

NEWEA 2019 Spring Meeting and Exhibit

Advancing Statewide Risk Reduction and Resilience in Massachusetts

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June 5, 2019

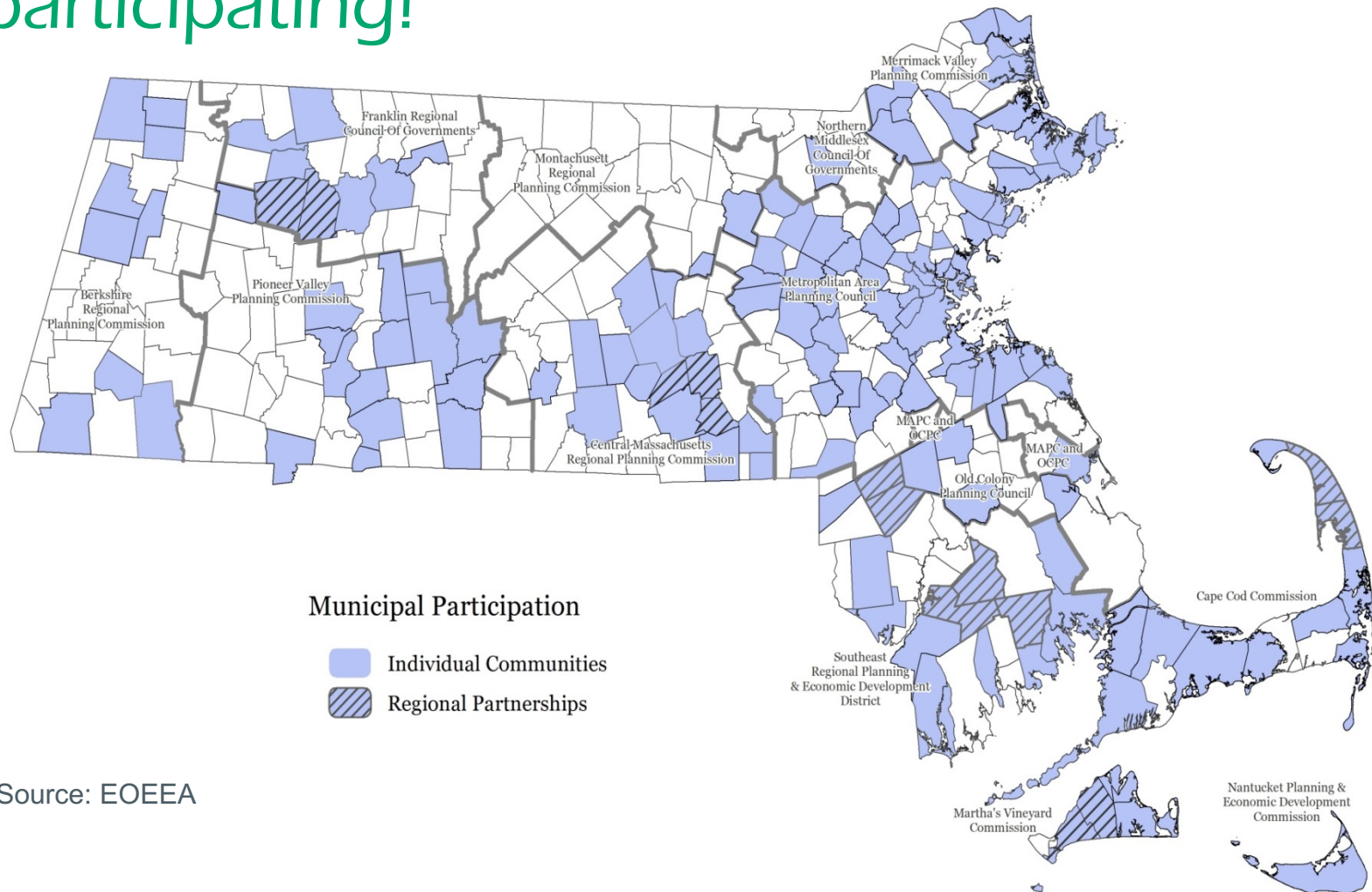
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Overview of Recent and Ongoing Programs and Initiatives in Massachusetts

- Executive Order 569: Establishing an Integrated Climate Change Strategy for the Commonwealth
- Environmental Bond Bill signed into law August 2018
- Governor Baker's *Senate Bill 10: An Act Providing for Climate Change Adaptation Infrastructure Investments in the Commonwealth*
- Statewide downscaled climate change projections
- Expansion of Coastal Resilience Grant Program
- Expansion of Municipal Vulnerability Preparedness Program

Municipal Vulnerability Preparedness Program

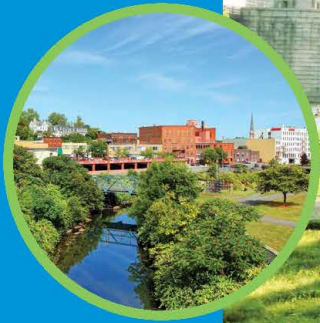
Over half of the State's communities are participating!



Source: EOEEA

Massachusetts State Hazard Mitigation and Climate Adaptation Plan

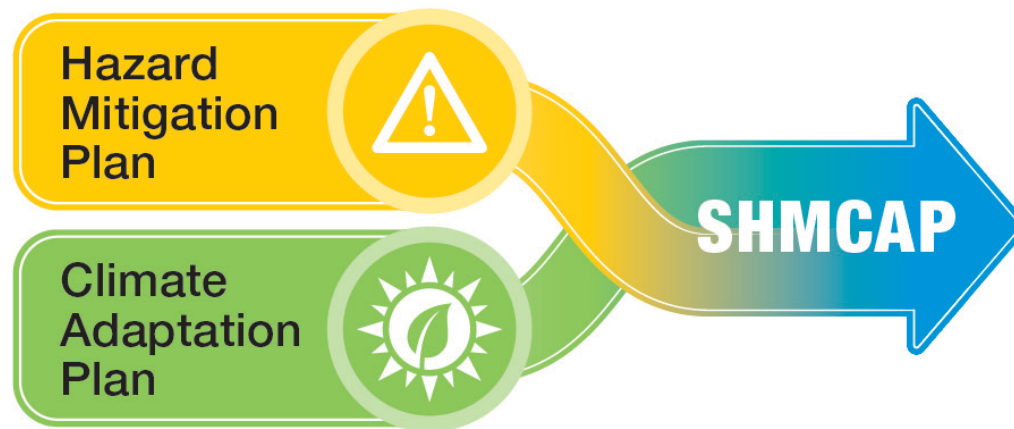
September 2018



EXECUTIVE SUMMARY

First-of-its-Kind Integrated State Plan

Innovative, first-of-its-kind statewide plan that fully integrates traditional hazard mitigation plan with climate change adaptation plan



First-of-its-Kind Integrated State Plan

Updates 2013 Massachusetts State Hazard Mitigation Plan

Fulfills requirements for Executive Order 569 climate adaptation plan



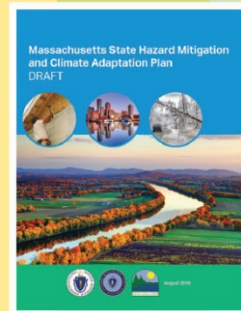
Eligibility for Federal Disaster Mitigation Funding

As a condition of receiving non-emergency Stafford Act assistance and Federal Emergency Management Agency (FEMA) disaster mitigation grants, states are required to have an approved State Mitigation Plan following the criteria established in 44 CFR §201.4, including requirements to address the projected effects of climate change on hazard risks.



Compliance with Governor Baker's Executive Order 569

Executive Order 569 directs the Executive Office of Energy and Environmental Affairs (EOEEA) and the Executive Office of Public Safety and Security (EOPSS) to coordinate efforts across the Commonwealth to strengthen the resilience of communities, prepare for the impacts of climate change, and proactively plan for and mitigate damage from extreme weather events, including publishing a climate adaptation plan that outlines a statewide strategy to address these impacts through adaptation and resiliency measures and policies.

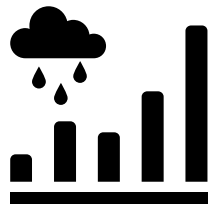


Stakeholder Driven Process

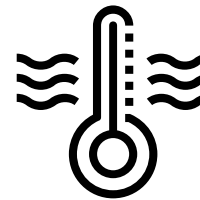


Climate change is already intensifying natural hazards

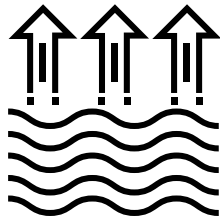
Projected impacts to the Commonwealth:



Changes in Precipitation



Rising Temperatures



Sea Level Rise



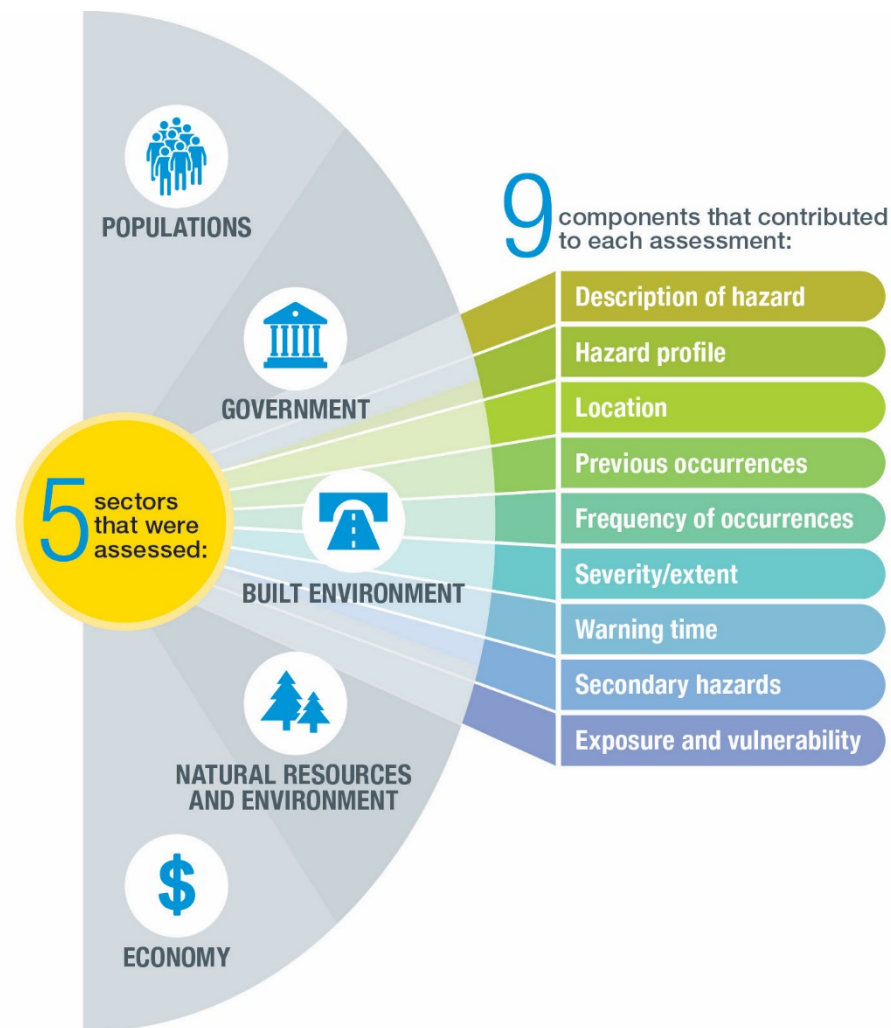
Extreme Weather

Our risks and vulnerabilities

- State resources and agencies will be affected by climate change and exacerbation of natural hazards
- Degree of exposure and consequences will vary across the Commonwealth

The risk assessment:

- Includes **five key sectors**
- Incorporates **best scientific data** available
- Includes information from **~80 state agency** climate change vulnerability assessments



Our risks and vulnerabilities



Inland Flooding



Tsunami



Severe Winter Storm



Drought



**Average/Extreme
Temperatures**



Tornadoes

Our risks and vulnerabilities



Landslide



Wildfires



Other Severe Weather



Coastal Flooding



Invasive Species



Earthquake



Coastal Erosion



Hurricanes/Tropical Storms



INLAND FLOODING

CAUSE	MOST AT-RISK LOCATIONS	HISTORIC FREQUENCY
In Massachusetts, flooding is caused by Nor'easters, ice jams hurricanes/tropical storms, or other heavy precipitation events. Spring snowmelt, rain on snow or frozen ground, impervious surfaces, and steep slopes with minimal soil can exacerbate flooding.	Between 1954 and 2017, Essex County experienced the most FEMA flood disaster declarations (18), followed by Norfolk County with 16.	Based on historical disaster declarations, the Commonwealth experiences a substantial flood event once every 3 years.

Potential Effects of Climate Change

	CHANGES IN PRECIPITATION → MORE INTENSE AND FREQUENT DOWNPOURS	More intense downpours often lead to inland flooding as soils become saturated and stop absorbing more water, river flows rise, and urban stormwater systems become overwhelmed. Flooding may occur as a result of heavy rainfall, snowmelt or coastal flooding associated with high wind and storm surge.
	EXTREME WEATHER → MORE FREQUENT SEVERE STORMS	Climate change is expected to result in an increased frequency of severe storm events. This would directly increase the frequency of flooding events, and could increase the chance that subsequent precipitation will cause flooding if water stages are still elevated.
	CHANGES IN PRECIPITATION → EPISODIC DROUGHTS	Vegetated ground cover has been shown to significantly reduce runoff. If drought causes vegetation to die off, this flood-mitigating capacity is diminished.

Exposure and Vulnerability by Key Sector

	POPULATIONS	General At-Risk Population: Populations living in or near floodplain areas; people traveling in flooded areas or living in urban areas with poor stormwater drainage. Vulnerable Populations: Populations with low socioeconomic status who may consider the economic impacts of evacuating; people over age 65 who may require medical attention; households with young children who have difficulty evacuating; populations with low English language fluency who may not receive or understand warnings to evacuate.
	GOVERNMENT	According to the DCAMM facility inventory, 196 state facilities are exposed to the inland flooding hazard. Middlesex County contains the most state-owned buildings exposed to this hazard (64), followed by Norfolk (26) and Hampshire (25) Counties.
	BUILT ENVIRONMENT	Twenty-five critical facilities, including 10 police facilities and 6 military facilities, are exposed to the inland flooding hazard. The greatest proportion of these facilities occurs in Middlesex County (8). Flooding can also wash out sections of roadway and bridges, as well as cause extensive damage to utilities and disruption of critical services, such as liquid fuel delivery, non-emergency health care services, and child care. Increased river flooding is likely to cause soil erosion, soil loss, and crop damage. Stormwater drainage systems and culverts that are not sized to accommodate larger storms are likely to experience flood damage as extreme precipitation events increase.
	NATURAL RESOURCES AND ENVIRONMENT	Severe floods cause a wide range of environmental impacts. Animals can lose their habitats if habitat elements are swept away or destroyed. Riverbank and soil erosion transform existing habitats and deposit sediment in downstream areas. If high levels of nutrients are present in the soil, this can also lead to eutrophication in downstream ecosystems.
	ECONOMY	Economic losses due to a flood include, but are not limited to damages to buildings (and their contents) and infrastructure, agricultural losses, business interruption (including loss of wages), impacts on tourism, and tax base. Using building replacement value as a proxy for economic exposure, Middlesex, Essex and Norfolk Counties are the most economically exposed to this hazard.

Our Strategy Actions

- Identified for all Executive Offices and more than 20 state agencies
- Address issues identified in risk assessment
- Include completion time frame, lead agency, agency priority score, and possible funding sources



Our Strategy

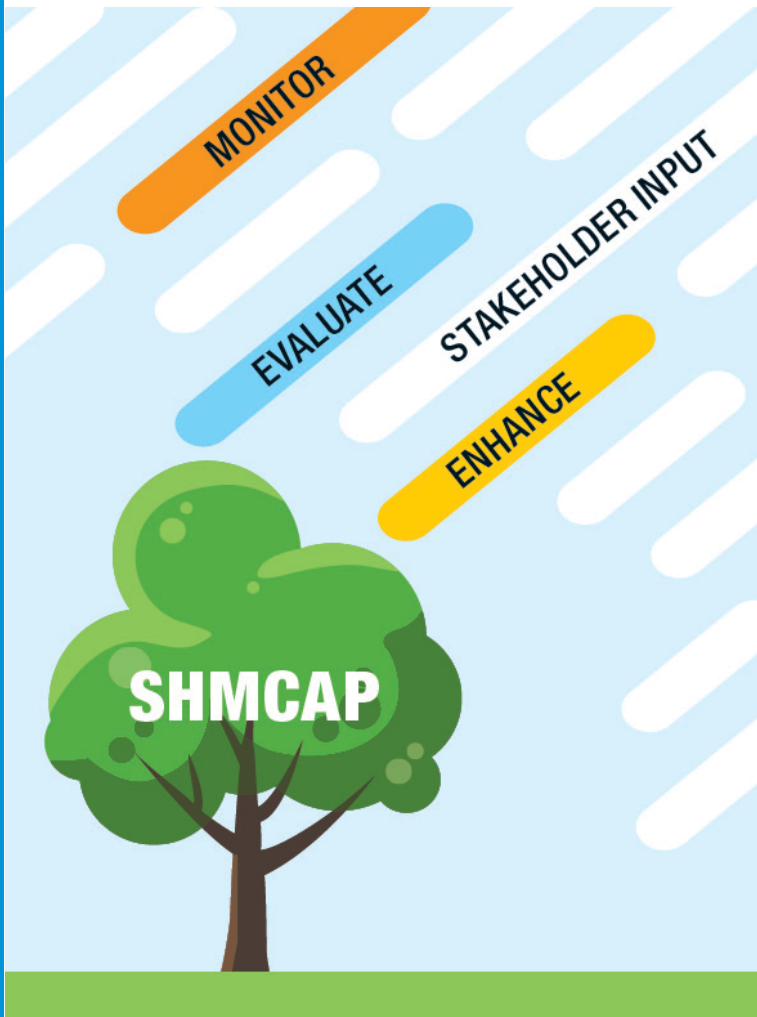
Example Global/Cross-Cutting Hazard Mitigation and Climate Adaptation Actions

ACTION	EXECUTIVE OFFICE / LEAD AGENCY	COMPLETION TIME FRAME
Incorporate climate change adaptation standards into budgeting, coordinating administrative functions, and planning.	A&F	3-5 years
Incorporate hazard and climate change vulnerability into personnel and workplace policies, training, and guidance, as appropriate.	A&F / HRD	3-5 years
Power system planning that incorporates climate change risk.	EOEEA / DPU	3-5 years
Create and deploy a SHMCAP project database.	EOEEA	3-5 years
Develop climate change design standards.	EOEEA	3-5 years
Maintain and enhance climate change projections and specific climate change data sets to support different groups of end users.	EOEEA	3-5 years

A Living Plan

SHMCAP is a living document.

- Will maintain relevancy, evaluate progress, and improve long-term resiliency
- Evolve as specific hazard mitigation and climate adaptation actions are implemented
- Will respond to ongoing dialogue with stakeholders



Update on Implementation

- Resilient MA Action Team (RMAT) established
- RMAT Technical Assistance RFR
- Reflected in the FY 2020 CIP
- Integrating material from the SHMCAP into the MA Climate Change Clearinghouse (<http://resilientMA.org>)
- Agencies proceeding with implementation of actions:
 - DCR: Upgrading/strengthening New Charles River and Amelia Earhart Dams
 - DHCD: Conducting a vulnerability assessment of housing stock
 - MassDOT: Progressing with the Massachusetts Coastline Flood Risk Model and updating culvert standards/criteria
 - EOEEA: Accelerating implementation of priority actions identified through the Municipal Vulnerability Preparedness program and increasing participation in planning program

Key Takeaways

- Get key decision-makers involved in the process early
- Robust stakeholder engagement leads to a successful plan
- Establish criticality thresholds; not everything is urgent
- Standalone executive summary is a wise investment



FEMA-Approved and Award-Winning

“Kudos for the complete inclusion of Climate Adaptation. I don’t know if any other state has taken such a bold and necessary step.”

“The plan is very well written and organized [and] incredibly thorough and comprehensive.”

“Various social vulnerabilities are identified and assessed... leading to a much more comprehensive analysis of risk and potential impacts to different populations.”



Business Achievement



Acknowledgements

- Governor Charlie Baker
- Sarah White (MEMA) and Katie Theoharides (EOEEA)
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