



Saugus Climate Adaptation and Resilience Plan

Virtual Open House

June 9, 2022

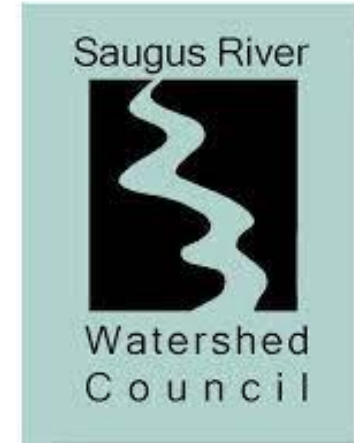
6:00 - 7:30 PM

Opening Remarks

Debra Panetta

Board of Selectmen

Project Team



MVP

Municipal Vulnerability
Preparedness

How Will Today's Open House Work?

- 1 Overview of the Saugus Climate Adaptation and Resilience Plan
- 2 Introduction to the Planning Process
- 3 Findings of the Impact Assessment
- 4 Project Next Steps
- 5 Interactive Breakout Groups



Join the conversation!

Please use the chat function to ask questions as we go!

If the meeting abruptly ends, please be patient and re-join using the same Zoom link. You will also receive an email with the meeting link.

What we're here to talk about today:

- What is the **Climate Adaptation and Resilience Plan**?
- How does this plan **relate to other plans for Saugus**?
- What are the **natural hazard risks** facing Saugus?
- What do we mean when we say **resilience**?
- How will the plan help **Saugus become more resilient**?
- What **have we learned** so far?
- How will we continue to **work with you**?

We Want to Hear from You!



Please be sure to stay online after this presentation to participate in our breakout groups about the places in Saugus that matter to you and how they can be improved for the future!

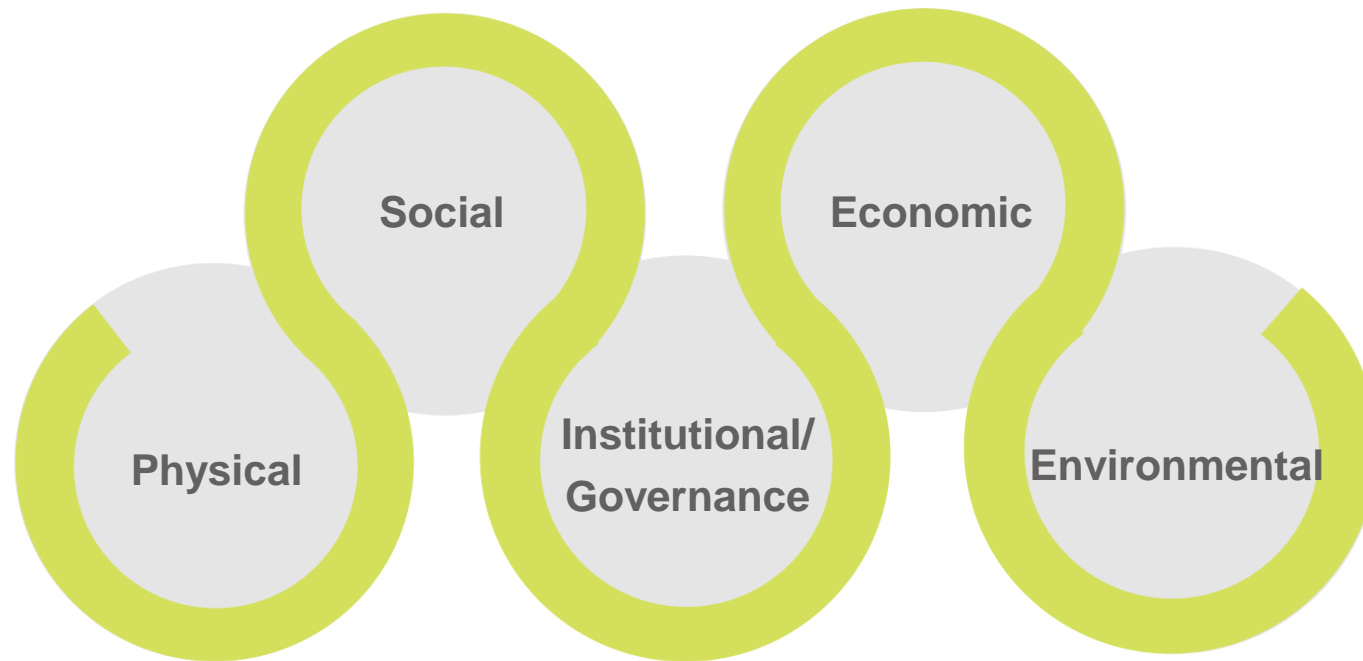
What is the Climate Adaptation and Resilience Plan?

Saugus Climate Adaptation and Resilience Plan

Goals of this plan

- **Create data-driven understanding** of natural hazards facing assets in Saugus today and how they will change in the future with climate change
- **Work with the Saugus community** to share information on climate-related risks and how we can adapt to these risks over time
- Through discussions with the community, **develop adaptation scenarios** to convey potential pathways **to reduce risks and build resilience** through changes to the built and natural environment

In a context where risk is increasing and evolving, our ability to change, adapt, and respond is our resilience.



Resilience means more than risk reduction. It means...

- **Multi-layered, multi-purpose** protection
- **Systems-level** thinking
- Adaptability **over time**
- Attention to **equity**

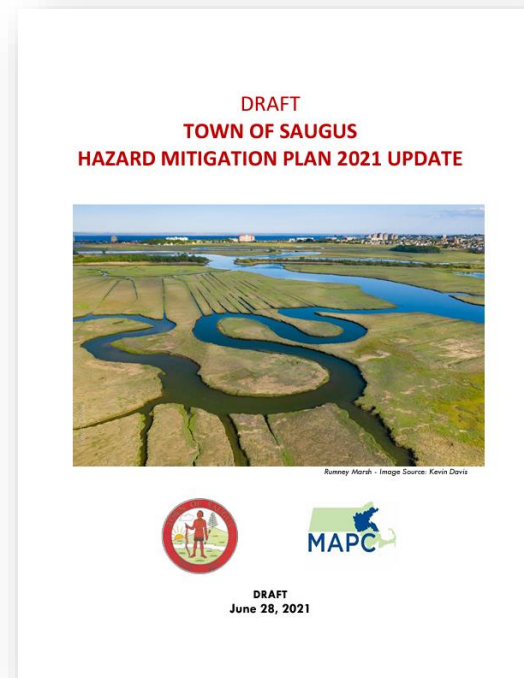
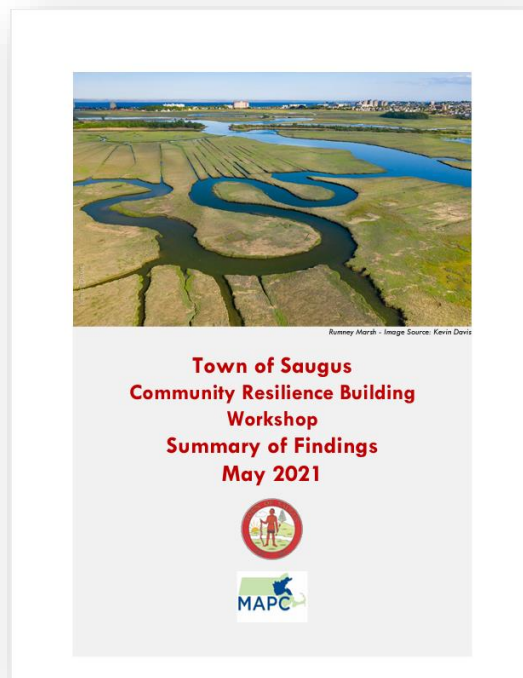


How does this plan build on previous efforts?

MVP Plan (2021)

Hazard Mitigation Plan (2021)

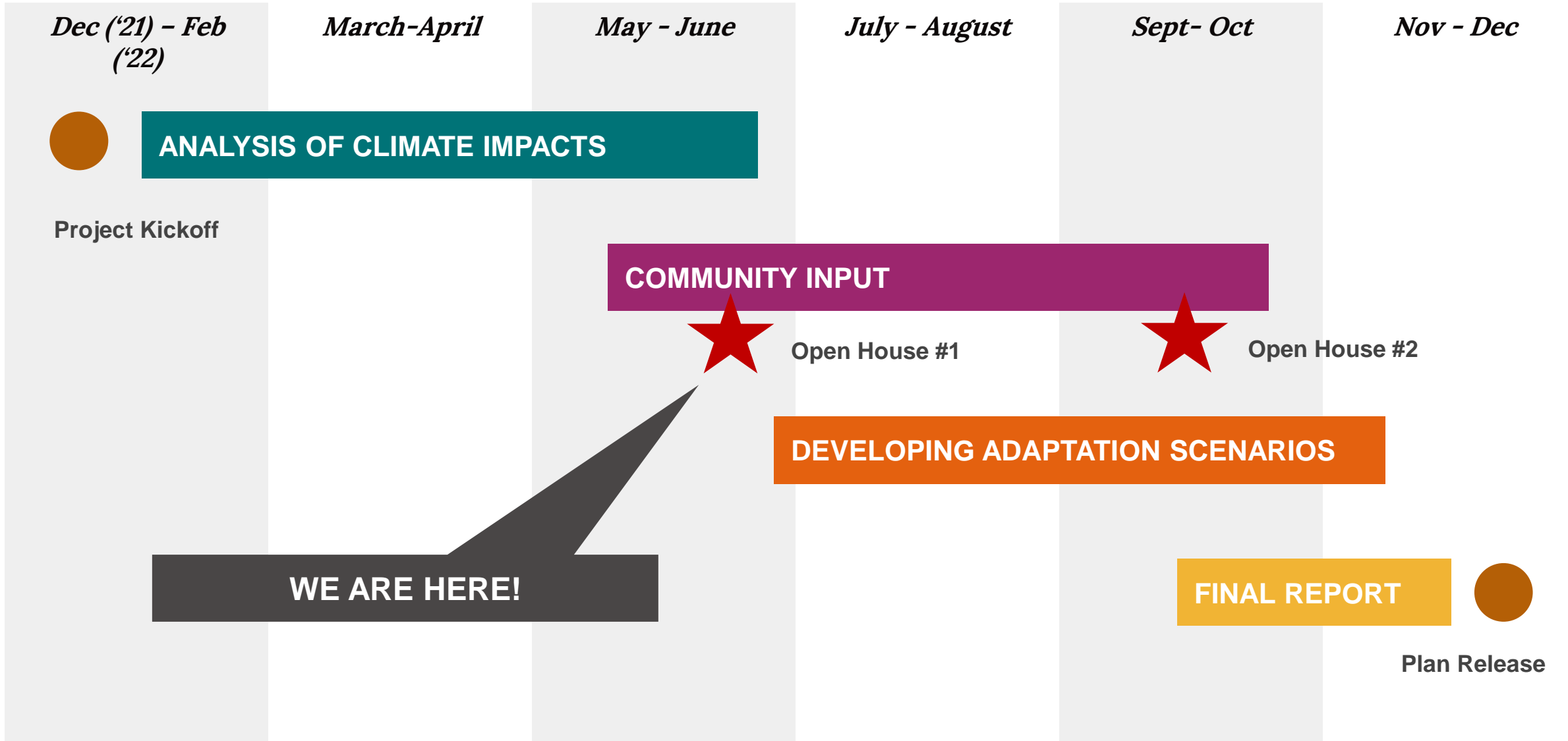
Saugus United 2035: Master Plan (2022)



“...many choices the Town makes today will result in investments that extend far into the century. For these, it will be important to consider longer-term projections. Weather extremes will no doubt impact Saugus over the next fifteen years. Flooding, heatwaves, strong storms, and power outages will strain town resources and pose threats to residents and first responders. Planning and preparation can lessen the damage and disruption inevitable storms will cause.”

Saugus United 2035 Master Plan (2022)

Where are we in the process?



What are the priority hazards facing Saugus?

What is an impact assessment?

An impact assessment identifies potential hazards and analyzes what could happen if a hazard occurs.

In Saugus, an impact assessment will help us understand natural hazard risks so that we can **develop and prioritize strategies to reduce risk and increase resilience.**

What types of questions can an impact assessment help answer?

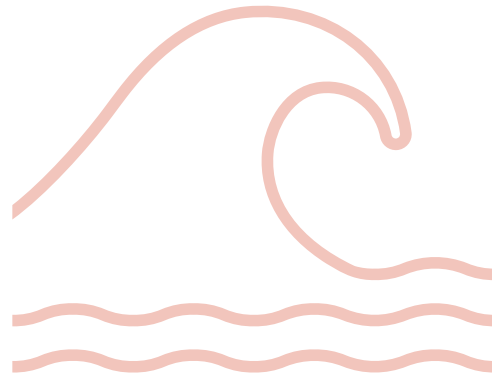
How many buildings are exposed to coastal flooding in 2070?

Which municipally owned buildings will be most impacted by heat over the next 50 years?

Which community assets should be prioritized for mitigation?

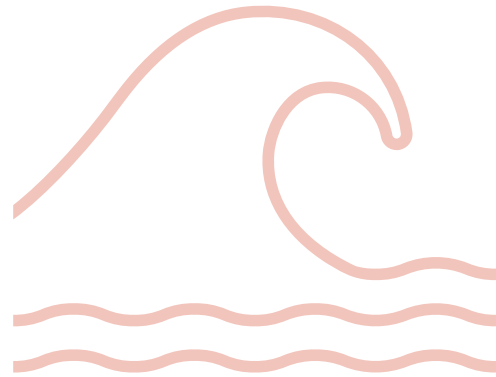
Which critical facilities will be impacted by natural hazards and when?

Saugus faces four primary natural hazards risks...

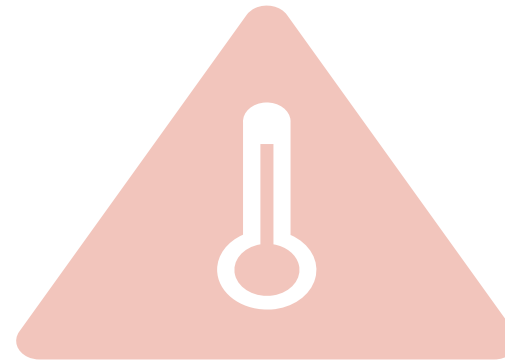


Flooding

Saugus faces four primary natural hazards risks...

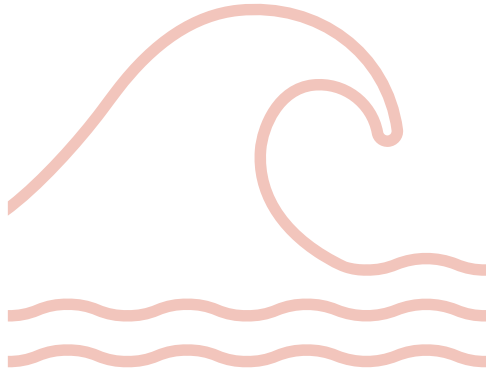


Flooding

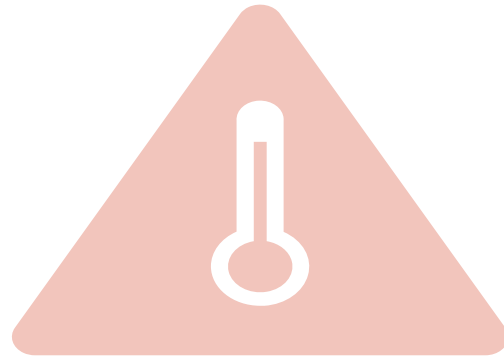


Heat Waves

Saugus faces four primary natural hazards risks...



Flooding

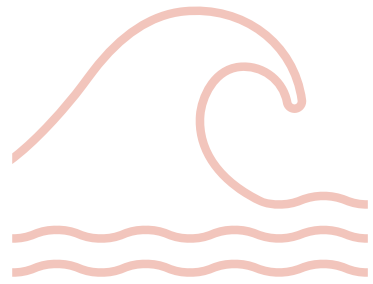


Heat Waves

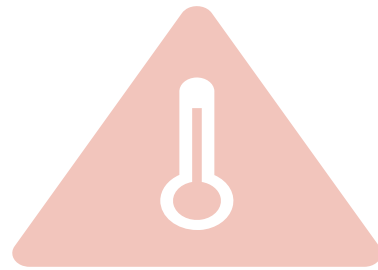


Severe Storms

Saugus faces four primary natural hazards risks...



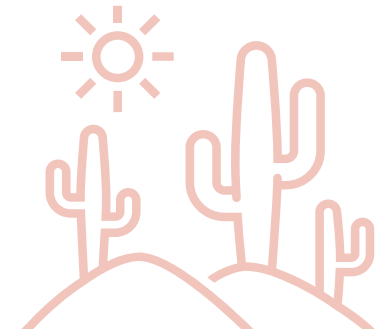
Flooding



Heat Waves



Severe Storms



Drought

Coastal Flood Hazards Overview



Flood Hazard

STORM SURGE FROM COASTAL STORMS:

Coastal storms create flooding due to surge—a rise in water levels due to storm pressure and waves—which can also lead to coastal erosion.

HIGH TIDE FLOODING:

Low-lying coastal areas flood when water levels rise above ground elevation due to high tides.

INLAND/STORMWATER FLOODING:

Lower lying areas, both along waterways and inland, can flood due to heavy rain events overwhelming drainage infrastructure.

Heightened by Climate Change

Sea Level Rise

Sea Level Rise

Increased Precipitation
Sea Level Rise

Climate Change is Intensifying Natural Hazards

The Massachusetts State Hazard Mitigation and Climate Adaptation Plan defines climate change as “a change in the state of the climate that can be identified by statistical changes of its properties that persist for an extended period, whether due to natural variability or as a result of human activity.”

In Saugus, climate change means:

- **Rising temperatures** with more days above 90 degrees Fahrenheit in the summer and fewer days below freezing in the winter.
- **Rising sea levels** which will increase the frequency and severity of coastal flooding associated with high tides and storm events and may threaten groundwater supplies.
- **Changing precipitation** patterns which includes more intense and more frequent rainfall events and more frequent severe storms. When combined with rising temperatures, changing precipitation patterns can also result in more frequent periods of drought.

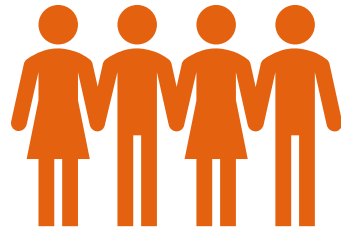
Climate change is expected to exacerbate existing social and economic inequalities, making it harder for environmental justice populations to prepare for and recover from flood events, extreme heat waves and other disasters. In MA, environmental justice populations are identified based on income, percent minority population, and English language proficiency.

How will climate change impact Saugus?

The combined effects of these risks is great...



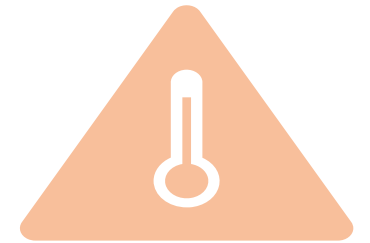
By 2050, **1,131 total buildings** are exposed to storm surge flooding



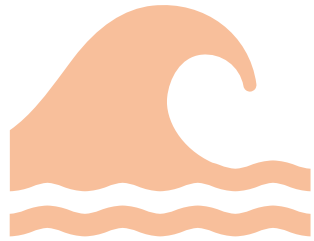
96% of buildings exposed to high tide flooding in 2050 are located within **environmental justice communities**



Nearly **900 buildings** may be **vulnerable to inland flooding 0.5-3.0 feet deep** during heavy rainfall events

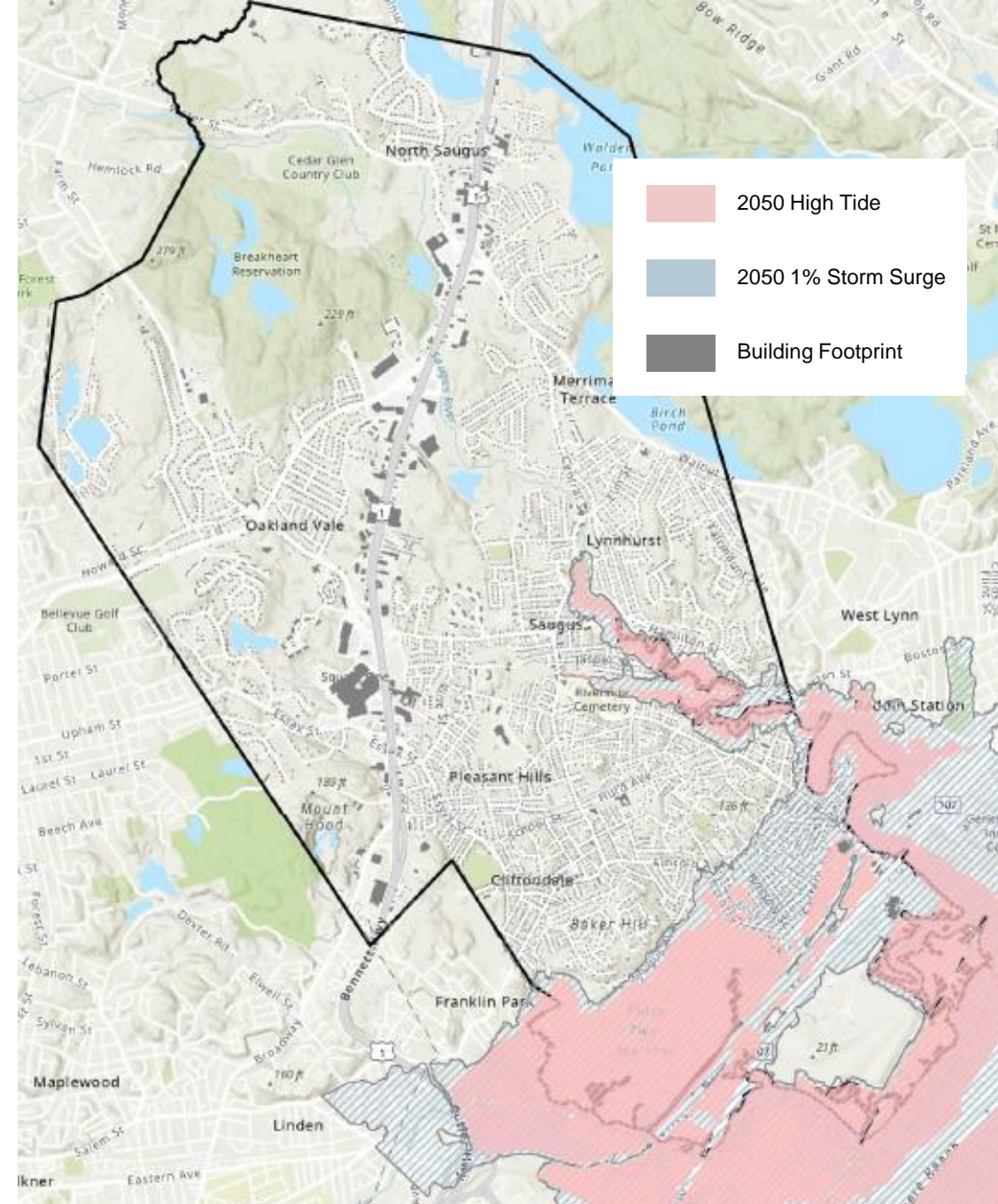


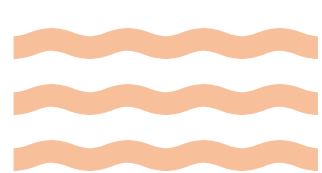
Temperatures in Saugus are expected to rise, with average **annual temperatures increasing up to 8.1 degrees F** by 2070.



Flood Impacts Storm Surge

- **93% (1,050) of buildings exposed to storm surge flooding by the 2050s are residential.**
- **7 critical** facilities including the Wheelabrator and Harbor Side Health Care are exposed to storm surge flooding by 2050. **All 7 are located within environmental justice communities.** On average, they are exposed to 5.2 feet of flooding.
- Roadways **at risk of flooding due to storm surge include Ballard Street, Bristow Street, Eastern Avenue, Salem Turnpike, and Saugus Avenue.** Storm surge flooding may impact access on over 14 miles of roadways in Saugus by 2050.
- **Vitale Park, Bucchieri Park, Rumney Marsh, Riverside Cemetery, Saugus Iron Works, Saugus River Conservation Area, and Stocker Playground** are some of the 17 parks and open space assets may be exposed to storm surge flooding by 2030.





Flood Impacts

High Tide Flooding

- The number of buildings exposed to high tide flooding **daily more than triples between 2050 (51 buildings) and 2070 (185 buildings)**. The majority of these are residences.
- **In environmental justice communities, the number of buildings exposed to high tide flooding increases more than tenfold between 2030 (9) and 2070 (110).**
- **11 parks and open spaces** may be exposed to high tide flooding by 2030.
- Tidal flooding does not pose a significant risk to critical facilities in Saugus.





FLOOD IMPACTS

Stormwater Flooding

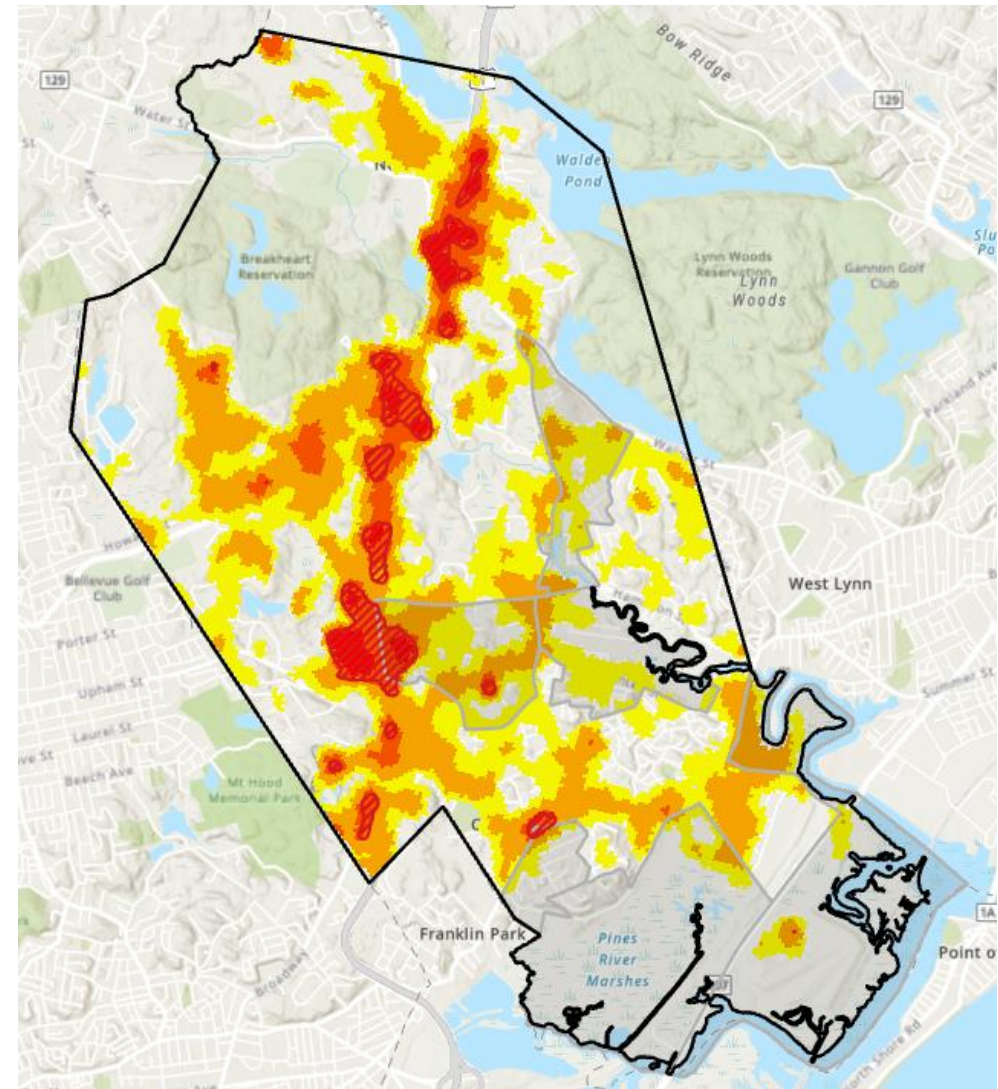
- **Inland flooding poses the greatest risk to critical assets in Saugus.** 28 critical assets are vulnerable to inland flooding greater than 0.5 feet deep during heavy rainfall events.
- **Over 160 buildings** including more than a dozen mobile homes and critical assets such as places of worship, post office headquarters, Saugus High/Middle School, Target, and Stop & Shop **may be vulnerable to inland flooding more than 3.0 feet deep during heavy rainfall events.**
- **24% of all buildings vulnerable to inland flooding more than 3.0 feet deep are within environmental justice communities.**
- Over 10 miles of roadway, including parts of **Broadway and Lynn Fells Parkway** may be inundated by more than 0.5 feet of flooding during heavy rainfall events.





Heat and Drought Impacts

- **Extreme heat is one of the leading causes of weather-related deaths** in the United States, claiming more lives in the US over the past 10 years than any other weather-related event.
- **Temperatures in Saugus are expected to rise, with average annual temperatures increasing up to 8.1 degrees F by 2070.** Areas far from waterways and with high proportions of impervious surfaces are more vulnerable.
- **By 2070, Saugus may experience up to 47 days per year that are over 90 degrees.**
- Nearly all (59 of 60) critical asset buildings in Saugus were found to be vulnerable to heat.
- **Despite overall increasing precipitation, more frequent and significant summer droughts are expected in the future.** Drought may have a profound impact on the wetland ecosystem of Rumney Marsh.



Map of Saugus hot spots identified by MAPC in 2016 and the [Urban Heat Island Severity Index \(2019\)](#) developed by the Trust for Public Land. This layer shows areas of Saugus that are hotter (on average) than the city as a whole.

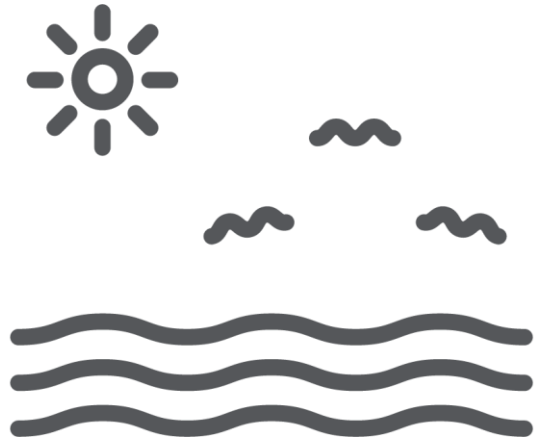


Severe Storm Impacts

- Although scientists agree on many climate change projections, more work remains to be done.
- Conclusive modeling is not yet available for some climate hazards including wind, ice and snow.
- However, all three of these hazards can be associated with changing precipitation patterns.
- **Currently, heavy snow and blizzards are considered high frequency events for Saugus, with a 20% chance of occurring each year.**
- **With climate change, warmer ocean waters and air will provide more fuel for severe winter storms like blizzards. While less snow may fall in total, more snow may fall at once.**

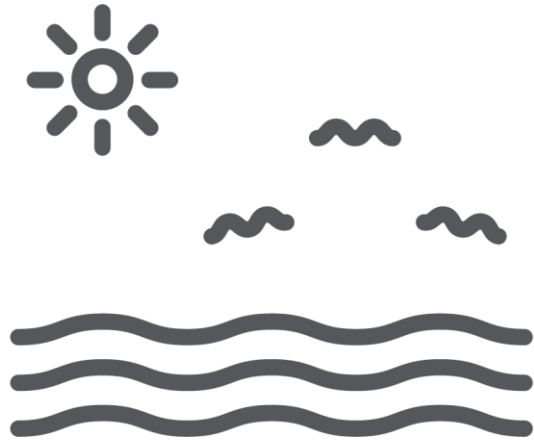


Why does this matter?



Living near the coast as part of tightknit community is what makes Saugus an appealing place to live.

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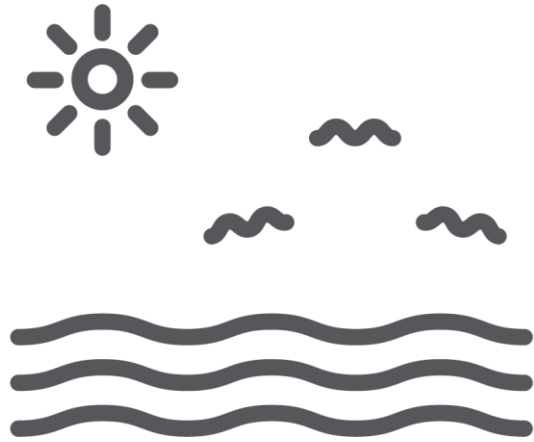


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Climate change is increasing sea-levels and causing storms, heat waves, droughts, and other events that we are not prepared for.

Why does this matter?



Living near the coast as part of **tightknit community** is what makes Saugus an appealing place to live.



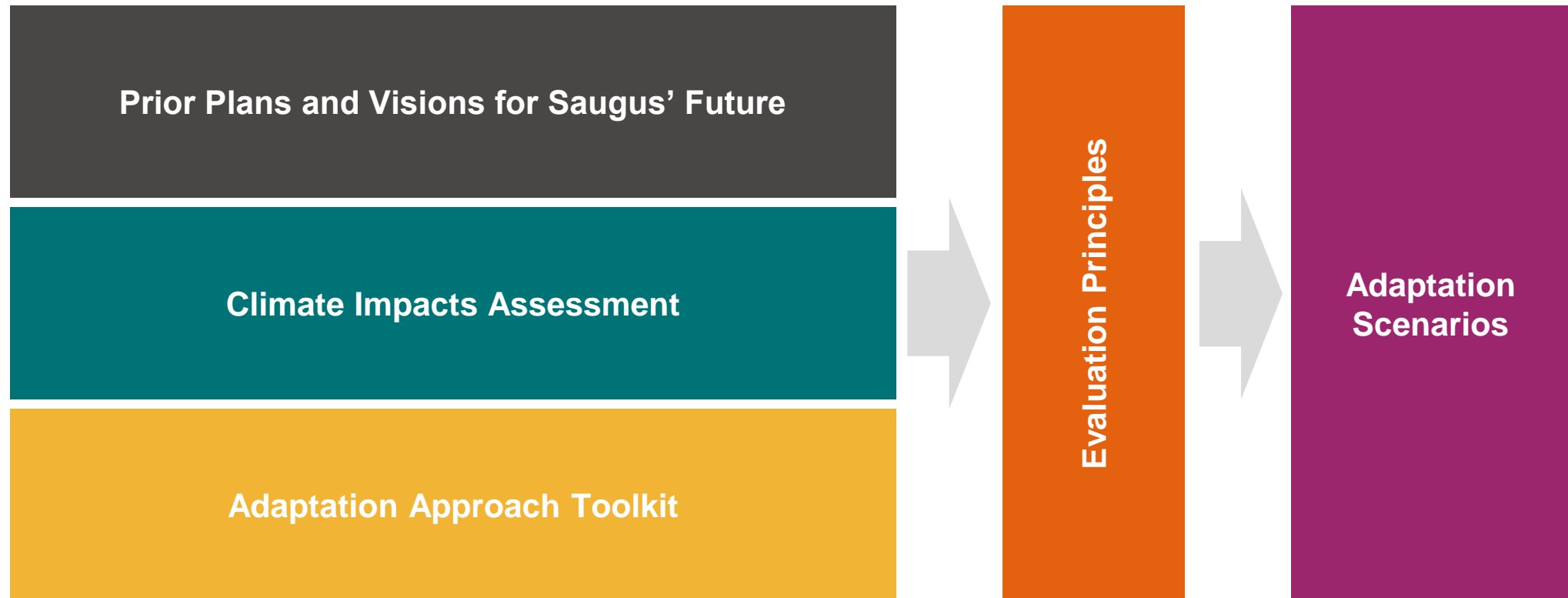
Climate change is increasing sea-levels and causing storms, heat waves, droughts, and other events that we are not prepared for.



We must **begin planning today** to adapt Saugus to climate change and ensure the town is **safe and resilient** for future generations.

Where are we headed?

Vision + Impacts + Toolkit = Adaptation Scenarios



Evaluation principles for scenario development

Effectiveness

Is the strategy effective at addressing coastal risks to homes, businesses, critical facilities, community assets, and infrastructure?

Feasibility

Can the strategy be implemented given technical, regulatory, funding, cost, community support, and operations and maintenance considerations?

Ecological and Public Health Benefits

What are the benefits of the strategy to the health of natural and human communities over time?

Equity and Quality of Life Benefits

Does the strategy improve quality of life and adding value for residents and visitors and in promoting community development?

Value Creation

Does the strategy create new opportunities and economic value for the community?

There are many ways to achieve resilience



ELEVATED SHORELINE



ADAPTED BUILDINGS AND INFRASTRUCTURE



TREE CANOPY



GREEN INFRASTRUCTURE



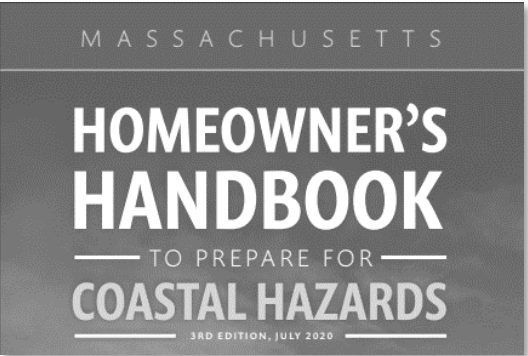
RELOCATING STRUCTURES



WATERFRONT PARKS AND BERMS

COMMUNITY EDUCATION AND ENGAGEMENT

UPDATED REGULATIONS AND BY-LAWS



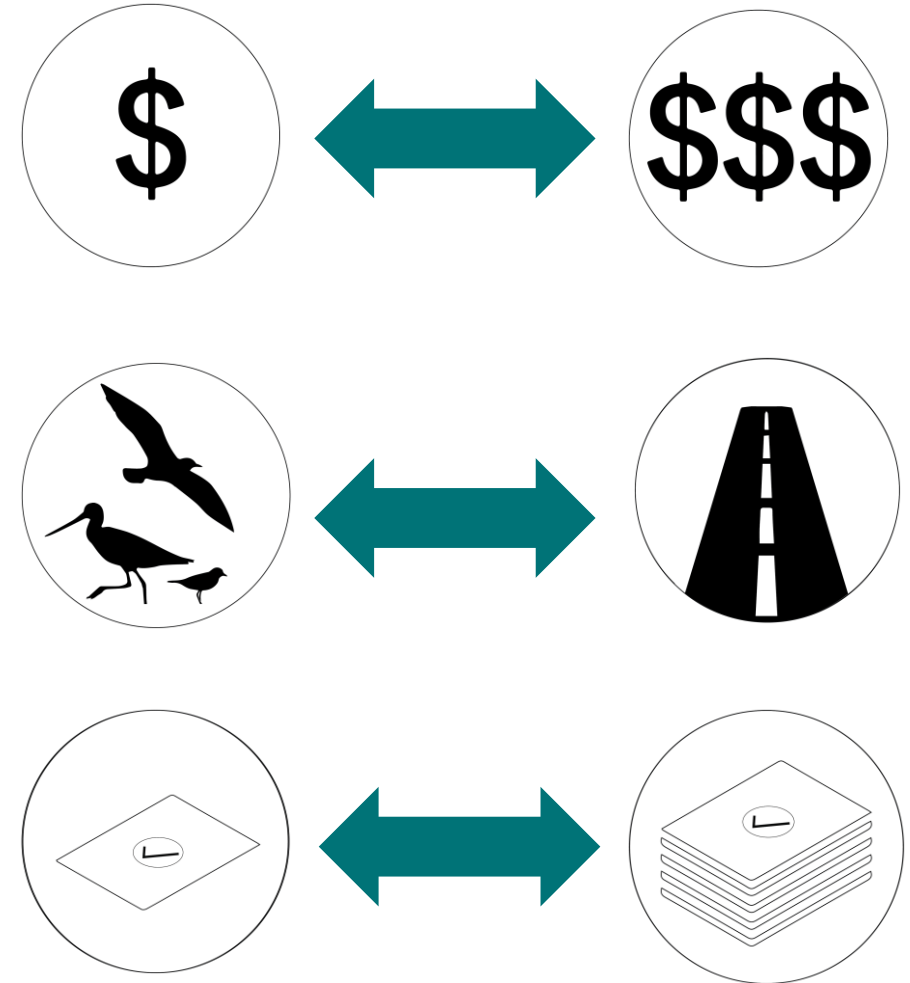
Examples of Climate Resilient Regulatory Language

Click below to see specific examples in each category.

Floodplain Overlay Districts	Floodplain Zoning Relief	Stormwater Regulations
Wetlands Regulations	Site Plan Review	Water Conservation Regulations
Tree Protection Regulations	Design Standards & Guidelines	Other Zoning Districts

Trade-Offs

- Each approach has benefits and trade-offs to keep in mind, including cost, effectiveness, impacts on community character, environmental impacts, and more
- To protect the things we love about Saugus, we will need to make hard decisions
- We need your help to determine what tradeoffs are acceptable (and where)



Q & A

Thank you!



MVP

Municipal Vulnerability
Preparedness

