

Precipitation and Storms in Rhode Island

TRENDS AND IMPACTS

NARRAGANSETT TOWN BEACH The ocean overtops the seawall and douses the sidewalk at high tide.

CREDIT: JACOB KLINGER

JANUARY 2013 This fact sheet provides an overview of the current science from peer-reviewed information as well as impacts and actions compiled by the University of Rhode Island (URI) Climate Change Collaborative, scientists, and managers in Rhode Island.

The intensity and frequency of extreme precipitation events has increased over the past 100 years, and has recently resulted in severe flooding in Rhode Island in March 2010 and during extratropical storm Irene (2011) and post-tropical storm Sandy (2012). An increase in ocean temperatures, which accelerates water evaporation, brings more moisture into the air and results in increased precipitation. These warmer waters also give energy to storms and hurricanes to grow in intensity and size.



FLOODING in West Warwick in 2010 demonstrates how low-lying areas are already vulnerable to flooding.

IMAGE CREDIT: NATIONAL WEATHER SERVICE

PRECIPITATION IS INCREASING

- + In Rhode Island, precipitation has increased by over 12 inches since 1905, mostly during non-summer months.
- + By 2100, precipitation in the Northeast during non-summer months may increase by an additional 7 to 14 percent above the current average, leading to a higher risk of flooding.
- + During the summer months, warmer air temperatures may lead to more droughts.



OBSERVING SANDY'S DAMAGE

Children scope out the eroded beach one day after post-tropical storm Sandy in 2012.

PHOTO CREDIT: KATE O'KULA

EXTREME PRECIPITATION EVENTS AND HURRICANES INCREASE IN INTENSITY

- + In the Northeast, the amount of rainfall during extreme precipitation events (defined as the heaviest 1 percent of precipitation events) has increased by 67 percent over the last 50 years, causing increased flooding and damages.
- + The frequency of extreme precipitation events is projected to increase. Today's storm that has a 5 percent chance of happening in any year may increase to a 20 percent chance of occurring in the near future.
- + While the number of hurricanes is not expected to rise, higher temperatures will likely increase the intensity of hurricanes in the Atlantic Ocean.

- + West Warwick, Westerly, Cumberland and Cranston are in the process of buying out vulnerable structures in the floodplain in cooperation with FEMA's Hazard Mitigation Grant program.
- + North Kingstown, Narragansett and Middletown participate in the National Flood Insurance's Community Rating System, taking advantage of incentives to reduce flood insurance premiums for each policyholder in the community by reducing risks



ROUTE 2 RAMP

during severe flooding in 2010.

CREDIT: RI DEPARTMENT OF TRANSPORTATION

The URI Climate Change Collaborative is an interdisciplinary project funded by Rhode Island Sea Grant that draws on communication and behavioral science as well as climate change research to promote adaptation to sea level rise and the impacts of climate change. Learn more at seagrant.gso.uri.edu/climate.

PRECIPITATION AND STORMS IMPACT COMMUNITIES BY **INUNDATING LOW-LYING COASTAL AREAS AND INCREASING RISKS FROM STORM TIDES.**

IMPACTS TO THE BUILT ENVIRONMENT:

- + Roads, infrastructure, and drainage systems are not designed to address future conditions.
- + Transportation, energy, and wastewater infrastructure will likely sustain more frequent damage and potential service shutdowns from flooding.
- + Increased storm-related flooding and erosion of beaches, bluffs, and riverbanks may impact public access, infrastructure, homes, and businesses.
- + Many dams will be at risk for potential failure, resulting in downstream flooding.

IMPACTS TO PUBLIC HEALTH AND WELFARE:

- + Flooding can hinder emergency services, contaminate drinking water, and increase water- and mosquito-borne diseases.
- + Moisture and mold growth can increase risks for allergies, asthma, and other respiratory diseases.
- + Coastal waters can be contaminated by storm drain or wastewater treatment facility overflows, leading to closure of beaches and shellfish harvesting.

IMPACTS TO NATURAL RESOURCES:

- + Increases in precipitation patterns and storm intensity will lead to changes in salinity and water levels of Rhode Island's marine and freshwater ecosystems.
- + Intense rain events and irregular precipitation patterns will place greater stress on native plant and animals, leaving them more susceptible to the threats of invasive species.
- + Heavy precipitation will increase the amount of contaminants that are washed into fresh and saltwater ecosystems through stormwater runoff, impacting important habitats and species.

For more information and detailed references, visit Rhode Island Sea Grant's page on climate change at <http://seagrant.gso.uri.edu/climate/>