

## Extreme Precipitation



### THE REALITY

Warmer air and ocean temperatures have produced a trend toward heavier precipitation events, especially locally.

**71%** ↑

Since 1958, the Northeast has experienced a 71% increase in precipitation, an increase nearly twice as great as any other part of the country.

### THE RISK

The consequences of more extreme precipitation include

Increased flood damage to properties in low-lying areas of the City, including the Business Park, West End neighborhoods, and coastal zones

Loss of public access through flooded roadways

Increased damage to critical city infrastructure, such as roads, treatment plants, water and sewer lines and other public facilities

### THE REALITY

Rising global temperatures have created shifts in the jet stream, producing extreme weather fluctuations



In February 2017 two 80-degree days were followed by a succession of damaging winter storms.

### THE RISK

Human health impacts of higher temperatures include increased incidence of asthma, allergies, heat stroke and other cardiovascular conditions, as well as an increase in insect-borne diseases such as Lyme and West Nile Virus

Environmental impacts of extreme temperature conditions include damage to trees and other vegetation, shifting agricultural ranges and loss of species

Recurring or persistent drought endangers the public water supply and can lead to dangerous changes in water quality, diminished food supply and associated economic losses

## Extreme Temperature Change



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Everyone in our community has a role to play in making Newburyport a resilient city. I want to thank former Mayor Holaday for commissioning this plan and I am grateful for the work of the Resiliency Committee for creating a path forward that allows us to face the urgent challenge of climate change and to each help as best we can. The Committee engaged key stakeholders and community members to create this plan, and they have identified the unique climate hazards and risks here, as well as our key assets. Newburyport has always been at the forefront of green and sustainable initiatives, and together we can increase energy efficiency, plan responsibly for the future, and build a more livable and resilient community.

— Mayor Sean Reardon

Lets rally together to ensure the future success of our home

Want to learn more about climate resiliency?



[cityofnewburyport.com/resiliency](http://cityofnewburyport.com/resiliency)

# NEWBURYPORT RESILIENCY

## PLANNING

Preparing for the Future



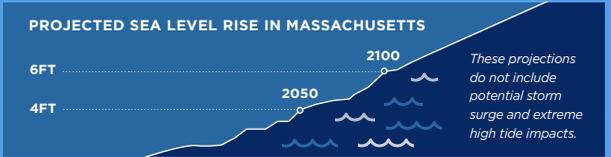
The Port Where Tradition and Innovation Converge



## Rising Sea Levels

### THE REALITY

Data show that sea level is rising fastest along the US East Coast.



### THE RISK

Low-lying coastal areas of Newburyport will be flooded without resiliency measures in place.

Newburyport's most vulnerable areas to sea level rise include:

- Plum Island / Plum Island Turnpike
- Low-lying shoreline properties along Water & Merrimac Streets, including the Wastewater Treatment Facility & parts of the downtown waterfront
- The Artichoke Reservoir

### THE REALITY

Climate driven changes to the jet stream favor increased development of tropical storms, northeasters and hurricanes.

Where Newburyport lies in the mid-and-high latitudes, storm frequency and intensity has been steadily increasing since 1950.



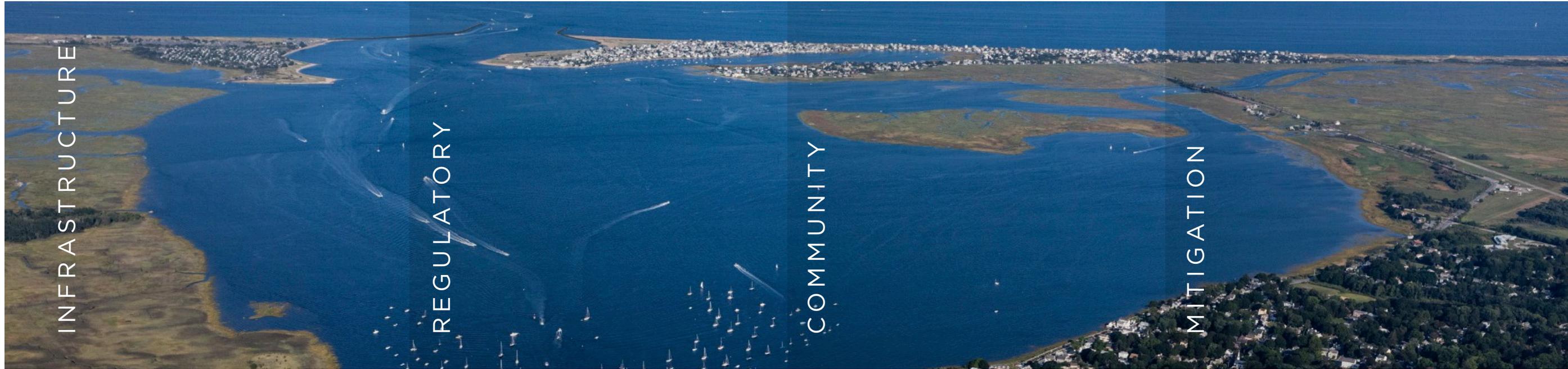
### THE RISK

- Increased storm damage to coastal properties from wind-driven waves and associated flooding
- Increased erosion and loss of protective coastal dunes on Plum Island
- Increased damage and outages to critical city infrastructure, such as roads, treatment plants, power lines, and public facilities



## Devastating Winds

We are working to address these challenges



## Infrastructure Installations/ Improvements

### STRATEGY

Implement immediate protective measures for the water supply and wastewater treatment facility, while planning longer-term adaptations for these critical assets, as well as vulnerable roadways, utilities and other public facilities.

### ACTION ITEMS

- Develop, and implement plans for permanent protection of the water supply.
- Develop plans for protecting the Wastewater Treatment Facility, sewer lift stations and future relocation of the WWTF.
- For the areas around Cashman Park and Waterfront Park, evaluate possibility of elevating or protecting these properties to preserve their amenities vs. adapting and transitioning the assets to alternate uses as sea level rises.
- Strengthen the electrical grid by reducing conflicts with trees, burying utilities and evaluating micro grids.

## Regulatory and Administrative Approaches

### STRATEGY

Review, evaluate, and revise local zoning and other ordinances and regulations to improve resilience, water conservation, energy efficiency and discourage development in the FEMA high hazard flood zones. Work with neighboring communities on long-term planning and priority-setting.

### ACTION ITEMS

- Develop a task force with Newbury to implement a long-term, sustainable, science-based plan to address the challenges facing Plum Island.
- Develop an automated water quality monitoring and warning system to protect residents from the health risks associated with combined sewer overflows (CSO's).
- Implement a storm water/impervious surfaces management program.
- Adopt a design flood elevation for all new development in the FEMA high hazard flood zones.
- Consider adoption of an expanded flood zone overlay district that takes projected sea level rise into account.

## Community Communication and Education

### STRATEGY

A strong public understanding of anticipated climate change impacts is critical to the resilience of our community. Communication about climate hazards should be an ongoing effort and should target all age groups and neighborhoods.

### ACTION ITEMS

- Continue to present data on projected sea level rise and climate impacts to the community in open and easily accessible ways.
- Develop recommendations to assist residents in making their households more sustainable and resilient to climate hazards.
- Educate and alert residents to emerging public health impacts related to heat, air and water quality, insect diseases, public safety, and emergency response, access and shelter.
- Create school-based programs to educate future generations about climate change impacts and resiliency.

## Mitigation through Carbon Footprint Reductions

### STRATEGY

To mitigate climate change and temper hazards for future generations, Newburyport and each of its residents must do their part to achieve community-wide net-zero emissions by 2050.

### ACTION ITEMS

- Incentivize or require new development and re-development projects to incorporate renewable energy and other energy efficiency and climate resilience measures.
- Increase the use of renewable energy versus fossil fuel energy citywide.
- Track the current municipal carbon footprint.
- Implement a program to quantify and track the carbon impact of residential households.