

Climate Change & the Commonwealth

Mia Mansfield, Director of Climate Adaptation and Resilience MA Executive Office of Energy and Environmental Affairs





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	Inland flooding
damages/year	, Drought
2007-2014	Landslide
On average,	Coastal flooding
6 events/year,	Coastal erosion
2009-2018	Tsunami
	Extremetemperatures
	Wildfire
	Invasive species
H	urricanes/Tropical storms
200+ critical Severew	vinter storms / Nor'easters
facilities in	Tornadoes

facilities in Tornadoes tornado Other severe weather hazard zones Earthquakes

Hazard Mitigation Plan Climate Adaptation Plan

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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

SHMCAP Implementation







Municipal Vulnerability Preparedness Program (MVP)

Three Years of MVP

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

Freshwater flooding

Extreme precipitation and precipitation-induced flooding, ice jams, dam failures

Severe winter storms

Snow/Ice storms, Nor'easters

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3 Extreme/higher temperatures

Extreme heat, extreme cold, average higher temperatures



MVP: What we're hearing - MVP Planning Reports **Municipal Priorities**



MVP Action Grants: Project Types

- Detailed Vulnerability and Risk Assessment*
- Community Outreach and Education
- Local Bylaws, Ordinances, Plans, and Other Management Measures
- Redesigns and Retrofits***
- Nature-Based Flood Protection, Drought Mitigation, Water Quality, and Water Infiltration Techniques**
- 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

Action Grants – Funding by Project Type

FY 18-19 FY 19-20



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



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



FY18 Action Grant Projects

Local Bylaws and other Management Measures

Integration of Low Impact Development Standards into Local Bylaws and Subdivision Regulations

Mendon



Project Priority:

To integrate 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

Example Action Grant Projects

Redesigns and Retrofits Nature-Based Flood Protection

Boston



Retrofitting a major waterfront park into a legacy park that uses naturebased solutions to address climate vulnerabilities while providing important access to recreation for residents.



Example Action Grant Projects

Nature-Based Flood Protection, Drought Prevention, Water Quality, and Water Infiltration Techniques

Millbury



Utilizing green infrastructure like stormwater planters, bioretention bump outs, rain gardens, and other measures like porous pavers and pervious pavement to reduce heat island effects and stormwater runoff into the Blackstone River.



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

> RMATTechnical Advisor (Aug 2019-2021)

Climate Change Coordinator Responsibilities:

- Participate in quarterly meetings, annual and postdisaster 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



RMAT: The first year



Massachusetts

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Massachusetts State Hazard Mitigation & Climate Adaptation Plan | FULL PLAN V PLAN HIGHLIGHTS V



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,



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Resilience Standards & Capital Planning Evaluation





provide an accessible webbased 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

Integration

Incorporate existing practices and procedures to promote consistent climate resilience strategy throughout the Commonwealth

Action Oriented

Establish clear, pragmatic

types with physical assets

quidance and standards

that can be applied to

diverse set of project

Science Based

Adaptable

Produce objective, replicable results grounded in scientific methodology and using best available data Develop deliverables that work for current and future projects across State Agencies and multiple climate hazards





Stakeholder Engagement & Working Groups



DEVELOPING CLIMATE RESILIENCE STANDARDS

ASSET CLASSIFICATION – 3 LARGE CATEGORIES



Buildings / Facilities

- Public Health
- Maintenance
- Education
- Government
- Office



Transportation Infrastructure

- Roadway
- Bridge
- Tunnel
- Rail
- Utility Infrastructure
- Dam, seawall, levee



Natural Resources

- Recreation Space
- Conservation Space
- Water supply
- Environmental Resource
 Area

DRAFT - IN PROGRESS

Green Infrastructure

FIND REPRESENTATIVE CASE STUDIES FOR EACH CATEGORY

Proposed Approach



TIERED METHODOLOGY FOR STANDARDS

TRANSLATE CLIMATE PARAMETERS INTO DESIGN CRITERIA BASED ON RISK







Collect additional field data (ex. stream flows, tide

Develop sitespecific climate model using available parameters

gauges)

Perform riskbased analysis to identify design criteria

Most level of effort required, ex.

- High criticality assets
- Substantial infrastructure
 investments



Use existing climate model data with a riskbased climate "factor of safety"

Tables with climate design criteria based on criticality and design life

Average level of effort required, ex.

- Service life < 50 years
- Limited public health/safety risk

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Where feasible, incorporate Tier 2 design standards If not feasible, use current design standards

Least level of effort required, ex.

- Temporary structures, service life < 10 years
- Green infrastructure projects

DRAFT – IN PROGRESS

Proposed Timeline

- Draft resilience standards and evaluation criteria vetted by working groups, stakeholders
- Piloting through grant programs & A&F
- RMAT Quarterly Meeting

- Resilient capital planning evaluation web-based tool utilized in FY22 Capital Budget and Grant Applications
- RMAT Quarterly Meeting



- Workplan finalization
- Agency working groups & Stakeholder engagement kick off
- RMAT Quarterly Meeting



- Resilience standards and evaluation criteria finalized with agency, stakeholder feedback
- Draft resilient capital planning evaluation web-based tool developed
- RMAT Quarterly Meeting

Next Steps: Climate Change & the Commonwealth

Bill S.10:

An Act for Climate Change Adaptation Infrastructure Investments in the Commonwealth

- 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 (\$1B in ten years)
 - Recurring, long-term revenue stream for multi-year project feasibility





USETT

Mia.mansfield@mass.gov https://www.mass.gov/municipal-vulnerabilitypreparedness-program

