Highlights of the Year: 2017-2018

In our ninth year, we continued research across northern, central and southern protected areas and within the largest marine reserve in Belize, looking at the health of various ecosystems and taxonomic groups. This year saw the start of several partnerships with the private sector, through the Intergovernmental Development Bank (IDB), on topics ranging from climate change adaptation planning to stakeholder engagement strategy for tourism development. We also continued to secure multi-year grants for our newly structured sustainable landscapes and coastal resilience programs.

Under the Coastal Resilience program, the health of coral reefs, mangrove and seagrasses and the impact of climate change on corals, in the Turneffe Atoll Marine Reserve, was assessed. We also successfully completed a second round of coral restoration studies. Under the Sustainable Landscapes program, we conducted forest assessments in northern Belize and continued bird banding at multiple sites across Belize. Our work to advance the planning of a management framework for the Central Belize Corridor, continued.

Nation building advanced through the training of UB students under our volunteer/intern program, supervision of undergraduate research projects and teaching within the Natural Resource Management and Marine Biology programs. These opportunities allowed our future conservation leaders and scientists to obtain enriched field and applied experiences. In the wider community, we formed new partnerships and maintained existing ones, with local and international NGOs, government ministries and regional partners working towards the conservation and management of Belize’s natural resources and protected areas.

We gladly invite you to read through the highlights of our past year and hope that you will be interested and inspired by our work, and its impact on the management of Belize’s natural resources.

Leandra Cho-Ricketts, PhD
Administrative Director
“Look deep into nature, and then you will understand everything better.”

– Albert Einstein
President’s Message

The UB ERI continues to be strategic in meeting its mission of building national scientific capacity for the management, sustainable use and conservation of Belize’s natural resources, through its support to the Natural Resource Management program, and now the new Marine Biology program at the University of Belize, but also in establishing partnerships for sustainable resource management across Belize. The work of the UB ERI continues to pave the way for environmental research at the university and in helping UB to achieve its mission of national development.

Our next generation of scientists and natural resource managers are able to experience current conservation and resource management strategies, through their involvement with the UB ERI programs and complete their academic experience at UB with invaluable skills learned at the institute.

The UB ERI also benefits the country by providing increased scientific capacity for the management of its protected areas and natural assets, including its forests and coral reefs. This has brought recognition to the university as a key partner in the management of Belize’s natural wealth and also highlighted its role as a key player in this arena.

I congratulate the UB ERI on another successful year and express my heartfelt thanks to all donors and partners, both private and public sector, who continue to support the UB ERI and recognize the relevance and importance of its work.

Prof. Emeritus Clement Sankat President
University of Belize
About Us

The University of Belize Environmental Research Institute (UB ERI), inaugurated in January 2010, was created primarily to address the large gap in local capacity for research and monitoring that exists within Belize. Belize has a wealth of natural resources, including the longest barrier reef in the Western Hemisphere, which supports the country's most important industries, including tourism and agriculture. Recognizing this, the work of the Institute is focused on producing results that are directly relevant and applicable to the sustainable management of Belize's natural resources and building local capacity for this. At a finer but equally important scale for Belize's development, the Institute was created as a semi-autonomous department of the University of Belize (UB), with transparent and efficient management of projects at its core, in order to provide a much needed mechanism for research within the University.

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 sustainable development.

Objectives

To provide a mechanism for research that meets the natural resource management needs of Belize as identified in national plans and policies;

To undertake teaching and training in environmental-related fields at the undergraduate, post-graduate and professional levels to build local research capacity;

To provide for the coordination and integration of environmental research to inform and influence decision-making regarding formulation of national policies, plans and laws;

To engage in national, regional and international collaborations for research, training and implementation of management and conservation initiatives;

To develop the appropriate mechanisms to enable self-sustainability including the provision of technical services to public and private entities engaged in the use and management of natural resources.
Coastal Resilience Program
Summary 2017-2018

Reef health surveys assess the overall status of the coral reef ecosystem, which is important for making management decisions for ecosystem conservation or protection. Within the Turneffe Atoll Marine Reserve, reef health surveys were conducted following the Mesoamerican Barrier Reef System Synoptic Monitoring Program methods by UB ERI staff and UB student volunteers. These were SCUBA diving surveys, so student volunteers were trained following the AAUS standards for scientific diving. There were 23 sites assessed in the summer of 2018.

Results Revealed:

• average coral cover was found to be 18.8%, which indicates fair cover

• fleshy macroalgae was found to be 18.9%, which indicates fair cover according to the reef health index (RHI)

• Commercially important fish biomass was at 423.9g/100m², considered poor

• herbivorous fish biomass was 1976.9g/100m², considered fair

These results indicate an overall fair status of reef health within the TAMR, with the result of low commercially important fish species i.e. snappers and groupers being of particular concern. The surveys this year were different from previous years in that permanent marker pins were placed to ensure the exact sites are visited in subsequent years. This approach allows true tracking of reef change over time.
Coral bleaching surveys were conducted at 9 of the 23 marked reef sites. At these sites, temperature loggers were placed and each coral colony was tagged and photographed to assess status throughout and at the end of the bleaching season.

Results revealed:

- 10% of colonies were found to have less live tissue
- The temperature loggers recorded that September 2017 was the warmest bleaching month with mean temperature of 87.3°F, but October was the month with greatest number of colonies displaying signs of bleaching

This was a pilot study for the Coastal Resilience Program. Along with this, bleaching prevalence surveys using the weighted-bar swimming transect method - that was selected by the National Coral Reef Monitoring Network, were also conducted at these nine sites and submitted to the National Coral Bleaching Database.
Coral Restoration

The Calabash Caye fore-reef has healthy coral colonies of Acropora palmata, Elkhorn Coral, and Orbicella faveolata, boulder coral. We collected gametic material from these colonies and facilitated ex situ fertilization to produce new, genetically unique coral recruits. These recruits were held in our field station wet lab where they were kept for a few weeks only, after which, they were transferred to a back-reef nursery for further growth and development.

Results revealed:

- Both species had high fertilization success and high settlement rates
- Acropora palmata having 80% survival rate in-lab
- Orbicella faveolata having a 10% survival rate in-lab
SUSTAINABLE LANDSCAPES PROGRAM
Plants

Tropical forests are rich in woody vines known as lianas. These plants play very important ecological roles including serving as “highways” for seed dispersers. However, they present a challenge to the timber industry as they slow down the growth of trees and can also cause accidents when trees are being felled. As part of a training in research design and implementation, in collaboration with Prof Francis “Jack” Putz and Anand Roopsind of University of Florida and supported by the Partners of the Americas, members of the UB ERI terrestrial program team investigated the response of lianas to low-impact selective timber harvesting. The study was carried out in the Laguna Seca Area concession in northwestern Belize in which reduced-impact logging (RIL) techniques are used. The regeneration of lianas was measured on 11 log landings and their associated skid trails and felling gaps. The study was conducted 10 months after logging operations. Liana diversity, abundance and modes of regeneration (i.e. seed versus vegetative sprouts) were assessed by plant family.

Results revealed:

• There were less lianas on log landings where all topsoil had been removed

• Taxonomic diversity was lowest on log landings

• Lianas, particularly those that regenerated directly from seeds, increased in abundance from felling gaps to secondary skid trails to primary skid trails

• Liana seedlings identified were primarily in the bean family (Fabaceae), calabash family (Bignoniaceae) and sandpaper vine family (Dilleniaceae)

• Low intensity RIL harvest slowed down liana regeneration only on log landings and did not result in liana proliferation or extreme changes in the liana plant community
Birds

Certain bird groups or species are considered sensitive and easily affected by disturbances. As such they can be used to indicate overall ecosystem health, especially habitat quality. The trends in their population can be indicative of changes to the ecosystem and potentially ecosystem services that relate to habitat quality, including watershed protection and biodiversity. In Belize there has been limited bird monitoring that is consistent and standardized for comparability across sites. Existing efforts have not been able to determine trends in abundance and distribution of bird populations to detect changes in ecosystem/habitat quality. To improve on this, in 2016, the UB ERI started a collaborative effort that continued this year with Black Rock Lodge, Belize Audubon Society, Corozal Sustainable Future initiative, Foundation for Wildlife Conservation, the Forest Department and the Institute for Bird Populations. During the 2017-2018 bird banding season, 1,520 birds were captured.

Results revealed:

• 72 migrant individuals and 80 resident individuals were birds that had been previously captured and banded

• The highest number of captures was at Black Rock Lodge

• November was a productive month for both resident and migrant birds at all sites

• With regards to species richness, there was higher diversity of migrants at Black Rock Lodge than at the Cockscomb Basin Wildlife Sanctuary but higher species diversity of residents at Cockscomb

• There was higher migrant species diversity at Shipstern Nature Reserve and higher resident species diversity at Runaway Creek Nature Reserve
Acropora palmata and Orbicella faveolata monitored under Coral Sexual Reproduction for Restoration

194 species of birds monitored under the Monitoring Overwintering Survival (MoSI) program

37 coral species monitored for coral bleaching; 55 coral species, 4 fish families monitored under reef health

Jaguars monitored at 5 locations across Belize
BUILDING TRAINING AND CAPACITY
UB ERI in partnership with the Cornell Lab of Ornithology held two (2) Data Mobilization Workshops.

UB ERI provided Bird Banding Training for 5 partners under the MoSI project.

UB ERI staff received DEM & Manipulation of Spatial Data Training facilitated by the United Nations Development Program (UNDP).

UB ERI in partnership with the Cornell Lab of Ornithology held two (2) Data Mobilization Workshops.

In partnership with Syracuse University and support from the Oak Foundation, UB ERI facilitated the following conflict management sessions for 45 participants:
Enhancing Conflict Management Success: Workshop at UB, TIDE Conflict Clinic, SEA Conflict Clinic

UB ERI staff received Governance Strengthening (GovST) Training for Community Based Organizations, the Belize Federation of Fishers as well as the Rio Blanco Mayan Association.

Under its Scientific Diving Program, UB ERI staff received SCUBA training, Scientific Diving training and DAN Diving First Aid.

Governance Strengthening (GovST) Training for Community Based Organizations, the Belize Federation of Fishers as well as the Rio Blanco Mayan Association.
OUTREACH AND PUBLIC ENGAGEMENT
Dr. Elma Kay delivered keynote presentation at 11th Natural Resources Management Symposium held in Belmopan

Dr. Elma Kay was invited to be a part of TedXBelmopan series and delivered a presentation called: Transforming Teaching for Sustainable Solutions

UB ERI and Dr. Leandra Ricketts hosted the 2018 board meeting of the Association of Marine Laboratories of the Caribbean with 16 scientists from across the Caribbean at the Calabash Caye Field Station on Turneffe Atoll

Abidas Ash delivered a presentation to MoSI partners on the results of the 2017-2018 MoSI data, at Blackrock Lodge, Cayo

Ninon Martinez delivered presentation entitled, Coral restoration of major reef building species within the Turneffe Atoll Marine Reserve utilizing sexual reproductive methods, at the Natural Resource Management & Research Symposium held in Belmopan, Belize
UNIVERSITY OF BELIZE (ERI DEPARTMENT)

STATEMENTS OF FINANCIAL POSITION
YEARS ENDED JULY 31, 2018 AND 2017 (IN BELIZE DOLLARS)

<table>
<thead>
<tr>
<th>ASSETS</th>
<th>2018</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>CURRENT ASSETS:</td>
<td></td>
<td></td>
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<tr>
<td>Cash and cash equivalents – unrestricted</td>
<td>$ 649,344</td>
<td>$ 562,248</td>
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<td>Inventory</td>
<td>3,173</td>
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<td>Prepayment</td>
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<td>Other receivables</td>
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<td>164,266</td>
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<td><strong>Total current assets</strong></td>
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<td><strong>727,877</strong></td>
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<tr>
<td>NON CURRENT ASSET:</td>
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<td></td>
</tr>
<tr>
<td>Property, plant and equipment – net</td>
<td>332,928</td>
<td>311,285</td>
</tr>
<tr>
<td><strong>Total noncurrent asset</strong></td>
<td><strong>332,928</strong></td>
<td><strong>311,285</strong></td>
</tr>
<tr>
<td>TOTAL ASSETS</td>
<td>$1,114,168</td>
<td>$1,039,162</td>
</tr>
</tbody>
</table>

| LIABILITIES AND EQUITY                |            |            |
| CURRENT LIABILITIES:                  |            |            |
| Accounts payables                     | $ 12,369   | $ 57,397   |
| **Total current liabilities**         | **12,369** | **57,397** |
| NON-CURRENT LIABILITIES:              |            |            |
| Gratuity and severance payable        | 9,887      | 10,557     |
| Deferred income                       | 627,359    | 528,646    |
| **Total non-current liabilities**     | **637,246**| **538,203**|
| **Total liabilities**                 | **649,615**| **596,600**|

| EQUITY:                               |            |            |
| General fund                          | 464,553    | 442,562    |
| **Total liabilities and equity**      | **$1,114,168** | **$1,039,162** |
STEERING COMMITTEE AND STAFF
UB ERI Staff

Elma Kay, Ph.D.
Administrative & Science Director (Terrestrial)

Leandra Cho-Ricketts, Ph.D.
Science Director (Marine)

Ian Sangster
Administrative/Financial Manager

Julissa Lopez
Administrative Assistant

Pia Gregoire
Administrative/Marketing Officer

Ivanna Waight-Cho
Monitoring Officer

Arlenie Rogers, Ph.D.
Marine Research Fellow

Denver Cayetano
Forest Biologist

Giselle Borland
Training/Communications Officer

Jani Salazar
Marine Biologist

Abidas Ash
Avian Biologist

Ninon Martinez
Research & Education Officer

Bart Harmsen, Ph.D.
Panthera Jaguar Research Fellow

Yahaira Urbina
Wildlife Biologist

Neydar Campus
Communications Assistant

Lenin Carías
Repository Assistant

Florentino Chiac
Intern

Lijia Manzanilla
Intern

Calvin Gonzalez
Forest Research & Monitoring Intern

Delwin Guevara
Forest Research & Monitoring Intern

Martha Hernandez
Office Assistant

Nicole Craig
Field Station Manager (CCFS)

Joshua Morey
Boat Captain (CCFS)

Albert Cherrington
Boat Captain (CCFS)

Dayna Smart
Relief Cook (CCFS)

Rosalind Terry
Cook (CCFS)

Elvis Williams
Shore Assistant (CCFS)

Deandre Flowers
Care-taker (CCFS)

Rene Coc
Care-taker (CCFS)
UB ERI Steering Committee

- Dr. Mariot Simon (Chair/VP)  
  University of Belize
- Edgar Correa  
  Forest Department
- Lindon Parham  
  Forest Department Alternate
- Lianne Torres  
  Belize Invest (Beltraide)
- Nicole Zetina  
  Belize Invest (Beltraide) Alternate
- Beverly Wade  
  Fisheries Department
- Vanessa Figueroa  
  Fisheries Department Alternate
- Nadia Bood  
  World Wildlife Fund
- Mauricio Mejia  
  World Wildlife Fund Alternate
- Mrs. Sherlene Julien  
  University of Belize - Finance department
- Mrs. Rose Lambey  
  University of Belize - Finance department (alternate)
- Trevor Roe  
  Roe Group of Companies
- Gleg Watson  
  Private Sector
- George Headley  
  Bullrun Overseas Ltd.
- Jose Perez  
  APAMO

Julianne Pasos  
Faculty of Science & Technology

Dr. Elma Kay  
UB ERI
Acknowledgements

The UB ERI extends its gratitude to all the students and staff of the University of Belize that supported the institute in achieving its targets and outputs for the academic year 2017/18. We also thank all our local partners who collaborated with us on our various projects and activities, especially the Turneffe Atoll Sustainability Association, Belize Audubon Society, and the Belize Fisheries and Forest Departments. Finally, we would like to express our sincere gratitude to our donors and international partners who continue to believe in the work we do, especially the Oak Foundation, Cornell Lab of Ornithology and Syracuse University.