

An Assessment of Disaster Risk for Critical Coastal Infrastructure in Caribbean Island Small Island Developing States

The risk of natural hazards to infrastructure is significant and likely to increase markedly over the coming decades. Scientific projections are for storms to become more intense and for 0.5 to 2 meters of sea level rise to occur by the year 2100. Caribbean nations could face climate-related losses in excess of \$22 billion annually by 2050. Regional and local organizations, such as the Organization of Eastern Caribbean States (OECS), the Caribbean Community (CARICOM), and the Economic Commission for Latin America and the Caribbean (ECLAC), need a comprehensive data source to identify how much land and associated infrastructure is at risk. This is a first step toward ensuring the safety of these assets and the long-term viability of the region.

Caribbean decision makers need state-of-the-art tools and data to plan for a disaster-resilient future. This research will enhance decision-making capacity by providing a hurricane and sea level risk assessment for critical coastal infrastructure. Critical coastal infrastructure, for the purposes of this work, includes airports, beaches, cruise ship terminals, power plants and maritime infrastructure which are vital for island economies and access. The Caribbean is one of the regions in the world most prone to natural disasters. As evidenced by the 2017 hurricane season, the Caribbean suffered extensive damage to structures and critical services (e.g., water, telecommunications, energy and transport). Such events pose a significant risk to sustainable development, as well as major economic sectors (e.g. tourism, agriculture and international commerce). The proposed approach creates a method to identify and geo-spatially classify critical coastal infrastructure in a standardized and replicable fashion.

The proposed **inventory and risk assessment** will provide a single, comprehensive source for data of lands deemed as critical coastal infrastructure. It will allow screening and prioritization of areas for resilience interventions. Users can obtain local sea level and flood risk projections and maps from Climate Central, and capture these results in formats that are easily shared (e.g. in presentations, constituent or leader communications) and can be used by:

- Regional institutions, climate change centers and consultancy firms for Vulnerability and Capacity Assessments (VCAs) as part of their analysis to fashion adaptation options for coastal infrastructure;
- The Caribbean Disaster Emergency Management Agency (CDEMA) and national and international disaster management agencies with mandates to pursue disaster risk reduction strategy in the region;
- Regional negotiators at the UN Framework Convention on Climate Change (UNFCCC) formulating a modality for the establishment of a research and development facility under the umbrella of the convention;
- The insurance community, including the Caribbean Catastrophic Risk Insurance Facility (CARIF), interested in developing a risk profile for the Caribbean;
- Communities and companies with coastal assets or those tasked with making investment decisions and or constructing credit ratings.

Using input from infrastructure managers, the proposed assessment will establish a new standard of developing geospatial data to assess infrastructure change, risk, and other research questions suitable for the regional scale. It will also include sufficient resolution such that individual facilities can utilize the data for local-scale analysis. Specifically, the approach creates, delineates and validates coastal infrastructure components so that exposure and risk can be determined. This work will facilitate and support the development of local and regional plans for resiliency of these critical assets and help decision makers prioritize resilience investment decisions in the coming decades.



Example of mapped infrastructure shows ports and airports in San Juan (PR) (Created by Becker Lab)