ABSTRACT

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Title: EXAMINING THE BEACH DYNAMICS OF THE CONNECTICUT SHORELINE AND THEIR IMPLICATIONS FOR COASTAL ZONE MANAGEMENT

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The notion that the presence of Long Island protects the Connecticut coast from intense storms is challenged by the impacts of hurricanes Irene and Sandy on the Connecticut shoreline. Observations on such impacts revealed that houses and other coastal structures located on wider beaches experienced significantly less damage than those located on thinner beaches. Thus, it is evident that beaches play a critical role in the protection of coastal structures from storm wave energy. This research aims to provide a better understanding of Connecticut's coastal dynamics and how they may leave the shoreline exceptionally vulnerable to storm wave damage.

Open-ocean beaches typically experience seasonal profiles, which are characterized by seasonal patterns of cross-shore sediment transport. This pattern of erosion and accretion results in the ability of beaches to be naturally replenished after storms and maintain the ability to serve as buffers for coastal structures. However, this research shows that Connecticut's shoreline does not experience seasonal beach profiles and therefore experiences wave energy asymmetry. This suggests that storm waves reaching the shoreline erode the sediments and abandon them in offshore sandbars, while the presence of Long Island prevents sufficiently energetic fair-weather waves from replenishing the beaches. As a result, the beaches are becoming gradually thinner and leaving the coastal structures increasingly vulnerable to storm wave damage.

This study also uses the data to make coastal management recommendations regarding how Connecticut's beaches can be maintained using more economically and environmentally sustainable methods. In rebuilding these natural buffers, Connecticut often relies on beach restoration projects in which the sediments are retrieved from external sources. However, such projects are expensive and ultimately temporary as the sediments erode and then remain in the offshore sandbars. A more cost-effective method would be to reclaim the eroded sand rather than import new sediment.