

## Why So Much Coastal Flooding?

Regionally, relative sea level rise is increasing faster than the global average because the land is subsiding.

Relative sea level rise has already risen nearly 7.6 inches in Rhode Island since 1938, the year of an historic and devastating hurricane that killed hundreds and caused massive property damage. Further sea level rise will only intensify threats to life and property from hurricanes and nor'easters.

In addition, today's 100-year coastal floods are projected to recur much more often in the future, motivating a great deal of work towards disaster adaptation planning in Rhode Island.

### Coastal Erosion

The rate of coastal erosion is typically several orders of magnitude greater than the vertical rise in sea level, but is an equally troubling problem. Rhode Island's coasts need an all-encompassing strategic, policymaking approach.

Steep bluffs (such as those on Block Island) and coastal cliffs will experience increased wave attacks at their base due to increased storminess, accelerating the pace of cliff retreat and failure. There is increasing recognition of this as an issue, as shown by a recent high profile case refusing to allow the building of a luxury home on Conanicut Island (Jamestown) because of the threat of cliff erosion.

Sand dunes, which are more prevalent along the South Shore, will experience more frontal dune erosion as sea levels rise and strong storms more frequently batter our coasts. As the dune erodes it becomes weaker and is less effective at protecting the habitat and infrastructure further inland.

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### Threats to Wetlands

Climate change-related impacts to wetlands, including rapid sea level rise and warming temperatures, endanger the wetlands' function and role as a vital ecosystem habitat.

Wetlands (i.e., coastal marshes) are also affected by non-climate stressors such as increasing nutrients (nitrogen and phosphorus) from sewage-contaminated groundwater and runoff from agriculture land, which stimulates algal growth.

Marshes buffer coastal areas, filter out nutrients and pollutants, and serve as nursery grounds for fish and shellfish species, and provide vital habitat for waterfowl and migratory birds.

Past a certain threshold rate, rapid sea-level rise (exacerbated by land subsidence) would cause large-scale inundation and loss of marsh vegetation and important habitats.



Erosion at Matunuck Beach after Superstorm Sandy. *Photo Credit: Rhode Island Sea Grant*

### Threats to Beaches

Loss of beach in one area may result in the shifting of sand to another beach close by.

Stabilization that prevents natural movement of barrier beaches horizontally along the coast (such as East Beach and Misquamicut State Beach) can lead to beach and wetland loss. Hard structures such as parking lots, buildings, and roads behind beaches prevent the natural landward migration of beaches. This results in the eventual disappearance of the beach and has the added impact of exposing the man-made infrastructure directly to the waves and storms.