

University of Belize
Environmental Research Institute

ANNUAL REPORT

August 2013 - July 2014





MISSION

“ The University of Belize Environmental Research Institute continuously builds national scientific capacity for the effective management, sustainable use and conservation of Belize’s natural resources. ”

VISION

“ As the premiere environmental research institute in Belize and highly respected in the region, UB ERI provides sound science and creates a culture of evidence-based decision-making in the public and private sector in areas relevant to Belize’s sustainable development. ”



Contents

ACRONYMS	4
ACKNOWLEDGMENTS	5
UB PRESIDENT'S MESSAGE	6
THE YEAR IN REVIEW	7
Institutional Strengthening & Sustainability	8
Student Assistantships	9
Staff Capacity Building	11
Calabash Caye Field Station	12
Capacity Building	14
Professional Development	14
UB Academic Programs – UB ERI Teaching	15
Research & Monitoring	18
Wildlife	18
Marine	20
Data Management Support	22
Climate Change Scenarios and Modelling	22
National Biodiversity Monitoring Program	22
Communication & Outreach	24
Central Belize Corridor Conservation Action Planning	24
Forest Management and Monitoring Stakeholder Forum	26
Marketing Efforts	27
Seminar Series	28
Publications	28
Financial Overview	30
STEERING COMMITTEE	33
STAFF	34

ACRONYMS

APAMO	Association of Protected Area Management Organizations
BAS	Belize Audubon Society
CAP	Conservation Action Planning
CARPIMS	Caribbean and Pacific Islands Mobility Scheme
CATHALAC	Water Center for the Humid Tropics of Latin America and the Caribbean
CBWS	Cockscomb Basin Wildlife Sanctuary
CBC	Central Belize Corridor
CCCCC	Caribbean Community Climate Change Centre
CCFS	Calabash Caye Field Station
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
ERI-SC	ERI-Steering Committee
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
MFFSD	Ministry of Forestry, Fisheries and Sustainable Development
MNRA	Ministry of Natural Resources and Agriculture
NPAS	National Protected Areas System/Secretariat
NBMP	National Biological Monitoring Program
NPASP	National Protected Areas System Plan
NRM	Natural Resources Management
NRT	National Ranger Training
NTPPAM	National Training Program for Protected Areas Management
Oak	Oak Foundation
PACT	Protected Areas Conservation Trust
PARCC	Program for the Advancement of Research on Conflict and Collaboration
TAMR	Turneffe Atoll Marine Reserve
TIDE	Toledo Institute for Development and Environment
UB	University of Belize
UB ERI	University of Belize Environmental Research Institute
UWI	University of the West Indies
WCS	Wildlife Conservation Society
WWF	World Wildlife Fund
Ya'axché	Ya'axché Conservation Trust

ACKNOWLEDGMENTS



UB ERI takes this opportunity to recognize and thank all the organizations and individuals without whose support we would not have been able to accomplish our work in 2013-14. Firstly, we wish to thank our donor partners who demonstrated their confidence in our work by their continued support of our programs. In particular we acknowledge the Oak Foundation, Panthera, PACT and GIZ. We especially thank our private sector partners who supported our facility expansion through their generous donations of funding and lumber, especially Bull Run Overseas Ltd., Pine Lumber, Bull Ridge Company Ltd., Panthera and the Yalbac Ranch and Cattle Group. We also wish to thank CARIBSAVE and CATHALAC for their partnership and contribution to our programs; our Caribbean partners: UWI-St. Augustine for continued collaboration on the MSc Biodiversity Conservation and Sustainable Development. We express gratitude to our NGO partners for their continued support of our work through collaboration on national initiatives, such as the National Biodiversity Monitoring Program and the National Training Program for Protected Areas Management, networks and programmatic research. In particular we thank Ya'axche, WCS, BAS and TIDE. Our government partners, the Ministry of Forestry, Fisheries and Sustainable Development and its Forest Department, Fisheries Department and National Protected Areas Secretariat, collaborated with us to achieve results in support of the National Protected Areas System and maintained the National Herbarium.

We especially want to thank our UB ERI Steering Committee for their time and dedication in providing oversight and guidance to the Institute; and express our gratefulness to the UB President, Provost and the Board of Trustees for continuing to believe in and supporting our work. There were many university departments that provided crucial support services which enabled us to do our work more efficiently. We thank the Provost's Office, the President's Office, Finance and Accounts Departments, the Registrar's Office, Office of Public Information, Physical Plant, Internet Communication and Technology Department, Human Resource Office, Science Department and the Department of Public Safety for all their help during the past year.

Finally, we wish to thank all the aspiring biologists, researchers and scientists that worked with us and without whose help we would have been unable to collect all the data we did. We thank our interns, both from UB and other tertiary institutions, who chose the UB ERI to build experience. We want to thank our dedicated cadre of student volunteers, who form an instrumental part of our marine team, for all their hard work under the water and the wildlife volunteers that worked ceaselessly on camera trapping. Last but far from least, a big heartfelt thanks to our UB ERI student assistants that are an instrumental part of our staff.



UB PRESIDENT'S MESSAGE

MR. ALAN SLUSHER

In the five short years since it came into being, the University of Belize Environmental Research Institute (UB ERI) has come to play a leading role in the research work of the University. Fittingly, its programme concentration on Belize's natural resources, both marine and terrestrial, and on the management of those resources, has been fully synchronised with the country's heavy reliance on the utilisation of its natural physical resources for the generation of employment, incomes, and overall economic and social development. With every prospect that this reliance will continue into the foreseeable future, the need to ensure that the society is fully informed and remains fully aware of the requirements for the management of those resources in ways that effectively guarantee their ongoing availability means that the UB ERI, and its key partner institutions must continue the valuable work that they have been doing, and must be fully supported to enable them to continue to deliver on their respective mandates.

This Report, covering the year August 2013 to July 2014, describes extensive sets of activities that were undertaken and completed by the UB ERI, or were continuing at year-end. These activities ranged from training for both students and natural resources management professionals, through short- and longer-term research projects, through specie and ecosystem monitoring, to the hosting of foreign students and lecturers on study-abroad courses at the Calabash Caye Field Station. An important ongoing activity involved information-gathering intended to balance environmental conservation against jobs-creation and profits

generation. A sense of the critical importance of the work of the Institute is conveyed in the discussions on the efforts to assess the size of the jaguar population in the country; the surveys of the conch, Nassau grouper, sea urchin, and general fish availability and the state of coral bleaching and general reef health at the Turneffe Atoll. While the situation may not yet quite qualify as "dangerous", there is a clear need for concern, and for stepped-up action to manage a situation that is heading in the wrong direction.

The continuous updating of UB ERI's website, and the availability there of its research work and of other material relevant to the processes and practices of natural resources management in Belize, are highly appreciated; and I expect that the information will be of great use to the Belizean community as well as to others.

It is the intention of the University, within the available resources, to continue to support the expansion of the Institute and its work.

UB acknowledges the invaluable ongoing support of a number of partner institutions, identified in the Report, without which the extent and effectiveness of the Institute's work would have been very much reduced. This support is greatly appreciated both within UB and by the wider domestic community.

I wish to express my own appreciation, as well as on behalf of the University of Belize, to the staff and management of the Environmental Research Institute, and to its Steering Committee, for a very successful year.



Dr. Leandra Cho-Ricketts
UB ERI Administrative Director &
Science Director: Marine

We, at the UB Environmental Research Institute, are happy to present our main highlights for the year August 2013-July 2014.

In early February, we were excited to inaugurate and open our new conference room and dry lab facilities. This was made possible through fundraising and donations from key partners which allowed us to purchase a wooden building with sustainably harvested lumber. This year also marked a significant achievement for us. It was the first year that the Calabash Caye Field Station (CCFS) was managed to profitability, with a profit margin of BZ \$84,828.00. We also received the challenge grant disbursement of BZ\$400,000.00 from the Oak Foundation, UB provided the match of the same amount. This grant covers the building of a staff and researchers quarters and a main pier at the CCFS to replace those destroyed by hurricane during 2010.

In our fifth year, the dedicated staff worked hard to achieve targets under our three main programs. Our *Research and Monitoring* efforts produced more data on jaguars in Cockscomb, Central Belize and Southern Belize, including a record number of jaguars caught on camera traps and the oldest recorded jaguar. Work towards reducing jaguar conflict on cattle farms also expanded onto more farms. For the fourth consecutive year, we continued tracking the health of marine ecosystems and monitoring Nassau grouper populations within the Turneffe Atoll Marine Reserve (TAMR), providing critical science support to the management of this reserve; and found that Calabash Caye is still an active turtle nesting beach.

UB ERI staff continued to build national scientific capacity under its *Training and Fellowships*

program. We once again delivered 4 courses within UB academic programs, provided internships and volunteer opportunities to over 15 students, supervised 1 undergraduate and 6 graduate thesis students, and this year UB graduated its first 2 students out of the MSc in Biodiversity Conservation and Sustainable Development. In the second year of the National Training Program for Protected Areas Management (NTPPAM), 24 protected area staff participated in training courses and 10 persons participated in the ranger training module, in partnership with Ya'axche. The Research Fellows completed another year of research on jaguar and sea cucumber populations with presentations made at local symposia and at least 4 publications produced.

Through our *Communication and Outreach* program we worked on developing the conservation action plan for the Central Belize Corridor through a series of multi-stakeholder planning workshops. The plan details the objectives and strategies for management of this important corridor. The public and private sectors along with academia, participated at a 2-day forest management and monitoring forum held at the UB campus. Discussions focused on challenges facing the forestry industry and strategies for making it more sustainable. Finally, during the year, UB ERI promoted its work at several UB student events and through the UB ERI-Panthera Seminar Series, shared research from visiting scientists.

Please look further into the report to see these and other highlights from the year. Happy reading!

INSTITUTIONAL STRENGTHENING & SUSTAINABILITY

The Institute continues to grow and this past year was no different. We inaugurated our new building on the UB ERI compound and our team has grown. We have also increased our collective knowledge and skill set, since many of our staff members have participated in several training workshops and courses.

Our Facilities Expanded

Many individual and group efforts made it possible for our Belmopan facilities to expand in early 2014. Although the wooden building had been delivered and installed in late 2013, the finishing touches were completed mid-February 2014 for its inauguration on February 26, 2014. The building houses a dry-lab, a meeting room and an equipment storage area.

UB ERI's partners and friends joined us to celebrate this milestone. Our four main partners Yalbac Ranch and Cattle Cooperation, Bull Ridge Company Ltd., Bull Run Overseas Ltd. and Panthera who worked with us to make the building a reality were honoured during the event and they were each presented with a plaque commemorating their contribution. These plaques are now on display inside the meeting room. The facilities have since been put to good use by our staff, visiting researchers and volunteers.



New Staff

Training/Communications Officer

Kathya Castañeda joined the team in August 2013 as our Training/Communications Officer. She works directly with the implementation of the NTPPAM. Along with the coordination and implementation of the NTPPAM, she is also responsible for developing a certification program aimed at building capacity in the natural resource management sector. She also works with our Marketing Officer and Student Publication's Assistant to develop content for our website, social media and newsletter. She works closely with technical staff to produce Summary for Decision Makers and other technical reports.



Administrative/ Marketing Officer

The position of Administrative/Marketing Officer was added to the UB ERI staff in February 2014. Pia Gregoire has actively marketed the CCFS and a study abroad course in Tropical Marine Ecology and Conservation. Over ninety (90) foreign universities were targeted. This resulted in increased website traffic and an associated awareness of the Institute, its work, and Belize.



In addition to marketing, the Admin. Officer, provides critical support to the operations at CCFS. We now have a more seamless and timely acquisition of supplies for the Field Station, and further administration support for CCFS and UB ERI!

Student Assistantships

During the year we had student assistants working with the UB ERI to advance the work of the institute. Caramyn Reid continued her work in assisting the office staff with in-house tasks and was a regular member of our workshop coordinating team. Christian Martinez, our Database Assistant, assisted with the development of database applications such as the sea turtle database. Marcelino Choco, another Database Assistant, assisted primarily with data entry tasks and the development of the internal Ecosystem Health database. Ruth Gutierrez, our Student E-prints Assistant, worked on updating the UB ERI repository and cross checking copyright issues. In terms of E-prints statistics, in the last year, a total of 80 articles were uploaded. Denver Cayetano our former Student Publications Assistant took a break allowing Zana Wade the opportunity to join the team early in 2014. They both worked primarily with the Communications Officer and Marketing Officer on designing and producing brochures, flyers, and formats for technical reports for the Institute. Zana also managed the photograph collection and the Institute's website.



Caramyn Reid



Christian Martinez



Denver Cayetano



Elizabeth Torres



Marcelino Choco



Ruth Gutierrez



Salvador Mesh



Zana Wade

On-going collaboration with Forest Department

Continuing our collaboration with the Forest Department's National Herbarium, two UB students worked at the herbarium during this academic year. Salvador Mesh and Elizabeth Torres were responsible for mounting plant specimens and integrating them into the collection, adding the entries into the national database and training other students in herbarium techniques.

Staff Capacity Building

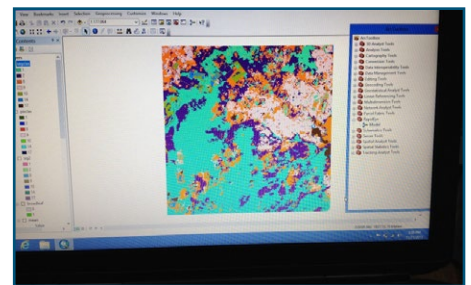
UB ERI staff members are continuously building their own skills and knowledge set. Below are a few of the training opportunities that our staff members were involved in throughout the year.

CATHALAC Training Workshop

In late August 2013, UB ERI's Terrestrial Science Director, Dr. Elma Kay and Monitoring Officer, Ivanna Waight-Cho along with representatives from 10 partner organizations received training from CATHALAC in Panama as part of a CARIBSAVE project to assess "Potential Impacts of Climate Change on Belize's Water Resources". The stakeholder workshop focused on land use change and scenario modelling through practical exercises using the applications within the IDRISI Selva software.

GIS/RS Rapid Eye Imagery Classification Training

Ivanna Waight-Cho attended a training workshop delivered by the remote sensing specialist of GIZ-Salvador. The first two days of this three day training consisted of a basic background on Rapid Eye and practice in classifying images using a model. Rapid Eye Imagery is used for deforestation mapping. The last day of the training was conducted in the field practicing ground truthing in the Never Delay area.



Land Use Change Modelling Workshop

Nicole Weatherburne attended a Land Use Change Modelling workshop in September 2013. As one of the deliverables for the CARIBSAVE project, Assessing Potential Impacts of Climate Change on Belize's Water Resources. This was led by Emil Cherrington with assistance from Dr. Elma Kay and Ivanna Waight-Cho. The workshop was focused on the use of some functionalities offered by IPH.D.ISI Selva which is a Geographic Information System (GIS) and Image Processing Software.



Dive Training

The marine team was also involved in skills development and certification. The Marine Biologist, Marine Field Technician, Monitoring Officer and the Calabash Caye Field Station Manager, were trained as scientific divers while 4 students were declared Divers-in-Training by participating in the theory and practical components of the Diver Emergency Management Provider course. This covered CPR, First Aid, Automated External Defibrillators, and other topics. They also completed a written exam for the American Association of Underwater Scientists (AAUS) Scientific Diver Certification and a practical exam for the Rescue Diver Certificate.



Syracuse University- PARCC Institute Training

Our Training Officer, Kathya Castañeda along with two UB lecturers: Dr. Pio Saqui from the Faculty of Science and Technology and Mr. Rudolph McKoy from the Faculty of Management and Social Sciences completed an intensive, three-week training in Interpersonal Conflict Resolution Skills, Negotiation Theory and Practice, and Group Facilitation. A team of facilitators from PARCC along with the three UB professionals will collaborate to deliver adapted versions of the courses to Belizean professionals under the “Environmental Governance and Conflict Management in Belize” Project starting in January 2015.



UB ERI's Marine Biologist receives scholarship

Our Marine Biologist, Celso Cawich, received an Erasmus Mundus Scholarship to pursue a Masters Degree at the University of the South Pacific in the Fiji Islands. We wish him all the best in this endeavour!



Calabash Caye Field Station

Infrastructure grant

The Oak Challenge grant of \$400,000 BZ for the construction of a staff and researchers quarters at CCFS was disbursed in April 2014 upon UB's commitment to provide the matching funds of \$400,000 BZ. Construction plans for the building are already completed and construction is expected to start later in the year.



UB Scientific Diving Program at Calabash Caye

The UB Dive Control Board met to discuss submission of the application to the AAUS for becoming a member organization with our own scientific diving program. Equipment upgrades and servicing, as well as representation at the upcoming annual AAUS symposium was discussed. The Dive Safety Officer and the Science Director (Marine) attended the 2013 AAUS meeting in October in Curacao to introduce UB's scientific diving program and promote the CCFS to universities with marine programs.

Sustainability

This year marked a very successful year for the CCFS, as it was the first year the station was managed to profitability, by earning BZ \$425,428.00. Our operational costs for the same period was BZ \$340,600.00 giving UB a profit margin of BZ \$84,828.00.

Visiting Groups

For the period August 2013- July 2014, our field station staff hosted a total of thirty (30) visiting groups with a total of 443 visitors. Of these groups sixteen (16) were foreign groups and fourteen (14) were local groups. There were 8 first time visitors to the field station. Some of the universities that visited us include: Boston University, Texas A&M, John Abbott College, St. Mary’s University, Moraine Valley Community College, University of Texas Brownsville, University of North Carolina Wilmington.



Boston University’s Experience at CCFS

From John R. Finnerty, Associate Professor of Biology & Director, Boston University Marine Program (BUMP):

When we first considered Calabash (in the summer of 2012), the Boston University Marine Program was seeking an ideal site in Belize where we could teach our Marine Semester courses, year after year. In these courses, we train juniors, seniors and graduate students how to conduct original research on pressing problems relating to tropical marine invertebrates and coral reefs. The CCFS has easy and safe access to key habitats including fore reef, back reef, lagoons, sea grass beds and mangroves; potential for long term collaboration with researchers at the University of Belize working on questions of common interest; logistical simplicity, i.e., we can depart Boston and be snorkelling at Calabash later the same day; friendly, helpful, and knowledgeable staff; key research infrastructure including lab space, classroom space, sea tables, 24/7 electricity, and internet access.



We particularly appreciate the willingness of the staff at the facility to accommodate special requests, which might include a student with dietary restrictions or an interest in a particular research question; a willingness to discuss collaborative initiatives that would benefit both BU and UB; and the potential for longitudinal studies where we build on findings from previous years. Perhaps the most exciting thing is the potential to publish papers in the peer-reviewed scientific literature that involve our BU students (and in the future, UB students).

CAPACITY BUILDING

Professional Development

National Training Program for Protected Areas Management (NTPPAM)

Year One of the NTPPAM was completed in July 2013 with the delivery of the final module of the Protected Area Management Planning course. At the end of the first year of implementation, a total of forty two (42) participants from seventeen (17) different organizations completed at least one of the four offered courses. PACT carried out a mid-term evaluation of the progress of the program. Its progression was deemed satisfactory and the UB ERI was commended for its “good project management”.

Year Two of the NTPPAM began in late March 2014. By July, two of the four remaining courses had been delivered. A total of twenty four (24) participants from twelve (12) different organizations had completed either the Research and Monitoring Level One or the Advanced Conservation Finance courses.



National Ranger Training Program

Another important component of the NTPPAM is the National Ranger Training (NRT). As a piloting effort, a consultancy was awarded to Ya'axché for the delivery of the three (3) modules under this section of the NTPPAM. These modules, namely: Core Skills and Competencies, Practical Field Skills and Law Enforcement Skills are scheduled to be completed in August 2014. Ten rangers that currently work within the National Protected Areas System participated in the NRT. At the end of the piloting phase, materials and content for all three modules will be updated for future delivery of the modules.



UB Academic Programs – UB ERI Teaching

The Field Methods and Assessment Course was delivered by Ivanna Waight-Cho during UB's summer session with guest lectures by Dr. L. Ricketts and Dr. E. Kay, Oceanic Society, Dr. Bart Harmsen, Dr. Rachel Carrie and Dr. Percival Cho. Students were introduced to various methodologies for monitoring mangroves, seagrass, coral reef, fish, Diadema, marine mammals, and mega-fauna and monitoring of wildlife, freshwater macro invertebrates, birds, and plants.



The Forest Ecology and Management Course was delivered by Dr. Elma Kay and this year among other activities, the class visited and compared logging operations in Laguna Seca and the Mountain Pine Ridge, worked in a teak plantation, attended the Forest Management and Monitoring Stakeholder Forum at UB, and completed a 200-acre controlled burn in Deep River Forest Reserve with the Southern Fire Working Group, led by Mr. Mario Muschamp of TIDE.



CAPACITY BUILDING

The Wildlife Management Course delivered by Dr. Bart Harmsen was taught in January. The time standing for the course was reduced from 4 weeks to 3 weeks. The team decided to deliver the course without a field component to make sure that students would become familiar with all the theoretical components of wildlife study. The content remained similar as the year before where students were familiarised with issues ranging from: general problems of measurement in ecology, population dynamics, issues of space and scale in wildlife studies, behavioural ecology, diseases, exotics, wildlife interventions, hunting and human-wildlife conflict.

The Fisheries and Aquaculture Management Course was delivered by Dr. Leandra Cho-Ricketts with students introduced to various fisheries management strategies, visited National Fishermen Cooperative to see industry operations, participated in deep-sea fishing at Turneffe, tested various fishing techniques and conducted fisheries independent surveys of lobster and conch at Turneffe. In addition, students visited Royal Mayan and Belize Aquaculture shrimp farms in the south.

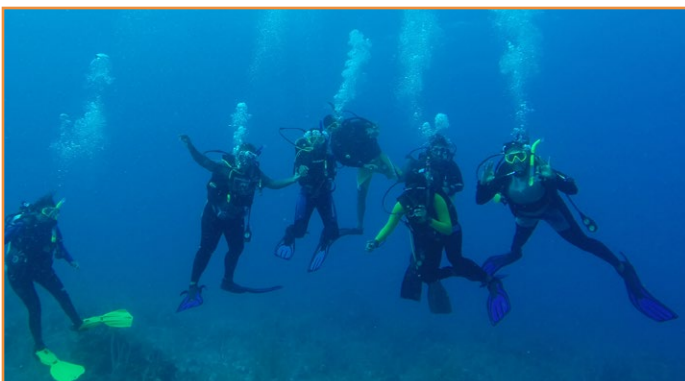


Regional Master in Biodiversity Conservation and Sustainable Development Program

The UB ERI has continued to be the focal point and coordinating unit for the Regional MSc. in Biodiversity Conservation and Sustainable Development offered by UB in partnership with the University of the West Indies-St. Augustine, University of Guyana and Anton de Kom University of Suriname.

The first two students in the program, Raul Chun from Belize and Leah Fouchong from Trinidad, graduated from the program at UB in June. Apart from the six part-time Belizean students remaining in the program, four new students from Trinidad, Guyana and the South Pacific were awarded CARPIMS scholarships to study in Belize under the program.

Dr. Leandra Cho-Ricketts delivered the MSc Marine Field Practicum course to 6 students (3 from UB and 3 from UWI St. Augustine) from July 2-12, 2014. Students were engaged in learning and applying various marine field survey techniques to complete field projects.



Undergraduate Thesis Project

Denver Cayetano, student of the Bachelor NRM Program, successfully completed his undergraduate research thesis investigating the success of the mahogany out-planting program being implemented in the Yalbac forest. Denver was supervised by Dr. Elma Kay, UB ERI and Dr. Alex Finkral of The Forestland Group.

Graduate Thesis Project

MSc graduate student Leah Fouchong completed study on parrotfish abundance in the TAMR. Her study was completed and defended in December 2013. Final thesis paper is available on UB ERI Repository.

Graduate Research Projects

Five MSc graduate students completed marine research projects supervised by Dr. Ricketts through the ERI. Projects looked at seagrass ecosystems in Placencia, Acropora restoration and resilient clades, levels of pesticides in southern corals as indicator of agricultural runoff, modelling of trade-offs from coastal development using the Marine InVEST model, status and health of mangroves at San Pedro, Ambergris Caye. Several students are exploring publication of their results.

UB ERI Marine Volunteers

Fourteen volunteers were trained during the past year while some past volunteers became official members of the UB ERI Scientific Diving Program. The new recruits received introductory training and became familiar with different methodologies. Currently the program consists of nine (9) volunteers: four (4) divers and five DITs (Divers in Training). This core of student volunteers forms an important part of our marine team and enable the ERI to successfully conduct our various monitoring programs. They received intensive and regular training in techniques to hone their skills.



Sea Cucumber Research

Current research being conducted by Marine Fellow Dr. Arlenie Rogers is on the "Reproductive Cycle of *Holothuria Mexicana*." This requires monthly data collection and fishing trips where UB students accompany Dr. Rogers. Students are trained in reproductive cycle data collection and gain hands-on experience with fieldwork. So far fourteen (14) students, seven (7) fishermen and one (1) Belize Fisheries Department Officer have been trained in sampling techniques. This study will provide crucial information on the life history of the donkey dong sea cucumber for use in managing the fishery of this species.



RESEARCH & MONITORING

Wildlife

Cattle Conflict Farm Improvements

Agreements were signed with 6 farmers from rural Belize to improve their cattle farms to prevent jaguars from killing their cattle. Several techniques were tried for the different farms: the use of donkeys as guard animals, improved fencing and rotation of cattle, extra lights at night around corrals, and even electric fences. All farms have 2-6 camera traps running continuously to monitor jaguar activity around the farm. The team will be able to assess if there is a decrease in loss of cattle while jaguars might still prowl around the farm.



Cockscomb Basin Wildlife Sanctuary

The Cockscomb jaguar survey is the longest running monitoring program of a single jaguar population in the world. Camera traps have been consistently placed at 19 locations since 2002. A record number of 30 jaguars (17 males, 12 females, 1 unidentifiable) were detected this year. This year also had the oldest individuals detected (at least 13 years old).

Small scale experiments were started to study the marking behaviour of jaguars and pumas. So far the limited video camera data showed no results. Research will be adjusted to use cameras on known marking locations.

In May 2014, Cockscomb was chosen as a site for telemetry of jaguars. Three GPS collars were purchased and pilot trapping session was set up within the protected area. No jaguars were captured and sites will be prepared for a second capture event.



Rural Belize Camera Survey

Rural Belize, a mosaic landscape of riparian forest and farmland (mainly cattle), suffers from high amounts of wildlife conflict, mainly caused by jaguars killing cattle. A large scale camera trap survey was carried out in the dry season of 2014. This survey indicated a large number of 21 jaguar individuals within the area.

Southern Corridor Collaborations

Collaborative work continued with Ya'axche and TIDE to monitor wildlife at the landscape level. Work focused on the status of larger wildlife species within the Southern Region. Ya'axche carried out small scale camera surveys in Golden Stream with 15 stations.



Foreign Student Visits

During the last academic year, there were two foreign students visiting with the Wildlife Team. A Ph.D student from Spain, Noa Gonzalez, worked on marking jaguar behaviour in Cockscomb. MSc student Robert Euwe from the Netherlands worked on assessing the use of burrow counts as a way to census pacas. His surveys were carried out in the Labouring Creek Jaguar Corridor Wildlife Sanctuary and the CBWS.



Marine

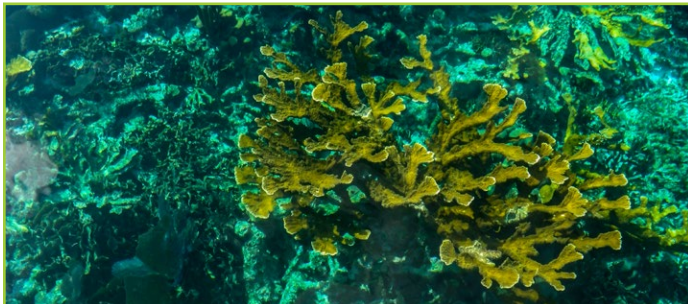
Ecosystem Health

In August 2013 the annual ecosystem health assessment was carried out covering a total of twenty four (24) reef sites, five (5) mangrove sites and seven (7) sea grass sites. The survey represented five years of continuous monitoring and results were utilized to generate a report on ecosystem health. Over the first 4 years, the general reef health deteriorated from FAIR to POOR and remained so for the past two years. Diadema sea urchin abundance remained CRITICAL with very low densities. Commercial fish species abundance remained POOR for the past two years. Macro-algae cover went from GOOD in 2010 to POOR in 2013. However, coral cover increased over the years and was recorded as FAIR in 2013.



Coral Bleaching

Coral bleaching levels are monitored annually during the peak bleaching period (August to February). Fifteen sites have been monitored at Turneffe Atoll since 2008, with about nine of them being regularly monitored since 2010. Coral bleaching was low in 2013/14. All data is housed in the National Coral Reef Monitoring Network Database and general results are available for public viewing at uberibz.org



Conch Survey

The UB ERI assisted the Belize Fisheries Department in the 2014 National Conch Survey out at Turneffe Atoll. A total of thirty four (34) sites were surveyed in September before the season opened in October 2014. Results were forwarded to the Fisheries Department as part of the national survey and used to determine the quota figures for 2014.



Seagrass Net Monitoring

Long-term seagrass monitoring has been occurring at Black Bird Caye and Calabash Caye in Turneffe Atoll for over seven years, making it one of the largest and most complete data sets in Belize under the Seagrass Net Project. Seagrass at both these sites were characterized as healthy and productive and representative of the *Thalassia* dominated seagrass communities at Turneffe.



Sea Turtle Nesting Monitoring

A group from Boston University was lucky to have been on site just minutes after sea turtle hatchlings emerged in November of 2013. It was a late, but important nest. It shows that Calabash Caye is still an important nesting ground for marine turtles. A complete excavation of the nest was conducted after emergence of hatchlings had stopped. Inside the nest were just over 100 eggs and 4 hatchlings that were unable to power their way to the surface. The excavation of the nest saved their lives and they were released later that evening after recovering enough strength to swim.

Student interns Javier Alegria and Denis Maldonado conducted turtle nesting monitoring in June and July 2014 at CCFS. A local care-taker at the end of the island directed Javier to two sites where he was confident turtles had nested in late May. New hatchlings are expected in late 2014.



Spawning Aggregations (SPAGS) Monitoring

The annual Nassau grouper spawning aggregation monitoring was carried out at the Turneffe Atoll starting in mid-January, specifically at Dead Man Caye, Dog Flea Caye, and Mauger Caye. Exploratory dives were conducted at Dead Man Caye but there was no sign of an aggregation. Mauger Caye was the only site with an active aggregation. January was the peak month with 433(±195) fish.

Data Management Support

For the past academic year, there has been enhancement and customization of all our existing database applications. Updates were made to the E-prints publications repository email configuration. The online wildlife database had major data management functionalities completed. Registered users can now upload and filter camera trap events and images.

An updated data access policy defining criteria on accessing databases was also completed. These procedures are now enforced when accessing data. UB ERI's system maintenance and backup checklist outlining procedures were also revised.

There is a new coral data entry application to improve security, speed and accessibility. The redesigned data entry interface can be accessed from the existing web based reporting application. The development of a data entry section for the sea turtle database was also completed and will soon be available online for testing.

Climate Change Scenarios and Modelling

Under the CARIBSAVE project, the second stakeholder workshop was held at UB's Auditorium in March 2014. Thirty participants from both governmental and non-governmental organizations including participants who attended the first stakeholder workshop were present. Presentations were conducted by individuals from the CCCCC and the National Meteorological Service introducing participants to several concepts related to climate change scenarios and modelling.



National Biodiversity Monitoring Program

In June 2014, Ivanna Waight-Cho, coordinated and facilitated the workshop where the implementation plan for the National Biodiversity Monitoring Program (NBMP) was presented. The draft five-year implementation plan highlights indicators, source of data collection, and implementing partners for the program. Participants from key governmental and non-governmental monitoring organizations reviewed the plan, provided comments on the plan and suggested variables/considerations for site selection. Sections I, II and III of the NBMP were revised and modified.

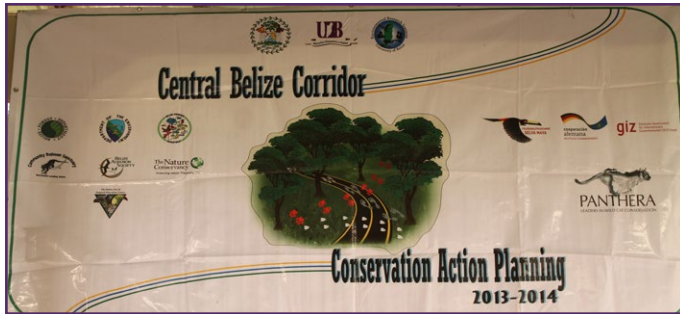


“ In the five short years since it came into being, the University of Belize Environmental Research Institute (UB ERI) has come to play a leading role in the research work of the University. ”



COMMUNICATION & OUTREACH

Central Belize Corridor Conservation Action Planning



During this academic year, in partnership with the Ministry of Forestry, Fisheries and Sustainable Development, with the support of Panthera, the Selva Maya Program of the German Cooperation Agency (GIZ) and the dedication of a multi-organization 15-member task force, the UB ERI initiated and led a management planning process for the Central Belize Corridor (CBC) using the CAP process, a participatory and consultative process

to develop a common vision for the management of an area or landscape. Planning for the CBC gathered over 100 stakeholders representing government agencies, non-governmental organizations, community-based organizations, private land-owners, community residents and developers. In a series of consultations these stakeholders defined and prioritized management targets in the corridor, threats to these targets and the strategies for implementing in order to achieve a functioning Central Belize Corridor through actions that balance our social, cultural and economic well-being. The new academic year will see continued engagement of stakeholders to refine the strategies for the plan as well as its completion.



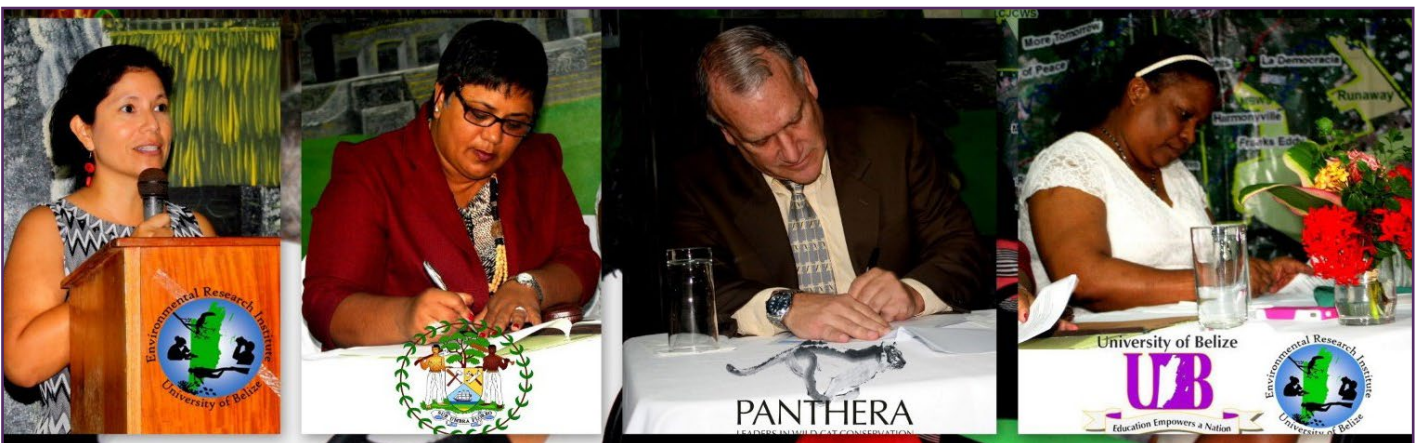
Appointment and training of task force members. [Forest and Fisheries Departments (MFFSD), Department of the Environment, Lands Department (MNRA), Agriculture Department (MNRA), Belize Audubon Society (BAS), Community Baboon Sanctuary, Rancho Dolores Environmental Group, The Belize Zoo and The Nature Conservancy.]



CBC CAP launch event held at the Belize Zoo for government and non-government partners, community and private sector stakeholders. Minister Lisel Alamilla (MFFSD) gave the opening remarks.



Three main CAP stakeholder workshops held in December 2013, January and February 2014.



Signing of Memorandum of Understanding by Minister Lisel Alamilla of the MFFSD, Acting President, Dr. Wilma Wright of the University of Belize and CEO Alan Rabinowitz of Panthera for joint work and efforts in jaguar and corridor conservation where stakeholders were able to see the commitment of the institutions involved to the development of the CBC CAP and ask questions pertinent on the way forward.

Forest Management and Monitoring Stakeholder Forum

Under the GIZ-Selva Maya Program funded project “Protection and Sustainable Use of Maya Forest”, the UB ERI in collaboration with the Forest Department hosted a Forest Management and Monitoring Stakeholder Forum at the University of Belize’s Jaguar Auditorium on March 21st and 22nd, 2014. The event was attended by ninety-six participants from 28 different forestry and forest management stakeholders from amongst governmental and non-governmental organizations, students from the University of Belize, other academia, communities and the private sector.

The forum was officially opened by the Minister of Forestry, Fisheries and Sustainable Development, Hon. Lisel Alamilla and had four sessions with technical presentations and a panel discussion on challenges, opportunities and capacity building needs for improved forest management and monitoring. Local speakers included Dr. Percival Cho, Mrs. Tanya Santos-Neal, Ms. Lynelle Williams, Mr. Ramon Pacheco, Mr. George Headley and Mr. Martin Cus representing the communities of the Toledo District. International speakers included Dr. Alex Finkral (The Forestland Group), Dr. Francis Putz (University of Florida), Dr. Tamara Heartsill Scalley (International Institute of Tropical Forestry), Mrs. Cristina Vidal (Rainforest Alliance), Dr. Jimmy Grogan (CITES Mahogany Working Group), Mr. Chris Cosgrove (Taylor Guitars) and Mr. Mario Eduardo Rivas (Asociación de Comunidades Forestales de Petén).



Marketing Efforts

Special Events

The UB ERI Marketing and Communications team coordinated participation at several different events to promote the Institute's work to the public. As part of the awareness campaign, we had information and display booths at the Annual NRM Symposium, at the 2014 UB Earth Day Event and during Orientation Week for the new UB intake in late July 2014. There are plans to increase the institute's presence at various events across the country.



Seminar Series

Many researchers visit with our staff at the UB ERI, and for us it is important to share information on the research taking place within the country. Visiting and local researchers have a space to share their work and experiences with the wider community.

In early March 2014, the UB ERI in collaboration with Panthera launched the Seminar Series for visiting researchers. Since the start of the series, we have hosted five (5) different speakers who presented on different topics. Topics included mammal ecology, forest management, optimizing jaguar prey occupancy, re-introduction of Mexican wolves and the experiences of jaguar conservation in Sonora, Mexico. We expect that these experiences shared, will inspire and motivate our Belizean scientists and students to engage in more research activity and discussion.

Special thanks to the presenters: Dr. Dan Thornton (Washington State University), Dr. Francis "Jack" Putz (University of Florida), Robert Euwe (Wageningen University and Research Centre, Netherlands), Dr. Carlos Lopez Gonzalez (Universidad Autónoma de Querétaro) and Carmina Gutierrez (Universidad Autónoma de Querétaro).



Publications

New brochures were developed for UB ERI and CCFS, the website and its content was then updated, and our press kit is now available on the website for ease of access by the media and general public. Testimonials were solicited from past visitors of the CCFS to be included in our Press Kit and CCFS website.



During the month of May, a flyer was developed to promote internship opportunities at CCFS, and volunteer opportunities were also promoted among the local Junior Colleges. This resulted in two interns and four volunteers going out to CCFS to participate and learn from our annual research and monitoring activities.

Newsletter

In an effort to share our work with partners and with the wider UB community, we launched a quarterly, digital newsletter named "Paws for an Update!" It highlights activities that the Institute organizes or participates in as part of our programs and projects. The newsletter is sent out electronically to the UB community, to partners and is made available on the website.



Summary for Decision Makers

Two summaries were produced this past year. German Lopez, UB ERI's Herbarium Manager, completed his summary entitled "Conservation of lowland savannah ecosystem in Belize" before embarking on his graduate studies.



In November 2013 we released Dr. Arlenie Rogers' second summary on the "Abundance and Distribution of Harvested Sea Cucumbers". This particular edition talks about the density abundance and distribution of *Holothuria mexicana* and *Isostichopus badionotus* in Belizean waters.



The following publications were produced during the academic year and are available on our E-Prints Repository and can be accessed at <http://www.uberibz.org/#!/technical-reports-publications/c1knm> :

Journal Publications

Several journal papers were submitted or published this year by the wildlife team.

Borchers, D., Distiller, G., Foster, R. Harmsen, B. and Milazzo, L. (2014). Continuous-time spatially explicit capture-recapture models, with an application to a jaguar camera-trap survey. *Methods in Ecology and evolution*. doi: 10.1111/2041-210X.12196

Foster, R. J., Harmsen, B.J., Macdonald, D.W., Collins, J., Urbina, Y., Garcia, R. and Doncaster, C.P. (2014). Wild meat: a shared resource amongst people and predators. *Oryx*. doi:10.1017/S003060531400060X

Harmsen, B. J. and Foster, R. J. (2014). What are we trying to conserve. *Bioscience*, published letter. 64(3).

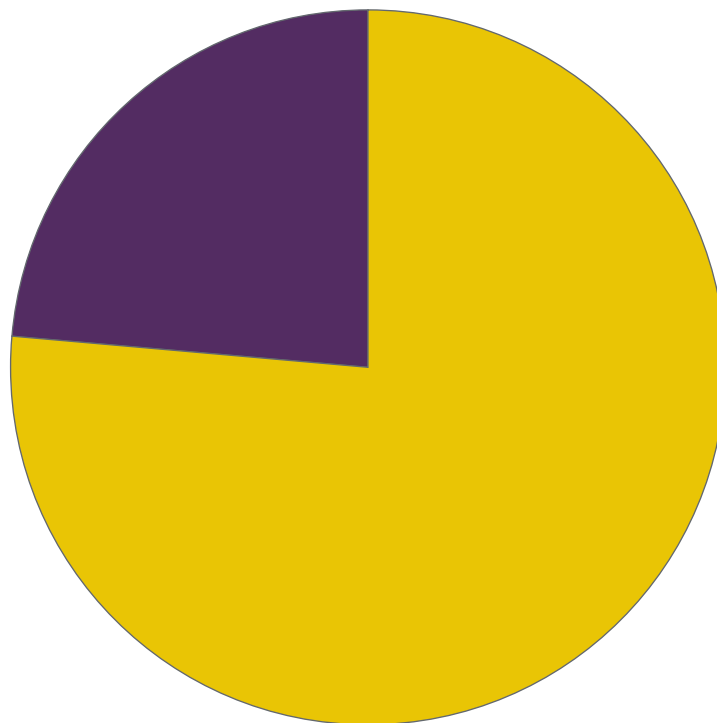
Watkins, A. Noble, J., Foster, R. J., Harmsen, B. J., Doncaster, C.P. (in press). A spatially explicit agent-based model of the interactions between jaguar populations and their habitats. *Ecological Modelling*.

FINANCIAL OVERVIEW

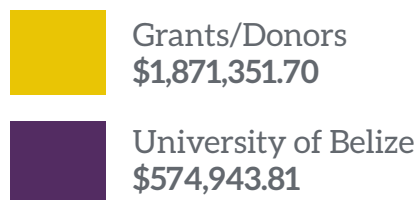
ASSETS	2014	2013
Current Assets		
Imprest (Petty Cash)	\$ -	\$ 158.53
Checking account-Scotiabank	\$ 1025,643.00	\$ 472,428.01
Other- assets:		
Employee Advance		
Receivables	\$ 25,286.65	\$ 12,464.10
Prepaid Ins	\$ 2,714.96	\$ 3,184.02
Total Current Assets	\$ 1053,644.61	\$ 488,234.66
Fixed Assets		
Equipment:		
ERI funded	\$ 107,046.37	\$ 133,204.52
Accm depr-ERI assets	\$ (57,377.36)	\$ (41,153.36)
Panthera funded	\$ 30,229.36	\$ 49,018.68
Accm depr-Panthera assets	\$ (19,381.30)	\$ (22,524.92)
Darwin funded	\$ 9,628.43	\$ 9,628.43
Accm depr-Darwin assets	\$ (7,586.31)	\$ (6,175.37)
GIZ	\$ 3,925.04	\$ -
Accm depr-GIZ assets	\$ (258.44)	\$ -
OAK funded	\$ 723,311.95	\$ 664,922.64
Accum depr-OAK	\$ (327,035.96)	\$ (207,172.96)
CARIBSAVE funded	\$ 3,185.16	\$ -
Accum depr-CARIBSAVE	\$ -	\$ -
ERI Bldg	\$ 78,801.16	\$ -
Accum depr- ERI Bldg	\$ (8,626.18)	\$ -
CATIE funded	\$ 741.56	\$ 741.56
Sub-Total	\$ 536,603.48	\$ 580,489.22
Total Fixed Assets		
TOTAL ASSETS	\$ 1590,248.09	\$ 1068,723.88
LIABILITIES & EQUITY		
Current Liabilities:		
Accounts Payable	\$ 20,607.44	\$ 6,659.01
Wages payable	\$ 966.63	\$ 1,755.51
Social Security payable	\$ 65.96	\$ 122.80
	\$ 21,640.03	\$ 8,537.32
Equity:		
Equity b/f prior yr	\$ 1060,186.56	\$ 853,205.26
Adj to PACT II a/c	\$ (7.81)	\$ 2,699.57
Net Income	\$ 508,429.31	\$ 204,281.73
Sub Total	\$ 1568,608.06	\$ 1060,186.56
TOTAL LIABILITIES	\$ 1590,248.09	\$ 1068,723.88

The University of Belize's ERI and Calabash Caye Field Station (CCFS) continued to enjoy the support of its local and foreign partners for yet another year. In addition to the budget provided by the University of Belize, the Institute was once again able to advance its research activities with the invaluable contributions of its two main donors - The OAK Foundation & Panthera.

Together, these funds fuelled the activities that materialized under the Institute's strategic objectives for the fiscal 2013/2014.

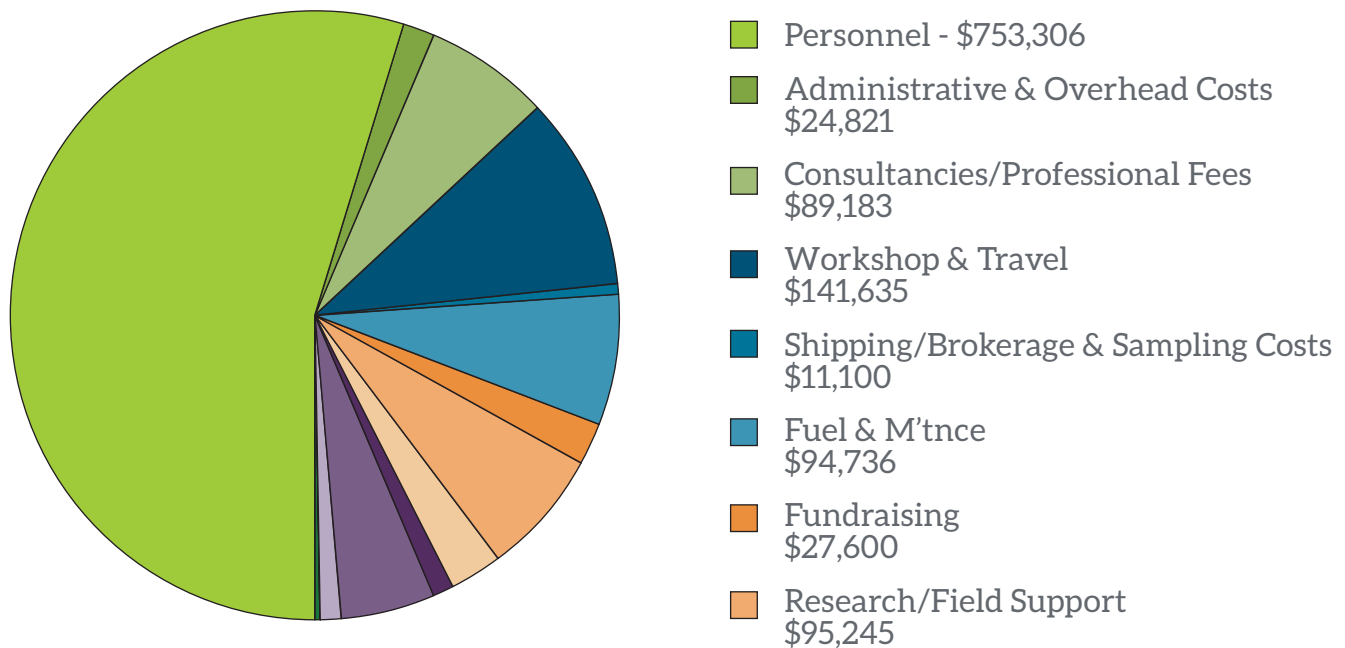


TOTAL FUNDS MANAGED OVER THE PERIOD
AUGUST 2013 - JULY 2014



The chart hereunder gives an exploded view of the expenditure associated with this resource pool:

**OPERATIONAL EXPENDITURE OVER THE PERIOD
AUGUST 2013 - JULY 2014**



In summary, our spending covered the key strategic areas:

- Hosting of 52 groups at the field station, mainly research-based students; the equivalent of which accounted for 3065 total guest days at the Caye.
- Support of our wild life programs.
- Student capacity building, by conducting training and offering student assistantships and fellowships.
- Training and workshop related activities within the National Protected Areas Management Programs funded by PACT and NPAS.
- The completion of the ERI Building due to a substantial financial contribution from Panthera.

STEERING COMMITTEE

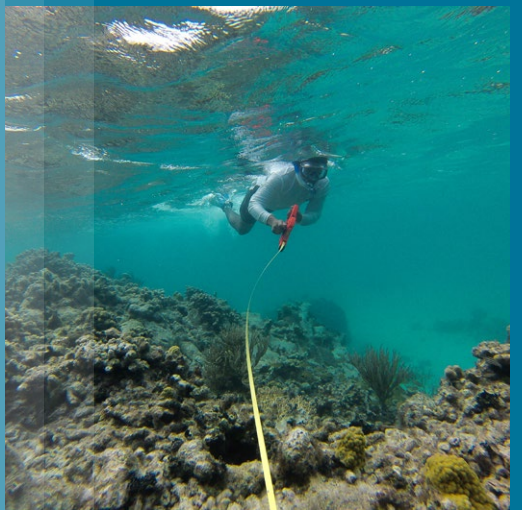
Name	Organization
Dr. Wilma Wright	Chair/Interim Provost, UB
Dr. Leandra Cho-Ricketts	Administrative Director, UB ERI
Dr. Joaquin Urbina	Dean, Faculty of Science & Technology
Mr. Dalwin Lewis	Alternate, Faculty of Science & Technology
Ms. Sandra Miranda	Finance Director, UB
Mrs. Nadia Bood	International NGO Representative, WWF
Mr. Mauricio Mejia	Alternate, International NGO Representative WWF
Mr. Glegg Watson	Private Sector Representative
Mr. Jose Perez	Private Sector Representative, APAMO
Mrs. Beverly Wade	Fisheries Department
Mr. James Azueta	Alternate, Fisheries Department
Mr. Trevor Roe	Private Sector Representative, Roe Group of Companies
Mr. Brian Lin	Private Sector Representative, BELTRAIDE
Mrs. Rasheda Garcia	Forest Department Representative
Ms. Victoria Chi	Alternate, Forest Department Representative
Mr. George Headley	Private Sector Representative, Bull Run Overseas Ltd.

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Emma Sanchez	Wildlife Biologist	esanchez@ub.edu.bz

STUDENT ASSISTANTS

Name	Position
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Elizabeth Torres	Herbarium Assistant
Salvador Mesh	Herbarium Assistant
Ruth Gutierrez	E-prints Assistant
Denver Cayetano	Publications/E-prints Assistant
Marcelino Choco	Database Assistant
Christian Martinez	Database Assistant
Zana Wade	Publications Assistant





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