Introduction

The Fire District initially contacted Professor King at URI to help address the coastal erosion /deposition issues occurring at Little Beach area in Bonnet Shores. These problems included removal of sand from the beach leaving a rocky type of beach and deposition/infilling of sand in the channel at the boat ramp and in offshore bars. Studies that include environmental mapping and characterization and predictive modeling were proposed to FEMA to better understand the processes causing erosion and deposition in the study area and to determine if there were engineering solutions that might help mitigate these problems. A proposal was submitted to do these studies as was selected for funding by FEMA.

Components of the Study plan

1. ### Baseline Studies

   Baseline studies are a key piece of understanding the sediment transport (and seaweed transport) processes within the area and are needed to develop conceptual plan options, and

   For the permitting phase of a specific engineering plan. These studies should include:
   - (a) Produce a bathymetry and topography map for the study area.
   - (b) Map sea grass distribution and bottom habitats in study area.
   - (c) Do a wave height and circulation pattern study for the study area.
   - (d) Develop a circulation and sediment transport model for the study area.

2. ### Develop and Evaluate Conceptual Alternative Engineering Plans for the Study Area

   This phase uses the information obtained in Phase 1 to evaluate engineering solutions for the study area.

3. ### Develop a Conceptual Shoreline modification Plan

   This phase will utilize the information derived from the first two phases to develop a user and environmentally friendly plan for the Little Beach shoreline.

Rational for the Study Components

Component 1: Baseline mapping studies are a key piece of understanding how changes in environmental processes like sea level rise and storms impact coastal erosion in the study area. These studies characterize the study area as it exists in the present. The data obtained by the baseline studies are then used to design a model that can predict how the study area will change in the future in response to different scenarios of sea level rise and frequency and size of storms. We plan to develop a predictive model for lower part of west passage from Bonnet Point up to north of the URI Bay campus that will model coastal erosion.

These studies are also needed both to develop and test conceptual engineering plan options to mitigate coastal erosion, and for the permitting phase of a any specific engineering plan.

Another critical reason to do detailed base line studies in a study area is that if that area is characterized accurately prior to a "disaster" event, then it relatively straightforward to define the damages caused by that event by redoing the same survey after the event. Obtaining federal funding for mitigating damages is much more straightforward if you have "before" and "after" maps of the study area.

Component 2: This component of the study uses the information and predictive model obtained in Component 1 to evaluate engineering solutions for the study area. Our plan is to involve a group of senior Ocean Engineering students in a senior design course in order to use the data obtained in our baseline studies to come up with best practices for increasing coastal resiliency in the Little Beach area. Several options will be considered including green shoreline options. We plan to do this work in collaboration with Save the Bay and CRMC.

Component 3: It is necessary to understand the circulation and sediment transport pattern within the Little Beach study area in order to propose potential engineering solutions to the beach erosion problems in the Little Beach study area. It is also necessary to have detailed knowledge of current speeds and directions and wave heights in the study area in order to develop a circulation/sediment transport model for the study area.

Timing of the Study
The study is planned as a 18 month study that will start by the end of August, 2022. Component 1 will start shortly and will take about 9 months to complete. Components 2 and 3 will start by January, 2023 and will be completed in March, 2024.