

# Building a Resilient Scituate

## EXECUTIVE SUMMARY

Climate change is the most compelling environmental, economic, and social issue of our time. Scituate, known for its numerous barrier beaches, prominent bedrock headlands, and rich cultural history, is one of the most vulnerable regions in Massachusetts. It is routinely hit hard with coastal storms causing massive storm surge and inundation with even just a lunar high tide. Projected sea level rise and changes in intensity of storm and precipitation events compel the need to assess the vulnerability of Scituate's people and places as well as plan for protecting its future. This report summarizes the latest climate risks, evaluates the vulnerability of Scituate's critical infrastructure and resources, and creates an action for incremental steps toward greater resilience and community vibrancy in an uncertain future.



Scituate, Winter Storm Riley, March 2018. Source: Simon Brewer

## Climate Change: Our Uncertain Future

2017 was the second warmest year on record and the period from 2006-2015 was the warmest decade since temperature has been measured. This has translated into an increase in the growing season by 10 days since 1980 <sup>1</sup> and model temperature projections anticipate more frequent heat waves.<sup>2</sup>



Scituate could experience five to 23 days over 90° by 2050 and nine to 58 days over 90° by 2100.<sup>2</sup>

Depending on various greenhouse gas emission scenarios, warming temperatures will cause ocean expansion and melting glaciers resulting in sea level rise. Sea level has risen by 11 inches over the last century and scientists anticipate this rate to accelerate.



Scituate could experience an additional eight inches sea level rise by 2030 and six and a half feet by the end of the century.<sup>1,3</sup>

In the last 50 years, precipitation in the Northeast US increased 71% in the amount of rain that falls in the top 1% of storm events. Projections suggest an increase in total precipitation, changes in precipitation patterns, and increased frequency of extreme storms such as hurricanes and nor'easters.<sup>3</sup>



Scituate could experience an increase of five inches of precipitation annually by 2050 and six inches by 2100 with the greatest increase during the winter.<sup>1</sup>

<sup>1</sup> U.S. Environmental Protection Agency. 2016. Climate Change Indicators in the United States, 2016. Fourth meditation. EPA 430-R-16-004. [www.epa.gov/climate-indicators](http://www.epa.gov/climate-indicators) Northeast Climate Science Center.

<sup>2</sup> Northeast Climate Science Center. UMass Amherst. Massachusetts Climate Change Projections. December 2017

<sup>3</sup> Sea Level Rise Study. *The Towns of Marshfield, Duxbury, Scituate, MA*. 2013. Kleinfelder.

## Scituate's Strength and Vulnerability

Projected climate impacts are an intensification, increased frequency, or geographic expansion of existing challenges. Scituate already has significant planning, experience and strengths to bring to these challenges.



Scituate's seniors comprise 17% of the population and are the residents at greatest risk to climate change. Many seniors live in Humarock vulnerable to extreme heat and coastal flooding. But the Town is well prepared with programs that connect seniors to programs, cooling centers, and resources for their well-being and safety.



Scituate is at risk to increased occurrences of vector-borne diseases with warmer winters, standing flood waters, and extended growing seasons. But it has significant strengths in preventing heat-related illness with 48.8% tree canopy cooling the town, mitigating air pollutants, capturing stormwater, and sequestering carbon. There is a nominal risk to toxic exposure from flooding of hazardous materials storage sites.



Scituate has over 1,600 acres of salt marsh and over 100 acres of eelgrass meadows providing critical shoreline protection. The salt marshes are showing signs of degradation and saltmarsh grass decline and migration, but the eelgrass meadows have remained relatively stable since 1995. There are four designated impaired waters in its rivers, bays, and ponds requiring TDML, but Scituate also contains 10,033 acres of State-designated BioMap2 Aquatic Core habitat demonstrating viable wetland systems able to withstand the impacts of climate change.



Scituate's drinking water has two sources, but it is vulnerable to scarcity during periods of drought and potential intrusion from coastal flooding and inundation of its well infrastructure. Its waste water treatment plant is located within a 1% Annual Chance Flood Zone and the flood risk increases greatly with sea level rise in 2038 and 2088.



Scituate has suffered 3,681 flood insurance claims totaling over \$63 million.<sup>4</sup> Critical Infrastructure located in current or future flood zones includes two well heads, pump stations, wastewater treatment plant, two bridges and a few businesses, where Front St. is the most vulnerable. Sixteen roads are prone to flooding in a 1% Annual Chance Storm. Businesses located in a 2088 flood zone are valued today at over \$57 million.



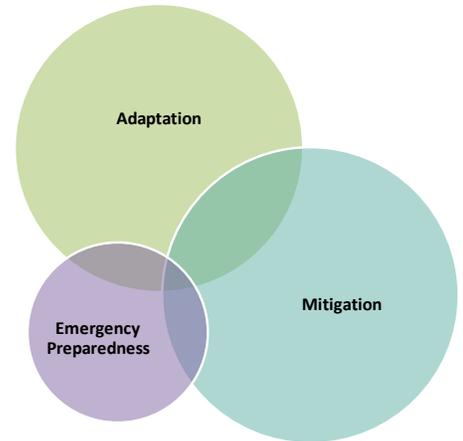
There 127 historic structures at risk to flooding in a 1% Annual Flood Chance Flood and approximately 60 historic structures vulnerable to sea level rise in 2088.

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<sup>4</sup> VHB. Natural Hazard Mitigation Plan Scituate, Massachusetts. August 2, 2016

## Scituate's Climate Action Plan

This climate action plan builds upon previous completed plans for hazard mitigation and coastal flooding, erosion, and resilience. It takes an adaptive management approach that combines emergency preparedness, mitigation, and adaptation. The Town's Climate Vulnerability Steering Committee created the prioritization of suggested climate actions agreed upon four guiding principles toward *Building a More Resilient Scituate*:



1. Balance growth, preservation, and resiliency to enhance our vibrant community and ensure its livability into the next century and beyond
2. Invest in infrastructure that promotes multiple benefits that address climate risks as well as beautification, economic growth, public programming, and public health.
3. Leverage the resources of multiple disciplines and sectors within municipal departments and across sectors to generate layers of resilience.
4. Approach *Building a More Resilient Scituate* as an ongoing effort to ensure Scituate's ongoing success leveraging capital improvement cycles and outside funding cycles.

### *Scituate is Proactive... Scituate is committed to Resilience*

The top climate action priorities were those receiving the most significant concern and sense of urgency for Scituate's future livability and were recommended to be implemented as soon as possible. The top climate action priorities are as follows:

1. **Address the vulnerability of coastal business districts.** Lead a climate vulnerability and resilience workshop with stakeholders, property owners, residents, businesses, and municipal staff and officials for participatory visioning the future with sea level rise and coastal flooding. The goal of the workshop is to educate stakeholders to the current and future risks and ensure stakeholders are active participants in the waterfront's current and future resilience. Front Street is a priority for this action.
2. **Address the vulnerability of Scituate's municipal infrastructure.** A priority could be the Waste Water Treatment Plant, currently in a 1% Annual Chance Flood. Protection measures discussed include earthen berms and other natural shoreline protection as an incremental resilience measure while investigating more significant structural investments that addresses future risk.
3. **Initiate a public outreach and marketing campaign** with a sense of urgency on climate change and resilience in Scituate. The Town has demonstrated results in such an effort, when, during the 2016 drought where resident's behavior shifted sufficiently to mitigate drinking water scarcity during that time.