eco-tourism Destination" by the prestigious World Travel Awards for the fourth consecutive year. Notwithstanding its rich ecosystems and such prestigious international awards, its natural resources, like those of its Caribbean neighbours, have not been managed in a sustainable way. Kamau Kili, a member of the Council for Sustainable Development in the Tobago House of Assembly (THA), summed the problem up in this way, "A narrow sectoral approach to natural resource management in Tobago has been compounded by a lack of data, as well as limited human and technical resources. This has resulted in poorly-informed decision-making and inadequate management of natural resources leading to environmental degradation and resource use conflicts."

The Buccoo Reef is one of the main tourist attractions on the island and the major revenue earner for sea tour operators in the Southwestern part of the island. It was designated a marine park in 1973, but over the years, has increasingly come under threat from anthropogenic impacts and, more recently, from climate change-induced coral bleaching. It is recognized as a national biodiversity hotspot and was declared an Environmentally

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### On World Environment Day 2007 "Melting Ice – A Hot Topic?"

Imagine:

- Sea-level rise?
- More frequent and serious flooding
- Losing our coral reefs, mangrove swamps and beaches
- Losing our lives and property

Learn more about Climate Change:

[www.unep.org/wed/2007](http://www.unep.org/wed/2007)

References used for the article "Melting Ice - A Hot Topic for Caribbean SIDS" and useful if you want to learn more about sea level rise include:

[http://news.bbc.co.uk/1/hi/sci/tech/portal/climate\\_change/default.stm](http://news.bbc.co.uk/1/hi/sci/tech/portal/climate_change/default.stm)

<http://caribbeanclimate.bz/>

<http://earthobservatory.nasa.gov/Library/GlobalWarmingUpdate/>

[http://news.nationalgeographic.com/news/2004/12/1206\\_041206\\_global\\_warming.html](http://news.nationalgeographic.com/news/2004/12/1206_041206_global_warming.html)

<http://www.acia.uaf.edu/>

[http://www.ccap.org/Presentations/CDM-FAD/2004\\_November\\_%20Meeting/Trotz--Caribbean%20Climate%20Change%20-%20Nov04.pdf](http://www.ccap.org/Presentations/CDM-FAD/2004_November_%20Meeting/Trotz--Caribbean%20Climate%20Change%20-%20Nov04.pdf)

<http://www.ipcc.ch/>

#### BACKGROUND ON THE IWCAM PROJECT:

The Integrating Watershed and Coastal Areas Management in Caribbean Small Island Development States (IWCAM) Project, with a value of USD 112 million, was approved by the Global Environment Facility (GEF) in May 2004. Implementing agencies are the United Nations Environment Programme (UNEP) and the United Nations Development Programme (UNDP). Executing agencies are the Secretariat of the Cartagena Convention (UNEP-CAR/RCU) and the Caribbean Environmental Health Institute (CEHI) and the UN Office of Project Services (UNOPS). The thirteen participating SIDS are: Antigua and Barbuda, The Bahamas, Barbados, Cuba, Grenada, Dominica, Dominican Republic, Haiti, Jamaica, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, and Trinidad and Tobago. The length of the Project is 5 years and commenced in the second quarter of 2005. The Project Coordinating Unit is located at the CEHI, as agreed by the Implementing and Executing Agencies and the participating countries.

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Sensitive Area in 2005 and subsequently a Ramsar Site in 2006. Despite these designations, the lack of enforcement of park rules and the inadequate implementation of the Management Plan (prepared in 1995 by the Institute of Marine Affairs for the THA ) have resulted in Buccoo Reef being little more than a "paper park".

The Courland Watershed is Tobago's largest watershed and most important water catchment area. It supplies water for rural villages in the watershed and the entire west and south coast. The catchment drains into the coastal areas adjacent to Buccoo Reef, which is located 7km to the south. It is the site of many activities, including both planned and unplanned housing developments, farming and hunting. Changes in land use patterns in the Courland Watershed, in particular increasing deforestation as a result of poor farming practices and bush fires, have greatly affected the quality of the run-off, and damaged the health of adjacent fringing coral reefs. The gradual degradation of Buccoo Reef has been documented by over 30 scientific studies, which all point to land-based sources of pollution as the main culprit in the loss of live coral cover.



Exposed land in Courland Watershed

It was against this backdrop that the GEF-IWCAM National Demonstration project for Trinidad and Tobago: **Land-Use Planning and Watershed Restoration in the Courland Watershed and Buccoo Reef Area**, was developed.

This project seeks to reduce the impact of the Courland Watershed and other smaller watersheds from Castara in the North, to Crown Point in the Southwestern end of Tobago, upon coastal areas, from Little Englishman's Bay to Buccoo Reef. The project objectives include:

- Reforestation of the Courland Watershed and a monitoring programme to include surveys to identify point and non-point sources of pollution;

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- Incorporation of community involvement into the management programme;
- Diversion of surface drains into a constructed artificial wetland;
- Upgrading of the land-use plan in the target area and improvement of the Environmental Impact Assessment process;
- Establishment of a sustainable and effective programme of data collection;
- Development of a formal procedure for data flow;
- Instigation of an integrated approach to decision-making, and
- Undertaking a long-term public awareness and sensitization campaign.

This Demonstration project is being implemented by the Buccoo Reef Trust (BRT), a Non-governmental Organization (NGO), in close collaboration with the Tobago House of Assembly (THA). The BRT has established a Project Management Unit (PMU), led by a Project Manager. The project team also includes a GIS Specialist, a Scientific Diving Officer and an Environmental Educational Coordinator. Since its inception in January 2007, the PMU has been working along with other members of staff at BRT and members of the National Intersectoral Committee (NIC).

#### Achievements to date:

##### *Formation of the NIC*

The NIC was formally launched in November 2006 following a Cabinet decision for its establishment. Its inaugural meeting was held in January 2007 and it has convened three successful meetings to date.



**Second meeting of the NIC**

The role of the NIC is to integrate IWCAM principles into national policy for Trinidad and Tobago. Its composition therefore includes representatives of a wide cross-

section of agencies and Ministries across the national community. These include relevant Divisions of the THA, NGOs, the United Nations Development Programme (one of the project's implementing agencies), and the Tobago Hotel Association; a total of ten members so far. It is expected that more agencies will nominate representatives. The NIC is chaired by Linford Beckles, a THA representative.

##### *Stakeholders Meetings*

Several one-on-one stakeholder meetings have been held. Interest in, and anticipated participation in IWCAM sub-activities is high.

##### *Public Awareness Campaign*

A simple public awareness campaign has begun. This will be expanded when more funds are available:

- Interview on Tobago's local television morning show, "Rise and Shine".
- Distribution of approximately 1,500 public awareness flyers in villages situated in the watershed, with the assistance of The University of the West Indies campus volunteer group.
- Article in a bi-monthly magazine.

##### *Data Collection and Monitoring*

##### **External Partnership**

BRT is fortunate to have entered into partnership with Coral Cay Conservation (CCC). CCC is a UK-based NGO with over 20 years experience in mapping and monitoring coral reefs worldwide, using the effective approach of combining qualified marine biologists with trained volunteers. The BRT, with financial assistance from the THA and the Global Environment Facility's Small Grants Programme (GEF-SGP, implemented by the UNDP), invited CCC to Tobago to undertake a major reef mapping programme called the *Tobago Coastal Ecosystem Mapping Project* (TCEMP).



**Baseline survey**

This 2-year project, which started in April 2007, will develop a detailed database of all the coastal areas surrounding Tobago down to a depth of 30 metres. This information will be of critical importance in formulating recommendations for the management of Tobago's reefs and fits perfectly into the overall aims of IWCAM. The project has a substantial education and capacity-building programme, including 48 scholarships to local volunteers for free training in scuba diving, marine taxonomy and survey techniques. For more information on TCEMP see [www.coralcay.org](http://www.coralcay.org)

In addition to the above-described mapping and baseline data collection of Tobago's coastal areas, the PMU has established a long-term coral reef monitoring programme.



*Baseline survey*

The aim of this component is to establish 12 permanent monitoring stations on reefs around the island in order to assess any changes over time. These stations have been set-up and the monitoring programme, using underwater video techniques, is well underway with video surveys carried out in both January/February and March/April. This work is being assisted and expanded through a partnership with Dr. Jennie Mallela, a coral reef post-doctoral researcher at the University of the West Indies.

#### *Geographic Information Systems (GIS) Unit Establishment*

In preparation for the installation of the GIS, discussions have been held with many of the local authorities with responsibilities in the Demonstration Project area, including the Department of Natural Resources and the Environment (DNRE), the Town and Country Planning Unit and the Tobago National Emergency Management Agency (NEMA). Discussions were also held with the Institute of Marine Affairs (IMA).

The GIS Specialist expressed interest in possible avenues of cooperation with each of these agencies. These discussions underlined the fact that there is a keen interest in GIS amongst stakeholders, and, that the IWCAM Project can make a distinct contribution to the development of GIS in Trinidad and Tobago.

The unit should soon be equipped and once properly installed at the BRT, initiatives aimed at encouraging community participation will begin. These will include a Citizen Science approach with high school students and On-the-Job internships for tertiary level students.

#### Work in Progress

##### *Watershed Restoration*

Initial talks have been held regarding restoration of the watershed with some key stakeholders. Actual work is on hold until a Memorandum of Understanding is established between the THA and BRT. It is anticipated that watershed reforestation work will be done in partnership with the Water Resources Agency, the Division of Natural Resources and the Environment; and the Reforestation Unit of the THA

##### *Community Participation*

BRT will also partner with the Poverty Reduction Programme and the Division of Community Development and Culture to support and empower communities in the watershed to start self-help projects which will have positive impacts upon the watershed.

#### Challenges

- The BRT is working together with the government on the execution of this demonstration project. For example, the THA's Division of Agriculture, Marine Affairs and the Environment, as the GEF-IWCAM National Focal Point, has an oversight role on the demonstration project. Institutional arrangements between BRT and government entities should be established to ensure progress, efficiency, and attention to sensitive political or cultural issues. This requires a consistent and concerted approach to communication and information-sharing.
- Overcoming difficulty in information sharing amongst agencies.
- Maintaining a national profile for the Demonstration Project which is located in Tobago, particularly as the lessons learned must be applied at the national level.



*Courland Watershed, Tobago*

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barrier to the movement of the glacier and as a result of its melting, they predict that glaciers in Antarctica now flow into the ocean up to six times faster than before. In the past decade, several major sections of Antarctic ice have broken off: the Larsen A ice shelf (1995 – 1,600 square kilometres), the Wilkins ice shelf (1998 – 1,100 square kilometres), and the Larsen B ice shelf (2002 – 13,500 square kilometres). It is estimated that the melting Antarctic ice caps contribute to at least 15% of the current global sea level rise. In January 2006, the British Antarctic Society, in a study commissioned by the British government, warned that the disintegration of the west Antarctic ice sheet could raise sea levels by at least 5 metres.

On the other side of the globe, the multinational Arctic Climate Impact Assessment (ACIA) report recently concluded that in Alaska, western Canada, and eastern Russia, average temperatures have increased at nearly twice the global average (3 to 4 degrees Celsius) in the past 50 years. This impacts the Greenland Ice Sheet, which is 1.71 million square kilometers and generally between two to three kilometers in thickness. Scientists who have been measuring its melting rate since 1979 report that in the period between 1979 and 2002 the melting has increased by approximately 16 percent. In 2006, based on images from a NASA satellite, the melting rate was estimated at 239 cubic kilometres annually. It is predicted that if the ice sheet were to melt in its entirety, which is a long term possibility, global sea levels would rise 7.2 metres.

From our perspective, the impacts of glacial melt upon Small Island Developing States (SIDS) will be especially destructive, both in the short and long-term. These include changes in water temperature, salinity, and sea level rise.

The GEF-funded Mainstreaming Adaptation to Climate Change (MACC) project, which aims to mainstream climate change adaptation strategies into the sustainable development agendas of the small island and low lying states of CARICOM, has high-

lighted some of these impacts as:

**Beach erosion:** As sea level rises, more Caribbean SIDS beaches will be reclaimed by the Atlantic Ocean and Caribbean Sea.

**Salinisation of soil, aquifers, and estuaries:** Sea level rise will bring salt and brackish waters into the soil, aquifers and estuaries, threatening drinking water supplies, agriculture, and important coastal ecosystems.

**Degradation of mangroves, seagrass beds, and coral reefs:** Both salination and beach erosion, as mentioned above, would cause degradation of these habitats. Additionally, sea level rise will result in a reduced amount of light reaching coral reefs and sea grass beds. The consequences of their destruction would be far reaching, including decreased stocks of the fish

which live and feed in and around the reefs; reduction in the amount of natural protection offered by coral reefs and mangrove swamps in particular, from storm surges; decreased tourism activities, such as snorkeling, scuba diving, and fishing; and a decrease in valuable biological diversity.

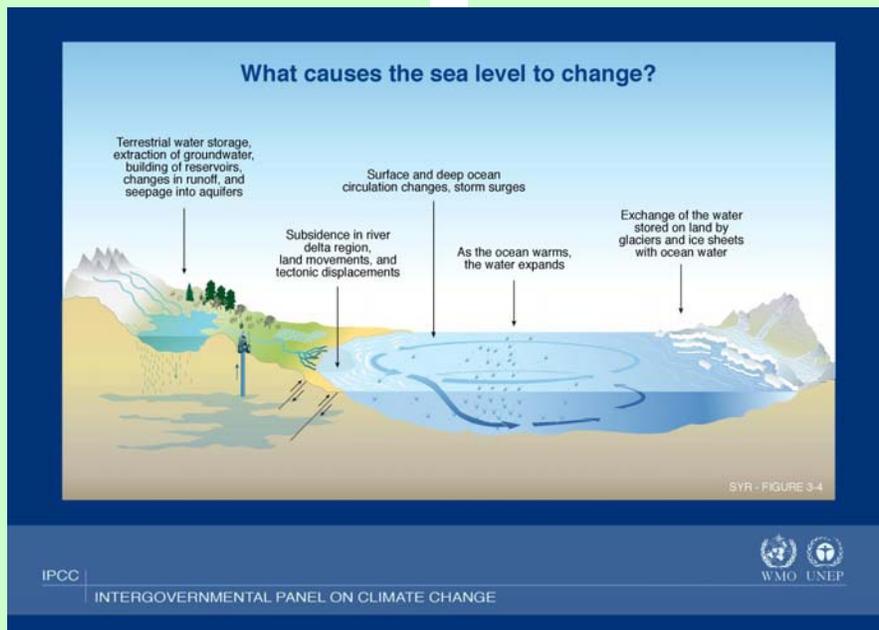
**Enhanced storm surges:** To further complicate the matter of diminished protection from

storm surges, the higher sea level, combined with other climatic changes, will bring about more severe storm surges, wreaking havoc on coastal ecosystems and communities.

**Coastal inundation:** With over 90% of populations and economic activities located in the coastal zones of Caribbean SIDS, flooding will have a negative impact upon economic livelihoods and cause loss of life.

Ronny Jumeau, the Seychelles' Minister for Environment and Natural Resources, addressed this threat to SIDS in his essay

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## IWCAM Training for Project Managers and National Focal Points

### Demonstration Project Managers Trained on Indicators, Integrated Water Resources Management & Environmental Monitoring of Industrial Waste in Coastal Zones, May 14-18, 2007

The Global Environment Facility (GEF)-funded Integrating Watershed and Coastal Areas Management Project (IWCAM) recently conducted a regional training activity in St. Lucia. Demonstration Project Managers from 7 of the 9 demonstration sites as well as representatives from 11 of the 13 GEF/IWCAM Participating Countries participated in the week of activities designed to orient them towards the project objectives and also provide training in key technical areas related to the project. The objectives of the week of activities were as follows:

#### *For Demonstration Project Managers:*

- To catalyze networking and communications amongst IWCAM Demonstration Projects.
- To introduce Demonstration Project Managers to the IWCAM Project Coordinating Unit.
- To train Demonstration Project Managers in IWCAM-specific administrative, public awareness and education procedures.

#### *For Demonstration Project Managers and National Focal Points:*

- To provide an initial introduction to GEF International Waters outcomes and indicators and their incorporation into project work planning, execution, and monitoring.
- To provide training on integrated water resources management (IWRM) and roadmapping for national IWRM plans.
- To develop "next steps" for IWRM Mainstreaming, in both demonstration project sites and at the national level
- To provide training in aspects of environmental planning and monitoring, including: Coastal Zone Management Planning; Impacts of industrial waste; Monitoring programmes; Coastal sampling techniques; and Relevant laboratory analyses.



Resource persons for the week included staff of the regional GEF/IWCAM Project Coordinating Unit as well as

technical officers from the Caribbean Environmental Health Institute (CEHI).

This initiative, jointly spearheaded by the GEF/IWCAM Project, in collaboration with the Caribbean Environmental Health Institute (CEHI) was co-funded by the Government of Japan, under the Japan-CARICOM Friendship and Cooperation Fund and the GEF, under the IWCAM Project.

The Workshop was held at the Bay Gardens Hotel. The feature address at the formal opening of the workshop was given by Mr. Donovan Williams, Permanent Secretary, Ministry of Economic Affairs, Economic Planning, National Development and Public Service for the Government of St. Lucia. It is expected that the execution of the workshop will result in a better understanding of GEF procedures, a better appreciation of IWRM, improved environmental planning and monitoring capabilities of the participants, and in improved coastal zone monitoring regimes for coastal marine industrial pollution in the Region.

#### Participants in the Workshops visited the Fond D'or Watershed on Friday 18 May





## International Year of the Reef (IYOR 2008)

The International Coral Reef Initiative (ICRI), a partnership among governments, international organizations, and non-government organizations throughout the world, has designated 2008 as the International Year of the Reef (IYOR 2008) to celebrate one of Earth's most precious, fragile, and diverse ecosystems. By raising awareness and understanding of coral reefs, IYOR 08 aims to promote urgent conservation and management policies to best protect our coral reefs on a global scale.

Over the last few decades, the health of coral reefs and their associated ecosystems (mangroves, seagrass, etc...) have degraded considerably worldwide. Marine resources within and surrounding coral reefs have also significantly declined, primarily due to human influences.

The first IYOR was declared and implemented in 1997 in response to the increasing threats and loss of coral reefs and associated ecosystems. IYOR 97 was a global effort to raise awareness and understanding of coral reefs and the threats they face, and support related conservation, research and management efforts. Despite IYOR 97's success in raising global awareness of coral reefs and associated ecosystems, ten years later, there remains an urgent need to increase awareness, to take action, further conserve and manage coral reefs and associated ecosystems.

The overall objectives of the International Year of the Reef 2008 (IYOR 2008) are to:

- Strengthen awareness about the ecological, economic, social and cultural value of coral reefs and associated ecosystems
- Improve understanding of the critical threats to coral reefs and generate both practical and innovative solutions to reduce these threats
- Generate urgent action at all levels to develop and implement effective management strategies for conservation and sustainable use of these ecosystems.

### GEF-IWCAM Consultancies:

IWCAM Consultancies which are underway, or which will shortly begin, include: a Capability Assessment for Geographic Information Systems; a Review of Policy, Legislation and Institutional Structures; an Indicators Mechanism Assessment; and a Review of Relevant IWCAM-related Projects. In coming months the Project will be sharing the outcome of this research.

The ICRI partners are committed to ensuring that IYOR 2008 is a success, and activities are already underway in many countries including several from the Caribbean. We also anticipate many exciting developments as the planning for IYOR 2008 begins in earnest, and you will be able to follow the progress by visiting: <http://www.iyor.org> (where you can sign-up to the IYoR newsletter). For further information on IYOR 2008 including ways to become involved in the year, please visit [www.iyor.org](http://www.iyor.org) or contact [info@iyor.org](mailto:info@iyor.org).



### The GEF-funded Sustainable Integrated Water Resources and Wastewater Management Project in the Pacific Island Countries

In an effort to share some of the lessons learned during the GEF-IWCAM development phase, GEF-IWCAM Technical Coordinator, Sasha Gottlieb, traveled to Fiji to participate in the GEF-funded Sustainable Integrated Water Resources and Wastewater Management Project in the Pacific Island Countries - Second Steering Committee Meeting. The project in the Pacific is in its development phase and plans to submit a full project brief to the GEF in late 2007. Given the similar approaches, colleagues from the Pacific were particularly interested in learning about the GEF-IWCAM approach for demonstration project development and hotspot diagnostic.

The two regions, along with colleagues from the Indian Ocean and Atlantic Ocean SIDS, will continue to collaborate in the development of an IWRM methodology and guidelines for SIDS and to serve as resources for each other throughout project implementation.

#### Sasha Gottlieb of IWCAM presents in Fiji



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*No Island Is an Island*, stating, "We are all linked together: what happens in the Arctic affects us all on the Equator... (Former) UNEP Executive Director, Klaus Toepfer, said that the... Arctic was 'the early warning system for the world'. The very same term has also been used to describe small island states as, thanks to our smallness and special frailties, we will be the first to succumb to the major environmental problems afflicting the world today."

Sea level rise from glacial melt is indeed a serious issue and one that should not be overlooked until it is too late. While reducing the carbon dioxide emissions of SIDS will not be sufficient to curb the global warming trend, islands can mitigate some impacts of sea level rise through sustainable and integrated management of watersheds and coastal areas.

Maintenance of coastal ecosystems will protect developments from storm surge and beach erosion. Reducing contamination, sedimentation and erosion will help keep mangroves, seagrass beds, and coral reefs healthy, better enabling them to respond to the degradation caused by sea level rise. Protection and maintenance of watersheds will maintain important freshwater resources, especially as sea level rise will increasingly cause salt-water intrusion into aquifers. Improved water efficiency will reduce demand on increasingly stressed water supplies.

These actions are part and parcel of the integrated watershed and coastal area management that GEF-IWCAM is helping the 13 Participating Countries to adopt. The coastal zones of SIDS are being developed with little regard to loss and degradation of land and flooding during storm surges. Our exposure to these threats in particular will increase with sea level rise. Responding to the challenge will require assessments of future rates of sea level rise amongst SIDS, information on likely effects and public awareness of these, as well as, adaptation and mitigation measures. The integrated approach to managing our watersheds and coastal areas must take these things into consideration.

*Contributors to this issue of Caribbean WaterWays:*

*Sandra Timothy, Owen Day, Vijay Datadin, Sasha Beth Gottlieb, Vincent Sweeney, and Donna Spencer.*



## The LBS Protocol - Update

In October 1999, Parties to the Cartagena Convention adopted the Protocol Concerning Land-Based Sources and Activities (LBS Protocol), a regional agreement for the prevention, reduction, and control of marine pollution from land-based sources and activities in the Wider Caribbean Region.

The main point sources of pollution to the Caribbean Sea are: domestic sewage, oil refineries, sugar factories and distilleries, food processing, beverage manufacturing, pulp and paper, and, chemical industries. The main non-point source category of pollution is run-off from the land.

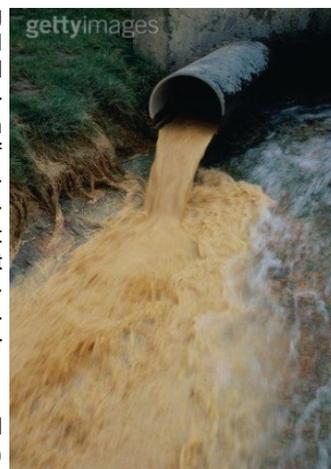
The Protocol provides the framework for addressing pollution based on national and regional needs and priorities. It adopts an approach which focuses upon addressing the sources of pollution, including the application of most appropriate technologies and best management practices. It also promotes the establishment of pollution standards and schedules for implementation.

Two countries (Trinidad and Tobago and Panama) have so far acceded to the Protocol. Seven more countries must accede before it can come into force. The United States, in March 2007 moved closer to ratifying the Protocol.

Several Caribbean countries will, with the assistance of the Assessment and Management of Environmental Pollution (AMEP) Sub-Programme of the Caribbean Environment Programme (CEP), based at UNEP-CAR/RCU, the Regional Activity Centres at the Institute of Marine Affairs (IMA), and the Centro de Ingenieria y Manejo Ambiental de Bahias y Costas (CIMAB), and the IWCAM Project, hold workshops to promote the Protocol at the national level.

**For more information see: [www.cep.unep.org](http://www.cep.unep.org)**

*Participating Country Focal Points, Demonstration Projects and others are invited to submit articles. Please contact Donna Spencer at [dspencer@cehi.org.lc](mailto:dspencer@cehi.org.lc)*



Contact Information:

**IWCAM Project Coordination Unit**  
**P.O. Box 1111, The Morne, Castries, Saint Lucia**  
**Tel: (758)-452-2501/1412; Fax: (758)-453-2721**  
**E-mail: [dspencer@cehi.org.lc](mailto:dspencer@cehi.org.lc)**