

The Roatan Coral Reef Water-Quality Monitoring Partnership

A Proposal to the Campus-Community Partnership Grants Program of the Associated Colleges of the South Environmental Initiative

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Introduction

For the last decade Birmingham-Southern College students have gone to the Institute for Marine Sciences (RIMS), in Roatan, Honduras to study Coral Reef Ecology biennially. Over a similar time span, students from Rhodes College have done the same thing on an annual basis. The reefs around Roatan are part of the second longest barrier reef system in the world and currently include some of the healthiest reefs in the Caribbean. However, a recent surge in development on the island (from 600 tourists in 1969 to 250,000 last year) has created concern for their long-term health. Overarching threats to the reef system noted at the International Coral Reef Action Network Mesoamerican Reef Alliance (ICRAN MAR) sponsored workshop “Conservation in Action: Joining Forces to Put Standards into Practice” held in Roatan June, 2006 included improper septic systems, coastal development, deforestation (of mangroves), etc. These can be assessed by water quality changes.

The non-profit Sandy Bay and West End Marine Park (SBWEMP) staff have begun a water quality monitoring program but they are resource-limited. We have agreed to form a partnership between the SBWEMP, the Roatan Institute for Marine Science (RIMS), and two Associated Colleges of the South institutions, Rhodes College and Birmingham-Southern College to establish a water quality monitoring program. Our goals are to purchase the necessary equipment and establish a protocol to monitor the water quality of the reefs within and outside the Marine Park on a monthly basis. We are asking the ACS Campus-Community Partnership (CCP) Program for funds to purchase the necessary water quality monitoring equipment. When students from either Rhodes or BSC are in Roatan, they will use the equipment to make measurements of water quality as part of their coursework and the students will train the Marine Park staff to use the equipment. For most of the year, when our students are not in Roatan, the equipment will be housed at the RIMS and used by the Marine Park staff to continue the monthly water quality monitoring program. The accumulated water quality data will be used in continuing lab exercises by the college courses and by the RIMS and SBWEMP in their ongoing programs to protect and conserve the unique and highly diverse Roatan coral reef ecosystem.

This partnership between two ACS institutions and two local non-profit environmental organizations matches several of the ACS Environmental Initiative CCP Alliance funding priorities in addition to the creation of off-campus service learning opportunities with community

partners. The fact that wealthy landowners and corporations (many foreign) profit from the development in Roatan, yet may be damaging the reefs that impoverished islanders such as artisanal fishermen need to survive, relates to the theme of environmental justice. Currently Honduran governmental agencies (CODEFOR and SERNA) are unable or unwilling to conduct water quality measurements necessary to ensure that degradation of the water is not occurring. This partnership between the ACS and local nonprofits that represent all of the people of Roatan, will allow continuous long-term assessment of the health of the reef ecosystem water. For the ACS students, working with and training islanders to measure water quality will be an off-campus service learning opportunity. We also hope that as this partnership progresses we are able to find more ways in which the students can participate in service-learning exercises with the RIMS and SBWEMP staff.

Project Description

The proposed project will begin with Rhodes students and Rhodes and Birmingham-Southern faculty meeting with RIMS and SBWEMP staff in Roatan as part of the Rhodes College Coral Reef Ecology course in early June 2007 to plan the sampling protocol so that water quality will be monitored on a monthly basis in areas where it is expected to be heavily impacted by development and areas that are thought to be more pristine. The students will be trained to use the water quality monitoring equipment first and they will conduct the June sampling survey while showing the SBWEMP staff how to use it. In subsequent months in the first week of each month, SBWEMP and RIMS staff will use the equipment to carry out monthly sampling. When Rhodes students return every June and BSC students every other January, they will participate in the monthly sampling survey. They will also use the data collected by the Hondurans to study long term trends in water quality.

Important negative factors that could impact the reef originating within the community are increased water turbidity due to deforestation and development and sewage contamination due to improper septic treatment exacerbated by population growth and tourism increase. These water quality parameters can be measured economically by undergraduate students and SBWEMP staff with minimal training. A LaMotte 2020 Turbidity Meter will be purchased to measure water turbidity. This battery-operated, lightweight, portable nephelometric turbidity meter measures water turbidity to the nearest 0.1 NTU, is accurate up to 1,100 NTU and meets or exceeds US EPA specifications for turbidity monitoring. Sewage contamination as indicated by the presence of fecal coliform bacteria will be assessed using US EPA approved Coliscan Easygel kits from Micrology Laboratories. These kits use basic microbiology procedure to plate bacteria on medium containing sugars linked to dyes that react with enzymes produced by *E. coli* to produce a purple color. Because they are incubated at room temperature, these kits require nothing more than Petri dishes and the inoculation medium. Equipment costs are indicated in the table below.

Table 1. Equipment Needed for Monitoring Water Turbidity and Fecal Coliform Contamination.

Item	Catalog #	range	sensitivity	methodology	Cost
LaMotte 2020	LM1799 Aquatic	0-1,100 NTU	.01 or 1 in low vs.	Nephelometric	\$829

Turbidity Meter	Ecosystem		high range		
batteries					\$10
Coliform Bacteria	CMFK2 Micrology			Coliscan MF Water Monitoring Kit	39.50
Coliform Bacteria	CMFKC Micrology	unlimited	variable	Coliscan MF Kit C expendable supplies	500 tests @ \$650
Total					\$1530

Thus we are asking that the ACS Campus-Community Partnership Grants Program provide \$1530 for the purchase of the above equipment. Additional funds are being requested through the ACS CFD Community Partnership, Environmental Justice and Service Learning subprogram to measure water chemistry parameters (nitrate, nitrite, phosphate, etc.) The Roatan Institute for Marine Science will provide in kind matching funds by shipping the equipment to Roatan from the USA, and provide boats and fuel for the sampling survey with the students. Further matching funds will be provided by the Sandy Bay-West End Marine Park in the form of boats, fuel and manpower to the best of their ability for continued sampling after the students leave.

Evaluation and Dissemination

The data collected by both students and MP staff will be analyzed by the students (with faculty assistance) to create a report on the water quality of Roatan's coral reefs. The first year's sampling will serve as a baseline as development is only beginning to surge. Data from following years will be added annually and new reports generated. These reports will be shared with RIMS, the Marine Park and the Marine Parks other collaborators (Coral Reef Alliance, etc.) to use as necessary to maintain adequate water quality for the preservation of the reef ecosystems. The reports will also be shared with ACS institutions through the environmental fellows program and offered for display on the ACS Environmental Programs website.

Institutional Approval

For Birmingham-Southern College

Kathy Murray
Birmingham-Southern College Provost

Kathleen Rossman
BSC ACS Environmental Fellow

For Rhodes College

Rhodes College Provost
Charlotte Borst
For Roatan Institute for Marine Sciences (RIMS)

Christopher Seaton
Rhodes ACS Environmental Fellow

Disclosure Statement

This proposal is being submitted jointly with a proposal to the Curriculum and Faculty Development Grants Program of the Associated Colleges of the South Environmental Initiative for monitoring the chemical component (nitrate, nitrite, phosphate, etc.) of water quality by the same partnership.