Sustainable Climate Change Adaptation Solutions for Coastal Caribbean Communities

Mid-Term Report

Prepared for the Robin Rigby Trust

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Project overview:

This project aims to address local erosion control needs by researching coastal vulnerabilities and identifying sustainable adaptation opportunities for the community of Negril, Jamaica. Over the past three months that I have been living in Negril, I have developed many skills and have gained tremendous insight into the factors that make coastal communities vulnerable to climate change. Adapting to climate change is an extremely complex issue, especially in areas, such as Negril, where the local economy depends on an actively eroding and highly developed beach environment. Actions are required to protect and restore coastal ecosystems, including the beach, seagrass beds and coral reefs, in order to make the community more resilient while still meeting tourist the expectations of tourists.

The original objectives of my project were to:

- *Increase the awareness of coastal property owners in project area about coastal processes and functions and less destructive ways to manage erosion*

- *Assess potential "Living Shoreline" demonstration projects on beaches and other vulnerable shoreline types*

- *Prepare joint funding applications to implement and monitor practical adaptation strategies identified through site assessments*

I have been working closely with the Partnership Caribbean Community Climate Change Adaptation (ParCA) to meet these objectives. I have also been gathering data to assess Negril's vulnerability to climate change using two approaches: GIS shoreline classification mapping (physical vulnerability) and collecting local ecological knowledge through the Community Based Vulnerability Assessment method (socio- economic vulnerability). ParCA is a 5 year project co-led by the University of Waterloo and the CARIBSAVE Partnership that is investigating how small and medium-sized coastal communities in Jamaica, Tobago, Nova Scotia, and Prince Edward Island will adapt to the impact of rising sea levels and other climatic changes. Key project developments so far include:

1. Local ecological knowledge

During my time in Negril, I have been collecting local ecological knowledge and working with local NGOs, researchers and the National Environment and Planning Agency (NEPA) to better understand the drastic ecosystem changes that have occurred along Negril's Seven Mile Beach. The beach is the main tourist attraction in Negril and it has been experiencing accelerated erosion in recent years, resulting in a loss of up to 80 feet in front of some properties. Both natural (increased storms and sea level rise) and human-induced impacts (development too close to the shore, poor waste management practices) have contributed to the problem. Local

infrastructure, buildings, businesses and ecosystems are now at risk. I have been documenting how people are responding to these changes. I will use this information to create educational material for local property owners and tourism operators that will incorporate local examples of best management practices.

On Novemeber 19, a team of ParCA researchers joined me in Negril, and we will be working together to collect more local knowledge through a semi-structured interview process known as Community Based Vulnerability Assessment (CBVA). We are aiming to interview 150 locals involved in the fisheries and tourism sectors to understand the social, economic and environmental changes that affecting their various industries and examine ways people are adapting to the changes. This will help us identify vulnerabilities, understand different approaches being used to manage the changes and ultimately inform policy documents and adaptation strategies for the Jamaican government.

2. Coastal mapping

Using GIS, I have surveyed and classified a 40km section of coastline between Negril and Lucea. The mapping methodology was developed by Dr. Danika van Proosdij of Saint Mary's University and includes assessing shore composition, shoreline stability, geomorphology, beach width and slope, and presence of anthropogenic structures to identify areas of the coast that are most vulnerable to storm surge and sea level rise. The maps produced will aid coastal managers in identifying at-risk locations where adaptation measures should be prioritized. This work has allowed me to explore untouched sections of Jamaica's coastline by land and sea.

Measuring beach slope

3. Documenting Hurricane Sandy

In late October, Negril was hit by Hurricane Sandy. In the two weeks following the storm, I witnessed how the community responded to the many impacts of storm. By talking with local property owners, I was able to better understand how decisions were made to deal with the many environmental changes that had occurred on the beach. I documented the changes and put together a short video on the impacts of hurricane Sandy in the week following the storm. (http://www.youtube.com/watch?v=Fz57z7OBIOI).

Key observations made during and after the storm include:

- In preparation for the storm, many property owners installed sandbags to protect structures on the beach
- In days following the storm, a sandbar formed across the mouth of the Negril River that prevented fishermen and glass bottom boat operators from entering or leaving the river and had a major economic impact to the boat operators
- Two days following the storm, hotels and restaurants on the high limestone cliffs of Negril's West were damaged by rocks and boulders thrown ashore by high waves
- Two weeks following the storm, massive mounds of seagrass (up to 6 m wide), washed up on the beach. Due to pressure from tourists, property owners had to quickly decide the best to remove the debris. The most common method to deal with this issue was to bring the seaweed onshore and bury it with the use of heavy machinery. Some hotel owners also pushed sand from their beach out into the water to cover up the seaweed, and explained to me that this was an acceptable practice because they had an 'excess of sand' on the beach. It became very obvious to me that resources are needed to help landowners deal with this issue in the future in a way that will have minimal long-term damage to the beach.

Mounds of seaweed wash up onshore

4. Education

Networking and information sharing with local researchers, government, landowners and tourism operators has been a key component of this project. I want to make sure that I am sharing what I have learned with the people who are making decisions on the ground. Education and outreach opportunities I have had so far include:

- Developed and delivered a presentation to the Negril Chamber of Commerce, which is a key decision making body in Negril on coastal processes, the role of coastal ecosystems, and recommendations for increasing adaptive capacity in Negril.
- Interview on national radio (flooding, development, climate change), circulating information on best practices for managing seagrass…local examples of best practices.
- Developed a factsheet on best practices for managing seaweed debris and shared with local hotel owners.
- Creating a factsheet on best practices for managing beach erosion
- Exploring options for further presentations in the local school, Rotary Club of Negril and to the local beach erosion committee.

5. Living Shoreline demonstration sites:

I believe that one of the most important actions Negril could undertake to build adaptive capacity would be to create public demonstration areas that showcase best practices for managing coastal erosion through enhancement of natural coastal processes, features, and vegetation. Establishing demonstration sites will provide the needed on-the-ground evidence that coastal vegetation can play a key role in stabilizing shorelines and mitigating the impacts of climate change. Incorporating some interpretive signage on the site could help to change the attitudes of locals and tourist to make them more accepting of naturally functioning landscapes.

I have identified two potential sites in Negril where soft-engineered strategies could be implemented to improve the resiliency of the site through the planting of native, coastal species and improving current land-use practices, such as driving on vegetation. I presented this idea to the Negril Chamber of Commerce and am hoping to follow up in a meeting with the beach erosion committee to explore the viability of this idea and discuss potential funding opportunities.

7. Developing research skills and knowledge

This project has provided me with the opportunity to develop several new skills. In May, 2012, I attended a CBVA training workshop in Tobago with other members of the ParCA team. In summer 2012, I was trained in basic GIS and the coastal vulnerability assessment methodology at Saint Mary's University. This training provided me with an exceptional opportunity to learn the skills that I have put into use over the past three months.

Next Steps:
Over the next month, I will continue to conduct interviews for the CBVA. I will also develop educational material for landowners and further explore the potential for the creation of demonstration sites in Negril.

Spending time in Negril has been a wonderful experience for my two-year-old son and I. We have made friends, visited amazing sites and gained a true appreciation for Jamaican culture. The skills I have gained will greatly benefit my work in Nova Scotia. I am extremely grateful to the Robin Rigby Trust for providing me with this invaluable opportunity.