



Shoreline Monitoring Methods

ARTICLE BY JOELIN METTAO

This past summer, I was given the opportunity to be a part of the Coral Reef Initiative (CRI) team with the Bureau of Environmental and Coastal Quality (BECQ). I interned with the Shoreline Monitoring Program under the Planning Section of the Division of Coastal Resources Management (DCRM). During this experience I was able to learn about, and witness firsthand, accretion (sand gain) and erosion (sand loss) occurring throughout our beaches along the Saipan lagoon.

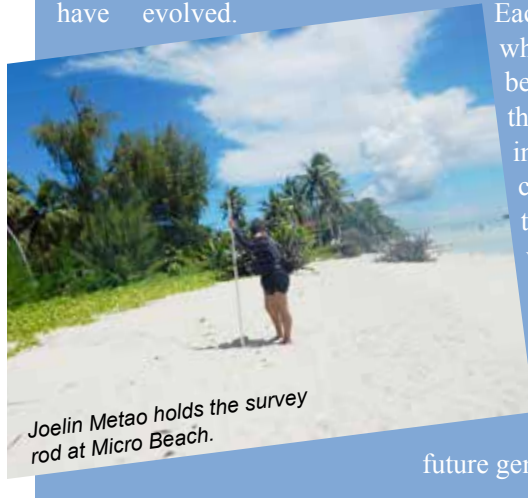
The Shoreline Monitoring team and I conducted beach profile surveys along the west side of Saipan – from Pakpak beach to Wing Beach, as well as the island of Managaha. Each beach that we surveyed has a set headstake, a permanent point that tells us where to start taking measurements. My team and I would then lay a 100-foot transect line from the headstake to the submerged beach toe. One team member is assigned to hold a 16-foot high survey rod and stop every 10 feet to measure the relative elevation at that point. The reading on the rod is viewed by the person who looks through the berger level, a piece of professional survey equipment used to measure height. This information is then passed onto the recorder who writes it down in a notebook. The collected data allows us to calculate a change in slope over time.

Different types of field and data collection methods were introduced by Gorman, Larson, and Morang (1998) such as aerial photography or satellite imagery, bathymetric (hydrographic) records, and profile surveys. Aerial photography or satellite imagery are used as a visual to display the change or movement of the shoreline. Bathymetric recording involves inputting the data collected into a program that produces a three-dimensional image of the shoreline. Shoreline profile surveys, as described above, were the primary type of data collection method that we were taught to use throughout this summer; however, a blend of all four field methods are used each summer to paint an image of our current and changing shorelines.

The west side of the island of Saipan is flourishing with businesses and recreational areas. There are also many homes and people populating these areas noticeably close to the island's shoreline. Often times, these areas are overlooked. They are more enjoyed than studied by any beach go-er. With this internship, I was able to view these beaches with a much sharper perspective. I want to know what will happen as sea levels continue to rise. Should the waters gradually cover more and more of the shoreline, the ability to enjoy these beaches for recreation would come to a stop and businesses and homes would eventually have to relocate. This curiosity was what fueled my interest in the project I conducted with my team.

As this internship comes to an end, I've come to learn how much these methods have evolved.

Each summer, more data is collected which means more information is being shared throughout our agency, the community, and anyone else interested in our island's constantly changing shorelines. With each new team, my current team included, we are able to explore more, if not better, methods of collecting and exploring data. Data collected will then improve our understanding of the island of Saipan, and our shores can still be enjoyed by future generations to come.



Joelin Mettao holds the survey rod at Micro Beach.



PUBLIC ENEMY NO. 1:

Shoreline Erosion

ARTICLE BY RETIM BILLY

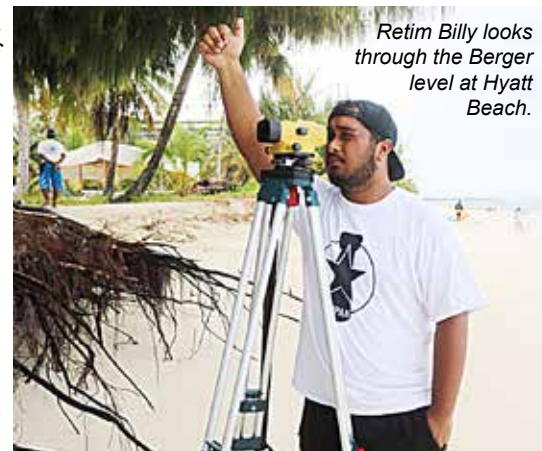
Do you remember a time when the beach extended so long you could play catch on the sand and not have to worry about the ball getting wet? Or when you could build a sand castle without the water destroying your masterpiece? I remember being a child and enjoying time spent at the beach, laying in the sand getting as tanned as I could. We all hold memories like these near to our hearts; however, that's all they will be. Memories. There is one thing that threatens the reality of enjoying the beach like we used to: shoreline erosion.

As a Coral Reef Initiative (CRI) intern this summer, I worked with the Shoreline Monitoring Program at Bureau of Environmental and Coastal Quality (BECQ). Our main project was to gather and analyze data on the shapes and sizes of our shores here on Saipan. Over time, the data that's gathered will show us whether a beach has 1) accreted (gained sand), 2) eroded (lost sand), or 3) remained stable. All three processes are occurring here in the CNMI, but I noticed that more beaches have eroded away instead of accreting or remaining stable.

After I learned about the rates of erosion at different beaches and threat that it poses to the CNMI, I conducted research on erosion mitigation. A project that was conducted in the Cayman Islands tested whether shoreline erosion can be mitigated by placing artificial reefs in the water to break waves that crash along the beach and reduce the amount of erosion occurring on the beach (Harris 2003). This method showed positive results, with the shorelines gaining about 20 feet worth of sand over the course of two months (Harris 2003). According to

Hedge 2010, green belts (vegetation that line the beaches to keep the sand in place) can be planted to help retain the sand. Geotextiles (permeable textile materials or fabrics) can be used to reduce sediment loss on coastlines as well (Ashis 2015). These solutions not only help protect our shores but also have many positive environmental impacts, such as creating habitats for marine and avian organisms, revitalizing the greenery, and creating another area for coral reef development.

Even though my internship has concluded, the project I took part in is still ongoing. Once enough data is collected, we will be able to decide on the best course of action for protecting our shores, so we can recreate our cherished beach memories with the generations to come.



Retim Billy looks through the Berger level at Hyatt Beach.

Ashis, M. (2015). Application of geotextiles in Coastal Protection and Coastal Engineering Works: An Overview. *International Research Journal*

of Environment Sciences, 4(4), 96-103.

Harris, L. E. (2003). *Status Report For The Submerged Reef Ball Artificial Reef Submerged Breakwater Beach Stabilization Project For The Grand Cayman Marriott Hotel*(pp. 1-14, Rep.). Melbourne, FL: Florida Institute of Technology.

Hedge, A. V. (2010). Coastal erosion and mitigation methods - Global state of art. *Indian Journal of Geo-Marine Sciences*,39(4), 521-530.