Climate Change & the Commonwealth

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MA Executive Office of Energy and Environmental Affairs
## Climate Change in Massachusetts

<table>
<thead>
<tr>
<th>Metric</th>
<th>Observed</th>
<th>By the 2090s</th>
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<tbody>
<tr>
<td>Temperature</td>
<td>2.9°F Since 1895 (Statewide)</td>
<td>7.2°F Average Annual; Range: 4 to 11°F</td>
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<tr>
<td>90°F Days</td>
<td>11 Climate Ready Boston</td>
<td>25-90 Climate Ready Boston</td>
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<tr>
<td>Sea Level Rise</td>
<td>11 inches Since 1922 (Boston)</td>
<td>4 to 10.2 feet Relative to mean sea level - 2000</td>
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<td>Heavy Precipitation</td>
<td>55% Since 1958</td>
<td>47% Annual increase in 2” precipitation days</td>
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Source: Climate Science Special Report, 2017; NOAA NCEI ClimDiv; NOAA Ocean Service
Executive Order 569 – 2016

- Comprehensive approach to reduce GHG emissions to combat climate change and prepare for the impacts of climate change
  - State Adaptation Plan
  - Climate Coordinators
  - Agency Vulnerability Assessments
  - Municipal Support

Environmental Bond – 2018

- $2.4 billion bond bill with focus on climate change resiliency
- Over $200 million authorized for climate change adaptation
- Codifies EO 569, including the MVP Program
Massachusetts State Hazard Mitigation and Climate Adaptation Plan (SHMCAP) - September 2018

14 hazards

- Over $9.1M in damages/year, 2007-2014
- On average, 6 events/year, 2009-2018
- 200+ critical facilities in tornado hazard zones

108 actions, including:

- Develop climate change design standards
- Maintain and enhance climate change projections
- Incorporate climate effects into capital planning functions
- Create MA Coastal Flood Risk Model

- Inland flooding
- Drought
- Landslide
- Coastal flooding
- Coastal erosion
- Tsunami
- Extreme temperatures
- Wildfire
- Invasive species
- Hurricanes/Tropical storms
- Severe winter storms / Nor’easters
- Tornadoes
- Other severe weather
- Earthquakes
SHMCAP Implementation

Leading by example → ResilientMA Action Team (RMAT)

Local partnerships → Municipal Vulnerability Preparedness Program (MVP)
Municipal Vulnerability Preparedness (MVP) Program

A state and local partnership to build resilience to climate change by building capacity to respond to climate effects at the local level and pilot innovative adaptation practice.

Across the Commonwealth, cities and towns need financial and technical resources to prepare their residents, businesses, and aging infrastructure:

- 300 high-hazard dams
- 12,000+ culverts and small bridges needing replacement
- 1,100 municipally-owned coastal structures
MVP Principles

A community-led, accessible process that

- Employs local knowledge and buy-in
- Utilizes partnerships and leverages existing efforts
- Is based in best available climate projections and data
- Incorporates principles of nature-based solutions
- Demonstrates pilot potential and is proactive
- Reaches and responds to risks faced by EJ communities and vulnerable populations

Why nature-based?
Where appropriate, nature-based solutions can be more cost-effective, protect water quality and quantity, sustain lands that provide food and recreation opportunities, reduce erosion, and minimize temperature increases associated with developed areas and climate change.
MVP Resources

MVP Planning Grant
- $15,000–$100,000 per plan
- Some expanded scopes
- $1M available

MVP Action Grant
- Open to MVP communities
- $25,000–$2M per project, up to $5M for regional projects
- $10M available

*Next funding round anticipated Spring 2020 for projects completed 7/1/20–6/30/21
MVP Resources

Municipal Vulnerability Preparedness
Our cities and towns are on the front lines of climate change. The new MVP program from the Executive Office of Energy and Environmental Affairs works with communities across the state to decrease risk, build resilience, and identify strengths and opportunities through targeted planning and action.
MVP Designations
71% of the Commonwealth
249 communities

Action Grant Projects
FY 18: 37
FY 19: 36
FY 20: 110 applications received for a $30M+ funding request

Total Awards
$17M+ in planning and action grants to date
MVP: What we’re hearing - MVP Planning Reports

Top Hazards

1. **Freshwater flooding**
   - Extreme precipitation and precipitation-induced flooding, ice jams, dam failures

2. **Severe winter storms**
   - Snow/Ice storms, Nor'easters

3. **Extreme/ higher temperatures**
   - Extreme heat, extreme cold, average higher temperatures

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MVP Planning Reports

1. Freshwater Flooding
2. Severe Winter Storms
3. Extreme/Higher Temperatures

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1. Freshwater Flooding
2. Severe Winter Storms
3. Extreme/Higher Temperatures
4. Average/Extreme Temperatures
5. Other Severe Weather
6. Drought
7. Coastal Flooding
8. Hurricanes/Tropical Storms
9. Wildfires
10. Ecological Changes
11. Coastal Erosion
12. Tornadoes
13. Landslide
14. Tsunami

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**DRAFT – IN PROGRESS**
MVP: What we’re hearing - MVP Planning Reports

Municipal Priorities

- Vulnerable populations
- Stormwater management
- Roadways

Top Vulnerabilities

- Regulations, zoning, and policy
- Data and maps
- Emergency management and preparedness

Top Priority Actions

Vulnerabilities
Priority Actions

DRAFT – IN PROGRESS
MVP Action Grants: Project Types

1. Detailed Vulnerability and Risk Assessment
   - Community Outreach and Education
   - Local Bylaws, Ordinances, Plans, and Other Management Measures


3. Redesigns and Retrofits
   - Nature-Based, Infrastructure and Technology Solutions to Reduce Vulnerability to Extreme Heat and Poor Air Quality

*Most common project type
**Second-most common project type
***Third-most common project type
MVP Action Grants: Project Types (cont.)

- Nature-Based Solutions to Reduce Vulnerability to other Climate Change Impacts
- Ecological Restoration and Habitat Management to Increase Resiliency

NEW IN 2019

- Energy Resilience
- Chemical Safety
- Land Acquisition for Resilience
- Subsidized Low-Income Housing Resilience Strategies
- Mosquito Control Districts
+ Expanded eligibility of project location
Nature-Based Solutions

- Concord: Reforestation and municipal tree resilience
- Essex, Ipswich, Newbury (Regional): Sedimentation study
- Falmouth: River restoration
- Millbury: Green infrastructure in downtown revitalization
- Northampton: Detaining, retaining, treating stormwater with green infrastructure
- Oak Bluffs: Beach nourishment
- Southwick: Stream crossing replacement with upstream nature-based flood mitigation measures
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Example Action Grant Projects

**Boston**

**PROJECT TYPE: Local Bylaws, Ordinances, Plans, and Other Management Measures**

Developing its first ever resilient building code so that development in the future floodplain is prepared for at least three feet of sea level rise, the likely scenario by late century.

**PROJECT TYPE: Redesigns and Retrofits**

Retrofitting a major waterfront park into a legacy park that uses nature-based solutions to address climate vulnerabilities while providing important access to recreation for residents.
Example Action Grant Projects
Land Acquisition for Resilience

Mattapoisett

Purchasing 120 acres of forest, streams, freshwater wetlands and coastal salt marsh as conservation land to prevent development in vulnerable areas

Data utilization
Proactive
Example Action Grant Projects

Redesigns and Retrofits

**Pittsfield**

Implementing a priority culvert replacement and right-sizing project for increased flood resilience

Proactive approach

Design & Construction
Integrating low impact development standards into local bylaws and subdivision regulations

- Parking areas shall be strongly encouraged to be designed to include landscaping to include low impact development techniques.

- Surface parking lots with over 15 parking spaces serving uses located in Highway Business or General Business Districts must have at least one shade tree (minimum two-inch caliper) for every 15 provided parking spaces.

- Total impervious area on any given site shall be minimized as possible through the use of natural plantings and construction of Low Impact Development best management practices.
MVP Next Steps

1. Municipal MVP trainings
   1/23 Webinar (POSTED ON MASS.GOV)
   2/4 Holyoke, MA
   2/13 Pittsfield, MA

2. Regional Coordinator Support
   Pre-application meetings
   Case studies and best practices to be MVP-competitive

3. Development of improved project evaluation criteria
   For social and resilience impact

4. Spring 2020 Funding Round
   Anticipated for projects beginning 7/1/20 through 6/30/21
RMAT: Resilient MA Action Team

Responsible for the State Hazard Mitigation and Climate Adaptation Plan (SHMCAP) implementation, monitoring, and maintenance, with representatives from each Secretariat and key state agencies.

**Climate Change Coordinator Responsibilities:**

- Participate in quarterly meetings, annual and post-disaster plan reviews, and 5-year updates
- Coordinate completion of required actions for each Executive Office
- Ensure new data is incorporated into the SHMCAP
- Increase general understanding of the SHMCAP through outreach, engagement, socializing the CC Clearinghouse
- Build collaborative partnerships to implement the SHMCAP
- Lead the SHMCAP’s 5 year update
A First-of-its-Kind Integrated State Plan

The 2018 State Hazard Mitigation and Climate Adaptation Plan (SHMCAP) expands upon the previous planning efforts of the Commonwealth's 2013 State Hazard Mitigation Plan and the 2011 Massachusetts Climate Change Adaptation Report. It accounts for projected changes in precipitation, temperature, sea level rise, and other aspects of climate change and includes recommendations for adaptation strategies.
Massachusetts State Hazard Mitigation & Climate Adaptation Plan

SHMCAP Action Tracker

State agencies identified over 100 initial priority actions to increase resilience and overcome the Commonwealth’s risks and vulnerabilities related to natural hazards and projected climate changes. SHMCAP actions can be sorted and viewed in multiple ways. The tracker is maintained by the State and contains a list of actions identified through the 2018 SHMCAP planning process as well as through the ongoing SHMCAP implementation process led by the Resilient Massachusetts Action Team (RMAT). Included are “global” actions that are intended to reduce risk across State government and the Commonwealth. All actions address at least one of the primary climate change interactions and associated climate change impacts identified in the risk assessment. Each action includes specific details, such as completion time frame, lead agency, agency priority score, and possible funding sources.

Actions

A&F: Budgeting, coordinating administrative functions, and planning.
Incorporate climate change vulnerability, resiliency, and adaptation standards into budgeting, coordination, and capital planning. Read More.

DCAMM: Incorporate hazard and climate change vulnerability into capital planning, master planning, and facilities management functions.
Incorporate climate change vulnerability, resiliency, and adaptation standards into capital planning for new projects; refer to agency climate change vulnerability assessments in master
Climate Resilience Standards & Capital Planning Tools for State Agencies

- translate climate science into actionable resilience standards
- provide an accessible web-based tool for use by various audiences
- integrate resiliency benefits into capital planning process throughout agencies
- provide a replicable methodology and a framework that can adapt over time

**KEY THEMES**

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<th>Integration</th>
<th>Action Oriented</th>
<th>Science Based</th>
<th>Adaptable</th>
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<td>Incorporate existing practices and procedures to promote consistent climate resilience strategy throughout the Commonwealth</td>
<td>Establish clear, pragmatic guidance and standards that can be applied to diverse set of project types with physical assets</td>
<td>Produce objective, replicable results grounded in scientific methodology and using best available data</td>
<td>Develop deliverables that work for current and future projects across State Agencies and multiple climate hazards</td>
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Developing climate resilience standards
Building on success of existing programs like MVP: Proposed new source of revenue for loans, grants, and technical assistance to municipalities and regional partnerships for priority adaptation projects

- Proposed deeds excise increase → est. $137M annually to the Global Warming Solutions Trust Fund
- Recurring, long-term revenue stream for multi-year project feasibility

Next Steps

Bill S.10:
An Act for Climate Change Adaptation Infrastructure Investments in the Commonwealth