

Oster, Dana (2009). "Mapping Short Term Barrier Beach Processes at Seawall Beach, Phippsburg, Maine to Model Transgressive Shorelines in 2100 from Sea Level Rise". Honors Theses.

The Maine coast is directly threatened by sea level rise from projected climatic warming in the coming century. As barrier beaches generally migrate with rising and falling sea level, it is imperative to be able to predict the morphology of the beach system in the near future. The purpose of this study is to create a computer model in ArcGIS to project a wide range of scenarios of changes in the shoreline at Seawall Beach, Phippsburg, Maine caused by sea level rise (SLR) in 2100. Four SLR scenarios were used to calculate average rates of transgression. The vertical range of SLR used was 3-21mm/yr. The Bruun Rule (Bruun, 1954) was used in conjunction with the average beach slope determined from topographic surveys (July 2008 through February 2009) to generate predicted rates of transgression between 0.85-6 m/yr. The Bruun Rule was tested against observed changes from 2001-2008. The observed average rates of transgression from 2001-2008 revealed the rates of transgression were 3 times faster than predicted by the Bruun Rule. The generalized Bruun Rule was modified using seasonal and historical data to quantify the localized processes and morphodynamics at Seawall Beach. The resulting calibrated rates of horizontal transgression determined using the four SLR scenarios were increased by a factor of three to 2.6-18m/yr. With the vertical and horizontal parameters for the model determined, the projected shoreline for 2100 revealed the western barrier spit and the Sprague Marsh's vulnerabilities.