

RHODE ISLAND



Erosion and the Economy

- More than 100,000 state residents and tens of thousands of out-of-state tourists use Rhode Island's beaches each summer, bringing millions of dollars in revenue. In Middletown, for example, town beaches provide jobs for 75 town residents, and a total economic value of over \$1.5 million per year.

- Property located along Rhode Island's coast represents an enormous investment. It has been estimated that if a 100-year storm had occurred in 1989, losses of properties in the coastal floodplain would have exceeded \$280 million. Losses would be even higher today, due to both sea-level rise and to additional construction since 1989.

Rhode Island's Changing Coast

- The majority of Rhode Island's south shore is eroding over the long term, with an average annual rate of retreat of 1 to 2 feet.

- Exposed sandy shores—for example, Matunuck in South Kingstown—can recede by as much as 30 feet in a single severe hurricane.

- If sea level continues to rise by



Coastal Erosion and Sea Level Rise

One of the most visual reminders of any major hurricane, flood, or storm event in Rhode Island is a sudden, dramatic change in the shape of the state's beaches. A visitor to the shore will see that the coastline has retreated—sometimes literally overnight—and large amounts of sand have vanished. As shoreline is lost, the risk of damage to coastal properties increases.

Faced with the challenge of preventing and reducing losses due to coastal erosion, decision-makers must answer some basic questions: What is at risk? What level of risk is acceptable? What solutions are feasible, considering the financial resources available? An understanding of erosion in the highly dynamic coastal environment is also essential to the development of sound coastal hazard management policy.

Understanding Coastal Erosion

The majority of Rhode Island's ocean and Narragansett Bay coasts are susceptible to erosion. The amount of erosion from storms - which are the biggest causes of change on the shoreline - is directly related to their number, intensity and duration.

Although they are susceptible to erosion, beaches form the first line of defense against ocean waves, providing a buffer between the waves and coastal properties. When beaches are cut back during

1 foot per century—as is actually being measured at Newport—all of Rhode Island's low-lying coastal areas (76 percent of the shoreline) could be adversely affected.

•From 1900 to 1980, Rhode Island's total population grew by 26.6 percent. However, growth in coastal communities has been significantly greater:

Charlestown	67.4 %
South Kingstown	41.6 %
North Kingstown	221.7 %
Narragansett	107.3 %
East Greenwich	57.0 %
Barrington	116.0 %

For further information on risks from coastal erosion and on what you can do to protect your home and community, contact:

• Your local emergency management, building, or planning official

• Federal Emergency Management Agency

617-223-9561

• Rhode Island Emergency Management Agency

401-946-9996

• Rhode Island Sea Grant/
University of Rhode Island
Coastal Resources Center

401-874-6224

• Insurance Institute for
Property Loss Reduction

617-722-0200

storms - especially the more severe storms that occur in fall and winter - they progressively lose this buffering ability, making further coastal erosion more likely. (It is important to recognize, however, that natural erosion and sedimentation - redepositing of sand - can vary among locations and from year to year, depending on such factors as nearshore currents, ocean swells, and the availability of sediment.)

As the beach erodes, vulnerable properties are placed at even greater risk. A home constructed in the V-zone, or velocity zone, is likely to be destroyed as the beach erodes and the barrier or headland is washed over by high water in a storm.

Sea-Level Rise

Human beings have become active agents of change in the earth's atmosphere and oceans. As the rate of sea-level rise accelerates in response to greenhouse warming, we may see an increase in coastal erosion. While sea level has risen and fallen in the past, these changes occurred over hundreds to thousands of years. We are now facing rapid sea-level changes on a scale of decades.

Higher sea levels could affect the coastal zone in a variety of ways, including greater shoreline retreat, increased coastal erosion, property destruction, and saltwater intrusion into bays, rivers, and underground water resources.

In addition, a general elevation in the water table could result from sea-level rise. This could lead to the failure of both septic systems and other drainage systems, such as storm drains, which need to be located at a certain elevation above the water table. This problem could be seen in over 58 percent of Rhode Island's coastal areas. Elevation of the water table would also affect the river drainage systems of Rhode Island by slowing down runoff and increasing the risk of flooding.

Reducing the Risk

Coastal erosion and sea-level rise have the potential to affect the majority of the population, as well as the economy and use of natural resources in the Ocean State.

One past approach to reducing damage from coastal erosion has been the use of engineered coastal protection measures. However, because the coastal system is so complex, these techniques are not effective in most locations, and have caused additional problems, such as changes in sediment supply along the shore.

To reduce coastal erosion, additional building or public infrastructure in hazardous areas must be avoided. Beach replenishment (replacing sand in eroded areas) and other "soft" structural methods should be used instead of other protection methods, such as revetments, that were unsuccessful in the past.



A 100-year storm is one that, in a given year, has a 1-percent chance of striking. While this may sound unlikely, we have seen such a storm in recent memory: the great hurricane of 1938.

The coastal V-zone is an area defined for insurance purposes and categorized by elevation above sea level and, to a lesser extent, distance from the shore. All locations in the V-zone are considered to be "subject to battering waves."

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