CLIMATE ADAPTATION

A Vulnerability Assessment for the Saco Bay Communities of Biddeford, Saco, Old Orchard Beach, and Scarborough

This vulnerability assessment was conducted by the Saco Bay Sea Level Adaptation Working Group (SLAWG), and assessed the vulnerability of Saco Bay communities to sea-level rise (SLR), flooding and erosion. The assessment looked at vulnerabilities for the towns of Saco, Scarborough, Old Orchard Beach, and Biddeford. This Saco Bay region contains the largest contiguous stretch of beaches and coastal wetlands in the state and has experienced some of the state's most severe erosion problems. Although the focus on the study was on the vulnerability of the communities as a whole, part of the assessment identified roads in the region that will be vulnerable to inundation under different SLR scenarios.

To determine the region's vulnerability to sea-level rise, the authors assumed a rise of a minimum of two feet above 2010 levels by 2100, consistent with 2001 projections from the Intergovernmental Panel on Climate Change and predictions adopted in Maine's Coastal Sand Dune Rules. The assessment did not include the effects of freshwater runoff, which may exacerbate coastal flooding; the analysis also assumed that the land surface will remain static, without significant alteration due to erosion or accretion. Erosion Hazard Area maps were used, pursuant to Maine's Coastal Sand Dune Rules, as a preliminary approach to estimate the potential impacts of sea level rise and wave action erosion along the coast; SLAWG is planning a separate future analysis of potential erosion impacts.

The vulnerability assessment simulated three different inundation scenarios: the 2010 highest annual tide (HAT), a prediction of the highest astronomical tide for a given year; the HAT plus two feet of sea- level rise (moderate SLR scenario); and the 1978 storm of record highest observed water level plus two feet of sea-level rise (extreme SLR scenario). The scenarios suggest that the areas at highest risk under the HAT plus two feet scenario are mostly located in Higgins Beach. A broader region, including the middle reaches of the Scarborough River watershed, is vulnerable under the 1978 storm peak plus two feet scenario. Under the HAT scenario, inundation is primarily limited to buildings within the Scarborough River, and at Pine Point.

Although the vulnerability assessment narrative does not discuss road inundation, the maps presented in figures 23-34 graphically identify in detail the roads and bridges that are vulnerable to inundation under the different scenarios, including estimates of the projected depth of flooding on particular road segments. In the Scarborough area, several roads are vulnerable to both the moderate and extreme SLR scenarios, particularly the bridges and roads spanning inlets or marshes on Route 1, Black Point Road, Eastern Trail, and two sections of Pine Point Road. Roads in the Pine Point Road area, as shown in figures 24 and 25, are especially vulnerable – the Pine Point Road would be inundated by up to two feet under the moderate SLR scenario, and Pine Point Road and many other coastal and residential roads could be inundated by up to four feet under the extreme SLR scenario. The Ocean Park area in Old Orchard Beach, as shown in figures 27 and 28, is also very vulnerable, with many roads

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inundated with up to four feet of water under the moderate SLR scenario and possibly over six feet of water under the extreme SLR scenario. As with the building inundation projections, these are static simulations that do not account for rainfall, waves, or runoff.

The assessment also details the potential economic impacts on property values in each community under the three scenarios. For the town of Scarborough, over 1,100 building footprints and $311 million of property value are at risk during the most extreme scenario. For Old Orchard Beach, the scenarios suggest that the Ocean Park and Walnut Street areas on Route 9 are vulnerable to flooding at current sea levels, and that the most extreme scenario endangers 877 buildings valued at over $461 million. Biddeford is minimally exposed under current conditions, but has over 210 buildings, valued at over $165 million, which are vulnerable under the extreme SLR scenario.

The assessment document also identifies a series of next steps proposed for calendar year 2011. These include the development of expanded damage estimates, to include the value of infrastructure such as roads, drainage structures, culverts, bridges, walls, tide gates, and other public works infrastructure. As of July 2013, these estimates are not available online. Also during 2011, SLAWG planned to develop and begin implementing an Action Plan. The Action Plan sets forth adaptation principles and identifies twelve implementation strategies and objectives: prioritize potential construction projects to adapt to SLR, comment on dune restoration and beach nourishment erosion control efforts, and recommend standardizing floodplain management standards and building code interpretations. The Action Plan was published in May 2011; at this time no substantial progress had been made any of the objectives identified.

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For More Information:
http://www.sacomaine.org/departments/boards/slawg-vulnerability.pdf

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