Recent Accomplishments and Upcoming Projects

**SCHOOL WITHOUT WALLS**

The Bahamas Innovation Hub is off to a swimming start! Last month, 32 students from southern Eleuthera’s Deep Creek Middle School visited CEI as part of our “School Without Walls” experiential education initiative. Here, students learned to identify common Caribbean corals, engage in coral restoration through microfragmentation and ultimately become Patch Reef Protectors. The students learned about microfragmentation, a method of coral gardening in which new coral polyps grow from cut coral pieces, which helps reef-building corals grow up to 25 times faster than their growth rates that are observed in the wild. Indeed, each student had the opportunity to name and plant his or her small fragment of mustard hill coral - a bright-yellow mounding species - onto local coral patch reefs in the turquoise waters that surround the island.

What’s more, students will have the opportunity to re-visit Cape Eleuthera and monitor the growth and survival of their personalized coral fragments in a few months’ time. Their enthusiasm and excitement in the ocean was contagious and we are eager to welcome these students back to campus again soon!

A big shout-out to the The Nature Conservancy and Perry Institute for Marine Science for going above and beyond to support this workshop to help young leaders get involved and learn about coral reef conservation and restoration!

**SWABBING FOR SAMPLES**

Determining fish diet is an important component of fisheries science, as understanding the relationships within a food web can reveal how an ecosystem might change as a result of harvest. The most common way to collect these data is to look within the stomachs of dead fishes, which requires a lot of samples and a lot of mortality. Non-lethal methods of assessing fish diet are available, including stable isotope analysis and lavage (where you pump a fish’s stomach and see what falls out). However, both of these techniques have numerous limitations that we may be able to address through the analysis of fish waste.

In a joint project with Mo Bergmann in Dr. Demian Chapman’s lab at Florida International University, we brought lemon sharks into the lab this fall and fed them a known diet consisting of only mullet, only bonito, or a mix of the two, and then swabbed their fecal matter to see if the DNA composition in their excrement matched the known diet that we fed them. If this proves to be an accurate representation of their diet, we may be able to take a simple fecal swab of a fish in the future and then know what it has been eating!
Greetings from Cape Eleuthera,

I would like to introduce myself as the new Assistant Director of the Cape Eleuthera Institute. It feels good to be back on Eleuthera, having grown up in Spanish Wells at the northern tip of the island. I previously worked as Deputy Director of the Marine Institute at the University of Plymouth in the UK, where I lived for the last 5 years with my wife and two small children. I come from a long line of Bahamian fishermen and farmers, and many of my family still work in the lobster fishery today.

The Bahamas spiny lobster fishery is the largest and most valuable fishery in the country. Recently, it was certified as a sustainable fishery by the Marine Stewardship Council, the only such lobster fishery in the Caribbean region. I am proud to have played a small part in achieving this milestone.

My future research at CEI will focus on helping the fishery meet its sustainability targets. Island School students will be at the forefront of this research starting with my first IS research class during the upcoming spring 2019 semester. In addition to the lobster work, I want to explore the relatively unknown deep water ecosystems of the Bahamas. My doctoral research was on deep-sea ecology, working at the University of Leeds and The Natural History Museum in London, where I am still an honorary Research Associate. I think there are innumerable new species and discoveries just waiting to happen on our deep-sea doorstep at Cape Eleuthera.

I am excited by the sheer talent that we have here at the Cape Eleuthera Institute and am committed to supporting our staff in producing world-leading research. We are also determined to make sure that this research is relevant to our Bahamian partners, so a big part of my job will be meeting with them to work out how we can best work together. Most of all, I am proud to be applying my skills and experience to ensure a sustainable future for The Bahamas.

Thank you for joining us in this exciting journey.

Dr. Nick Higgs
Assistant Director
Cape Eleuthera Institute
This fall marked the beginning of the Bahamas Coral Innovation Hub! Based out of Cape Eleuthera, the hub aims to upscale coral reef restoration in the Bahamas and develop new technologies. The hub also aims to educate, train and engage local Bahamians on the importance of coral conservation. Key hub members include The Nature Conservancy, The Perry Institute for Marine Science (PIMS), SECORE International, SHEDD Aquarium and the Cape Eleuthera Institute (CEI).

Our Goals

As an archipelago of over 700 islands and cays painted in crystal clear, blue waters, it's no secret that coral reefs are vital to Bahamian culture, economy and ecology. Still, live coral cover is lower in the Bahamas than any other Caribbean nation. Over the next five years, the Bahamas Coral Innovation Hub will develop one of the largest coral reef restoration projects in the Caribbean, as well as tackle the following cutting-edge research questions:

1 - How can we use sexual coral recruits and microfragmentation to grow and farm corals on a much larger scale than what we see today?

Microfragmentation is the process of cutting slow-growing corals into smaller pieces, which are then grown in our wetlab. These fragments grow tissue very quickly, and once they are large enough, they can be outplanted onto local reefs.

2 - How can we maintain genetic diversity of our reared coral populations, so that they might be more resilient to climate change?

3 - How can we raise awareness about the importance of corals and coral restoration technology? In particular, how can we involve local communities and Bahamian youth in our reef-rebuilding work?

Perry Institute for Marine Science and Cape Eleuthera Institute coral researcher Lily Haines explained that the process of microfragmentation is an effective tool in both growing new corals and teaching people about how corals grow and change over time.

By working together, the Coral Innovation Hub plans to grow and plant thousands of baby corals onto Bahamian coral reefs each year, in addition to offering experiential education opportunities in coral restoration to hundreds of students in The Bahamas.
Using Animal-Borne Cameras to Get A Turtle’s Eye View of The Bahamas

Have you ever wondered what it would be like to swim through the ocean like a sea turtle? We certainly have, and the idea of seeing the world through the eyes of a sea turtle inspired us to start the ‘TurtleCam’ project.

The TurtleCam is made from a camera, a small radio transmitter, and a couple of recycled foam buoys. Each of these items are glued together to create a device that can be mounted directly on the shell of a free-swimming sea turtle. These devices, or TurtleCams, are fastened to the turtle’s carapace using corrodiible links that detach within a few hours allowing us to recover it and the footage it contains. These TurtleCams are providing us with a first-person (or should it be first-turtle?) perspective of how seaturtles see the world around them.

Animal-borne cameras have been utilized by scientists and film-makers for many years to reveal the secret lives of wildlife. While this footage never fails to captivate an audience, perhaps the most exciting videos have come from marine animals. This is because most marine animals spend the majority of their lives far beneath the waves and out of sight to humans, meaning that even their most typical behaviors can be a mystery to us. It is therefore of little surprise then that scientists have excitedly deployed these cameras onto an ever-increasing range of marine animals, including whales, sharks, crocodiles, and sea birds. We are now adding to this list by deploying animal-borne cameras, for the very first time, onto the juvenile green sea turtles of The Bahamas.

Perhaps the most interesting discovery that we have made so far is that juvenile sea turtles appear to be extremely social. Contrary to most prior conceptions of sea turtles being solitary animals, juvenile sea turtles spend large amounts of time interacting with each other. Sometimes this can involve short chases, flipper biting, or even a behavior that can be best described as nuzzling. We have also been using the footage to help us determine in which habitats turtles spend the majority of their time. By identifying such critical habitats for sea turtles, we can begin to develop conservation management plans that ensure that these habitats remain free from threats, such as boat traffic or entanglement in fishing gear.

The clear value of this footage from a scientist’s perspective is furthermore complemented by the ability of these videos to capture people’s imaginations. We truly believe that these videos, which allow you pretend for a minute that you are like one of these turtles swimming through the ocean, can help inspire countless people to live more turtle-friendly lives; and this can be easily achieved regardless of where you live. Indeed, each year countless sea turtles are accidentally caught and killed by fisheries that are hunting for commercial species, such as tuna or swordfish. Those that are not caught by fisheries often suffer a similar fate, after choking on plastic bags and other plastic waste that is ingested after confusing it for a jellyfish prey. These issues of unsustainable fisheries and plastic in the ocean are global problems, and we all have a responsibility to help against these. By supporting fisheries that fish in a smarter and less wasteful manner or reducing our use of single-use plastics, you too can help create a more turtle-friendly world.

We hope that you are as inspired by the TurtleCam footage as we are and we can only imagine what fantastic discoveries this project will uncover in the future!
| **362** | **45** primary school teachers
| South Eleutheran children reached in our Local Schools Program |
| **Consistently provided After-school Programs** |
| 35 | **5** days a week for **58** children |
| Deep Creek Plastic Club in a community clean-up |
| 4 | **13** local high school students |
| Bahamas Environmental Steward Scholars completed a **100**-day semester at The Island School |
| **7** boys from Young Men's Leadership Program |
| launched a profitable summer business |
| **88** Eleutheran children went on experiential field trips to Lighthouse Point |
| **61** children were able to participate in summer camps |


For a more complete list of our publications please check out our website!

Our Team

Nathan Robinson, PhD.  Nick Higgs, PhD.  Edd Brooks, PhD.  Valeria Pizarro, PhD.  Brendan Talwar, MSc.  Eric Schneider, MSc.

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GET INVOLVED!
If you are interested in working with us, please check out our website! There are many opportunities available ranging from senior research projects to internships and more!