Chapter 7. State Strategy, Actions, and Implementation Plan

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Abbreviations

GHG	Greenhouse gas
RMAT	Resilient Massachusetts Action Team
SHMCAP	State Hazard Mitigation and Climate Adaptation Plan

7.1 Introduction

This chapter presents the Commonwealth's strategy for hazard mitigation and climate adaptation through the implementation of actions developed by state agencies through the Resilient Massachusetts Action Team (RMAT) in collaboration with local municipalities, regional organizations, community organization representatives, and federal partners. This chapter is based on findings from Chapter 4 (State Capability and Adaptive Capacity Analysis), Chapter 5 (Risk Assessment), and Chapter 6 (State Agency Vulnerabilities). The strategy is built on the integration and collaboration of various actions to be taken at the state, regional, and local levels to advance hazard mitigation and climate adaptation. This chapter also presents the steps for implementation and ongoing plan maintenance, including future considerations for implementation pathways in addition to steps and a schedule for ongoing maintenance.

Together, the actions described present a comprehensive strategy for the Commonwealth: a means to reduce risk, mitigate hazards, protect populations, and ensure the implementation of an intentional and effective 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan (2023 MA SHMCAP).

7.1.1 2023 MA SHMCAP Strategy Mission and Goals

The RMAT developed the following mission and goals to guide the development and implementation of the 2023 MA SHMCAP.

The mission:

> *Increase the capacity of the Commonwealth to prepare for, mitigate against, adapt to, and reduce the risk of natural and other hazards and climate impacts through the development of a comprehensive and integrated hazard mitigation and climate change adaptation program. This program will prepare the Commonwealth to reduce risks from hazards and climate change impacts through an equitable and just approach to advance wellbeing in an equitable and sustainable manner; reduce loss of life; protect social, environmental, and economic wellbeing; and ensure health and safety of those living and visiting Massachusetts, including the built and natural environment that sustains it.*

The goals:

- **Collaboration, communication, funding, and engagement.** Strengthen collaboration, communication, and federal and non-federal funding strategies between state agencies, all levels of government (including Tribes, communities, and diverse partners). Work together to form strategic, effective, and inclusive policies, programs, funding, and projects that demonstrate a unity of government approach to address hazards that pose the most risk to the Commonwealth. Ensure the accessibility of this plan to all populations across the state to provide for an engaged, educated, aware, involved, and safe population, including language accessibility and environmental justice and other populations to empower them to take actions to mitigate risks and improve resilience.
- **Science-based and informed decision-making**. Develop programs to support, collect, and disseminate hazard and climate data and findings on frequency, intensity, and duration in the near, medium, and long terms to improve the effectiveness of mitigation and adaptation strategies and increase the capacity and participation of all sectors and scales.
- **Resilient state assets and services.** Reduce risks to critical natural and built state assets and services—including infrastructure, housing, public safety, and natural and cultural resources—to preserve and enhance safety, cultural assets, and quality of life. Reduce risks to critical assets and lifelines from high-consequence vulnerabilities such as high-hazard dams, inland and coastal flooding, wildfire, and extreme temperature through improved building codes; resilient design and build standards; land use and zoning requirements; and targeted conservation, restoration, and land management strategies. Measure progress through annual assessment of all state activities that will reduce risk using 2023 performance metrics.
- **Implement adaptation actions for communities and ecosystems.** Increase community resilience, environmental health, ecosystem functions, and biodiversity by implementing actions that can adapt over time to reduce increasing risks to the most vulnerable natural and human communities. Reduce risk of injury and loss of life by focusing on pre-disaster mitigation actions and prioritizing socially vulnerable or

underserved communities most at risk from all high-consequence vulnerabilities such as high-hazard dams, inland and coastal flooding, wildfire, and extreme temperature.

- **Climate mitigation.** Ensure that actions to reduce hazard and climate risks consider greenhouse gas (GHG) reduction and carbon sequestration and storage measures that would reduce climate change and therefore, its risks and impacts in alignment with the goals of the Commonwealth's 2025, 2030, and 2050 Clean Energy and Climate Plans. Ensure that nature-based solutions are prioritized and used where deemed effective. Measure progress through annual assessment of all state activities that will reduce risk using 2023 performance metrics.
- **Resilient and equitable infrastructure, ecosystems, and communities.** Promote meaningful and collaborative participation in and benefit from the 2023 MA SHMCAP to ensure a plan that provides risk reduction for the communities and assets that are most at risk based on social vulnerability factors and Risk Assessment findings. Hazard mitigation and climate adaptation actions should result in equitable community and environmental resilience for the natural and built environments, improve community safety and well-being, and address past disproportionate provision of burdens and benefits. Ensure that nature-based solutions are prioritized and used where deemed effective to promote community and ecosystem health in recognition that healthy ecosystems are critical to the provision of community and environmental resilience. Measure progress through annual assessment of all state activities that will reduce risk using 2023 performance metrics.

7.1.2 2023 MA SHMCAP Strategy Themes

The development of the 2023 MA SHMCAP benefited from ongoing key efforts designed by the state, including the RMAT, the inclusion of climate change in the 2018 MA SHMCAP, and the *2022 Massachusetts Climate Change Assessment* (MA Climate Assessment). As highlighted in Chapter 2 (Planning Process), state agencies in partnership with subject matter experts developed the 2023 MA SHMCAP building on these efforts and centering around the following themes:

- **Collaboration and support for a whole-of-government approach**. The need for robust collaboration among partners was acknowledged by all participants in the 2023 MA SHMCAP process. To better communicate the need for and commitment to partnership and collaboration, many of the actions are organized under action topics. These are actions that address similar risks and consequences but are led by different state agencies. For example, "Action Topic 1: Assess heat vulnerabilities, develop an outreach strategy, and address heat related human health risks" is presented under the state agency actions. This action topic is supported by four different actions led by four different state agencies within their areas of responsibility. Grouping these actions together, as well as identifying key partners for each individual action, makes the need for a whole-of-government approach to the risks posed to human health by extreme heat more apparent.

- **Focus on most consequential hazards.** Based on the Risk Assessment findings, the most consequential current and future hazards across the Commonwealth include inland flood risk caused by extreme precipitation, coastal flood risk caused by storm surge and sea level rise, extreme heat, and invasive species. Other hazards that are consequential regionally include coastal erosion and drought. The 2023 MA SHMCAP focuses on the most consequential statewide hazards by design and identifies actions that directly respond to priority impacts and vulnerabilities.
- **Resilience building through conservation, restoration, and management**. Given the state's wealth of natural features, including forests and coastlines, there is a great emphasis on protecting and conserving these resources. Many agencies and partners proposed actions related to conservation, restoration, and management strategies to reduce risks and provide social and ecological benefits. In addition to risk reduction, actions addressing natural and working lands can reduce greenhouse gas (GHG) emissions through compact development patterns, carbon storage and sequestration, and reduced energy and water demands.
- **Environmental justice and other priority populations**. Throughout nearly every stage of developing the 2023 MA SHMCAP, various agencies and partners identified the need to reduce risks to environmental justice and other priority populations, which are reflected in the actions.

These themes are reflected in Section 7.1.6 (Cross-government Actions) and Section 7.1.7 (State Agency Actions).

7.1.3 Future Considerations

Effective hazard mitigation and climate adaptation planning necessitates the evaluation and identification of potential gaps and strategic and inclusive means to address those gaps to increase resilience. Therefore, as the Commonwealth begins to implement the 2023 MA SHMCAP actions, the RMAT will evaluate opportunities to strengthen and support collaboration and partnership at all scales. Implementation pathways to further address these vulnerabilities may include engaging representatives, advocates, agencies, and subject matter experts to incorporate these vulnerabilities in existing actions (see below) and creating new actions during the annual maintenance meetings for the MA SHMCAP. Current actions that begin to address or could be expanded to address these impacts include:

- **Cross-government action**: Develop and implement new heat flag system.
- **Cross-government action**: Identify opportunities to improve cooling standards in buildings to address extreme heat impacts.
- **State agency action**: Provide municipal and local health climate equity training and technical support.
- **State agency action**: Implement resilience strategy at state-aided public housing.

7.1.4 Approach

Action development is a key component of designing and implementing an actionable and effective plan to mitigate hazards and impacts to communities throughout the Commonwealth. The 2023 MA SHMCAP development process led to the creation of two types of actions:

- **Cross-government actions.** These are cross-cutting agency actions that largely occur at a statewide scale and address multiple priority impacts and high-consequence vulnerabilities.
- **State agency actions.** These are specific actions to be taken by state agencies based on their mission.

The approach to developing the state agency actions for 2023 differed from the one used for the 2018 MA SHMCAP in that the priority impacts from the MA Climate Assessment and the high-consequence vulnerabilities from the 2023 Risk Assessment were used as the starting point of action development. Specifically, during the three rounds of action development, agencies were asked to consider which priority impacts and high-consequence vulnerabilities their actions addressed. As action development proceeded, agencies were asked to evaluate the gaps in priority impacts and consider ways to modify actions to align with the identified gaps. The process and sets for action development are summarized in Chapter 2 (Planning Process).

7.1.5 2023 MA SHMCAP Strategy

7.1.5.1 Overview of Hazard Mitigation and Climate Adaptation Actions

The 2023 MA SHMCAP Strategy is made up of different types of actions that are based on impacts and vulnerabilities, as well as an understanding of the issues and factors that contribute to those impacts and vulnerabilities. In some cases, Massachusetts has data and information to support taking direct actions, such as changing regulations, and codes, carrying out structure and infrastructure retrofits, or providing capital planning dollars to invest in resilience to state-owned buildings, infrastructure, lands, and waters. For example, agencies are aware of the need to address flood risks, water supply and quality concerns, and ecosystem damage associated with culverts, dams, and bridges and have developed actions to do so.

In other cases, more research, consensus-building, or planning and policy work to frame direct actions needs to occur. In those cases, actions such as assessments, research, modeling, outreach, education, and planning and policy development are the appropriate next steps.

Finally, the authority and responsibility of the state in hazard mitigation and climate adaptation planning means that, in some cases, the Commonwealth's appropriate role is to guide, fund, and provide technical assistance to support local, regional, community, and advocacy organizations. This includes developing state funding sources and seeking federal funding sources to support efforts at local and regional scales; providing technical assistance and support for municipalities that want to act but lack the capacity and capabilities to do so; and creating and sharing climate and hazard data, science, and modeling to support local and regional analysis. The 2023 MA SHMCAP Strategy includes many actions to support and catalyze local and regional actions. Through the implementation of the plan, this will ensure a whole-of-government approach to increasing resilience in the Commonwealth at the local, regional, and statewide scales.

7.1.5.2 Cross-Government Actions

The cross-government actions are characterized as multi-agency actions that rely heavily upon engagement, collaboration, and coordinated efforts. They focus on addressing gaps identified by RMAT participants, community focus groups, and municipal and non-governmental entities to mitigate hazards and increase resilience statewide.

There are a total of 15 cross-government actions, which are organized based on alignment with the 2023 MA SHMCAP goals, as presented in Table 7-1.

Table 7-1. Summary of Cross-Government Action Counts by Goal

Goal 1: Collaboration, Communication, Funding, and Engagement	Goal 2: Science-Based and Informed Decision-Making	Goal 3: Resilient State Assets and Services	Goal 4: Implement Adaptation Actions for Communities and Ecosystems	Goal 5: Climate mitigation	Goal 6: Resilient and Equitable Infrastructure, Ecosystems, and Communities
4	4	2	4	0	1

7.1.5.3 State Agency Actions

Priority impacts identified in the MA Climate Assessment and high-consequence vulnerabilities identified through the 2023 Risk Assessment are the organizing framework for the state agency actions presented in Section 7.1.7. There are a total of 127 state agency actions, which are organized first by the sectors from the MA Climate Assessment (human, infrastructure, natural environment, governance, and economy) and then by the priority impact or high-consequence vulnerability that is best addressed by the action.

7.1.6 Cross-Government Actions

The cross-government action developed by the RMAT for the 2023 MA SHMCAP are presented in the following pages.

Goal 1: Collaboration, Communication, Funding, and Engagement		
Cross-government ACTION 1: Convene a climate resilience stakeholder working group		
Create a Resilient Massachusetts Action Team subgroup to increase external stakeholder engagement and partnership for resilience programs.	**Lead(s) & Partner(s)**	**Hazard(s) Addressed**
	Leads: EEA, MEMA	All
	Priority Impact Addressed	**Timeframe**
	All	3 – 5 years
Cross-government ACTION 2: Increase funding to support municipal and agency resilience actions and access to funding opportunities		
Identify new and sustainable revenue streams to increase funding to municipal, agency, and NGO resilience actions. Develop a "one stop" funding portal for climate resilience-related state grant programs.	**Lead(s) & Partner(s)**	**Hazard(s) Addressed**
	Leads: EEA, A&F Partners: DPH	All
	Priority Impact Addressed	**Timeframe**
	Emergency Service Response Delays; Reduction in State and Municipal Revenues	Less than 3 years
Cross-government ACTION 3: Develop a framework for statewide resilience progress tracking		
Through a stakeholder process, identify statewide climate resilience goals and associated metrics that the Commonwealth can use to track progress statewide. These metrics should inform agency and municipal funding strategies and environmental permitting and reviews, including MEPA.	**Lead(s) & Partner(s)**	**Hazard(s) Addressed**
	Leads: EEA, Partners: MEMA, A&F	All
	Priority Impact Addressed	**Timeframe**
	Increase in demand for state and municipal government services	Less than 3 years
Cross-government ACTION 4: Launch a statewide Climate Communications Campaign		
Launch a statewide Climate Communications Campaign targeting climate action for decarbonization and resilience, sharing key findings from statewide reports, and expanding awareness of and access to resources for taking critical action.	**Lead(s) & Partner(s)**	**Hazard(s) Addressed**
	EEA	All
	Priority Impact Addressed	**Timeframe**
	Increase in demand for state and municipal government services	Less than 3 years

Goal 2: Science-Based and Informed Decision-Making		
Cross-government ACTION 5: Launch an Office of Climate Science		
Launch an office of climate science that serves as an authoritative resource and provides subject matter experts on statewide climate data and models and supports consistent application across agencies. Convene the academic climate science community and identify opportunities to partner with universities on climate science needs and next steps.	**Lead(s) & Partner(s)**	**Hazard(s) Addressed**
	Lead: EEA Partners: TSS, MassDOT, DMF	All
	Priority Impact Addressed	**Timeframe**
	Increase in Demand for State and Municipal Government Services	Less than 3 years
Cross-government ACTION 6: Create a tool for loss avoidance studies and future mitigation projects		
Create a tool for Loss Avoidance Studies to advance understanding of the effectiveness of local and state level hazard mitigation and climate adaptation work. The tool will also aid in the development of state and local cost-benefit analyses and identification of cost-effective mitigation projects.	**Lead(s) & Partner(s)**	**Hazard(s) Addressed**
	Lead: MEMA Partner: EEA	All
Other priority impacts addressed by action: Reduced ability to work; economic losses from commercial structure damage and business interruptions; damage to tourist attractions and recreation amenities; damage, disruption, or loss of coastal infrastructure such as seaports, airports, and maritime industries; and all priority impacts listed under the Governance sector.	**Priority Impact Addressed**	**Timeframe**
	Inability to carry out mission and services due to damage, disruption, or loss of state assets and services	Less than 3 years
Cross-government ACTION 7: Statewide Floodplain Regulatory and Coordination Framework		
Develop a statewide floodplain management framework that coordinates state floodplain development processes, as well as state agency collaboration for best floodplain management practices across the Commonwealth that considers climate change data and impacts. Identify best practices for municipalities to adopt to increase resilience standards for residential and/or non-residential construction in their communities. Advance opportunities within the building code to enhance resilience. Develop a Floodplain Management Plan that prioritizes actions that can be taken statewide to address and mitigate floods and their impacts.	**Lead(s) & Partner(s)**	**Hazard(s) Addressed**
	Lead: EEA Partners: DCR, other agencies	Inland flooding, coastal flooding and storm surge, dam overtopping, coastal erosion, groundwater rise, landslides, and other severe weather

Other priority impacts addressed by action: Emergency service response delays and evacuation disruptions; increase in costs of responding to climate migration; health effects from aeroallergens and mold; loss of life or injury due to high vulnerability dams, hurricanes, wildfires, extreme flooding, or extreme temperatures; increased risk of dam overtopping or failure; damage to inland buildings; increase in demand for state and municipal government services; damage to inland state and municipal buildings and land; and priority impacts listed under the Natural Environment sector.	**Priority Impact Addressed**	**Timeframe**
	Damage to Roads and Loss of Road Service; Increase in Need for State and Municipal Policy Review and Adaptation Coordination; Reduced Ability to Work	3-5 years
Cross-government ACTION 8: Enhance consideration of resilience in Develop a local option "Stretch Flood Code" for residential and/or non-residential construction		
Develop an appendix of above-code flood standards for integration to the statewide building code—also referred to as a "Stretch Flood Code"—which municipalities may voluntarily adopt to prescribe more resilient standards for residential and/or non-residential construction in their communities.	**Lead(s) & Partner(s)**	**Hazard(s) Addressed**
	Lead: EEA/EOED Partners: DCR, OPSI, DOER	Inland flooding, coastal flooding and storm surge, dam overtopping, coastal erosion, groundwater rise, landslides, and other severe weather
Other priority impacts addressed by action: Emergency service response delays and evacuation disruptions; increase in costs of responding to climate migration; health effects from aeroallergens and mold; loss of life or injury due to high vulnerability dams, hurricanes, wildfires, extreme flooding, or extreme temperatures; increased risk of dam overtopping or failure; damage to inland buildings; increase in demand for state and municipal government services; damage to inland state and municipal buildings and land; and priority impacts listed under the Natural Environment sector.	**Priority Impact Addressed**	**Timeframe**
	Health Effects of Extreme Storms and Power Outages	3-5 years

<table>
<tr><th colspan="3">Goal 3: Resilient State Assets and Services</th></tr>
<tr><td colspan="3">Cross-government ACTION 9: Expand evaluation of climate resilience for state capital investments</td></tr>
<tr><td rowspan="2">Expand utilization of the RMAT's Climate Resilience Design Standards Tool to ensure climate vulnerability and resilient design is an evaluation criterion in determining state capital planning processes.</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Lead: A&F
Partners: EEA, MEMA, EOED, MassDOT</td><td>All</td></tr>
<tr><td rowspan="2">Other priority impacts addressed by action: Damage to inland buildings; damage to coastal buildings and ports; reduced ability to work; damage, disruption, or loss of coastal infrastructure such as seaports, airports, and maritime industries; damage to inland state and municipal buildings and land; damage to coastal state and municipal buildings and land.</td><td>Priority Impact Addressed</td><td>Timeframe</td></tr>
<tr><td>Inability to carry out mission and services due to damage, disruption, or loss of state assets and services</td><td>Less than 3 years</td></tr>
<tr><td colspan="3">Cross-government ACTION 10: Formalize MEPA resiliency policy to ensure consideration of climate change during MEPA reviews</td></tr>
<tr><td rowspan="2">Expand application of the RMAT’s Climate Resilience Design Standards Tool to environmental permitting and reviews through MEPA process.</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Lead: EEA
Partners: DCR, MassDOT, EOED</td><td>All</td></tr>
<tr><td rowspan="2">Other priority impacts addressed by action: Damage to inland buildings; damage to coastal buildings and ports; reduced ability to work; damage to cultural resources; damage, disruption, or loss of coastal infrastructure such as seaports, airports, and maritime industries; damage to inland state and municipal buildings and land; damage to coastal state and municipal buildings and land; and priority impacts listed under the Natural Environment sector.</td><td>Priority Impact Addressed</td><td>Timeframe</td></tr>
<tr><td>Inability to carry out mission and services due to damage, disruption, or loss of state assets and services</td><td>Less than 3 years</td></tr>
<tr><th colspan="3">Goal 4: Implementation of Adaptation Actions for Communities and Ecosystems</th></tr>
<tr><td colspan="3">Cross-government ACTION 11: Develop and implement a new Heat Flag System</td></tr>
<tr><td rowspan="2">Identify methods to obtain additional data on heat and ways to effectively communicate heat risk to the public across agencies. Develop and implement new Heat Flag system in alignment with NOAA's Heat Advisory Criteria for New England, to identify days of extreme heat to urge preparedness and caution to people outdoors, particularly children, elderly.</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Lead: HHS
Partners: LWD, DPH, MEMA</td><td>Extreme temperatures</td></tr>
</table>

Other priority impacts addressed by action: Emergency service response delays and evacuation disruptions; increase in mental health stressors; disproportionate impacts on unhoused populations from extreme temperatures or extreme flooding; reduced ability to work.	**Priority Impact Addressed**	**Timeframe**
	Health and Cognitive Effects from Extreme Heat	Less than 3 years
Cross-government ACTION 12: Develop a coastal resilience strategy		
Develop a coastal resilience strategy that considers climate resilient development and standards in vulnerable areas, develops best practices for coastal adaptation, and explores managed retreat.	**Lead(s) & Partner(s)**	**Hazard(s) Addressed**
	Lead: EEA, CZM Partners: EOED, MassDOT, DMF, DER	Coastal erosion, coastal flooding and storm surge, hurricane/ tropical cyclone, landslide, other severe weather
Other priority impacts addressed by action: Coastal erosion; inability to carry out mission and services due to damage, disruption, or loss of state assets and services; damage, disruption, or loss of coastal infrastructure such as seaports, airports, and maritime industries; emergency service response delays and evacuation disruptions.	**Priority Impact Addressed**	**Timeframe**
	Damage to Coastal Buildings and Ports	Less than 3 years
Cross-government ACTION 13: Protect 30 percent of land and ocean by 2030 (to align with the global 30x30 goal)		
Implement EEA's Resilient Lands Initiative and incorporate the Healthy Soils Action Plan. Develop a statewide approach and collaborative efforts to preserve and enhance forest health and conservation to enhance resilience and provide carbon sinks for GHG mitigation, including coastal sources.	**Lead(s) & Partner(s)**	**Hazard(s) Addressed**
	Lead: EEA Partners: DCR, DMR, DER, DMF, DFG, MDAR	All
Other priority impacts addressed by action: Damage to inland buildings, damage to coastal buildings and ports; damage or loss to homes and critical facilities in the wildland urban interface; and all priority impacts in the Natural Environment sector.	**Priority Impact Addressed**	**Timeframe**
	Forest Health Degradation	5+ years
Cross-government ACTION 14: Identify opportunities to improve cooling standards in buildings to address extreme heat impacts.		
A multi-agency team will assess opportunities to promote cooling in residential buildings and mitigate extreme-heat risks to renters and remote workers.	**Lead(s) & Partner(s)**	**Hazard(s) Addressed**
	Lead: HHS / HLC Partners: LWD, DPH	Extreme temperatures
Other priority impacts addressed by action: Increase in need for state and municipal policy review and adaptation coordination; health effects from aeroallergens and mold; reduced ability to work.	**Priority Impact Addressed**	**Timeframe**
	Health and Cognitive Effects from Extreme Heat	Less than 3 years

<table>
<tr><th colspan="3">Goal 5: Consideration of Climate Mitigation (when designing hazard reduction actions)</th></tr>
<tr><td colspan="3">All actions implemented as part of the 2023 MA SHMCAP will evaluate the opportunity to reduce GHG emissions and when applicable will select options that have the lowest GHG emissions possible. This includes considering the use of generators, pumps, and other common adaptation strategies and designing those strategies to reduce rather than increase emissions. Refer to the state agency actions, which are sorted by Priority Impact/Vulnerability, for additional actions the Commonwealth plans to take to address the goal.</td></tr>
<tr><th colspan="3">Goal 6: Resilient and Equitable Infrastructure, Ecosystems, and Communities</th></tr>
<tr><td colspan="3">Cross-government ACTION 15: Update school curriculum to include climate science and green workforce development.</td></tr>
<tr><td rowspan="2">Implement a pilot clean energy innovation pathway for high school students focused on helping students get applied learning experience in the clean energy and climate sector. The initial clean energy innovation pathway pilot will provide data to inform growth to additional schools.</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Lead: EOE
Partners: Workforce Skills Cabinet (EOED, LWD, EHS)</td><td>All</td></tr>
<tr><td rowspan="2">Other priority impacts addressed by action: Damage to electric transmission and utility distribution infrastructure; damage to rails and loss of rail/transit service; loss of energy production and resources; health effects of extreme storms and power outages; reduction in state and municipal revenues; increase in demand for state and municipal government services; economic losses from commercial structure damage and business interruptions.</td><td>Priority Impact Addressed</td><td>Timeframe</td></tr>
<tr><td>All</td><td>5+ years</td></tr>
<tr><td colspan="3">Refer to the state agency actions, which are sorted by Priority Impact/Vulnerability, for additional actions the Commonwealth plans to take to address the goal.</td></tr>
</table>

7.1.7 State Agency Actions

The following state agency actions are organized by sector, priority impact/high-consequence vulnerability, and action topic, where applicable. The most urgent priority impacts are the first 2-3 priority impacts presented in the beginning of each sector and are organized by the following color coding:

Orange: Urgent Priority Impact
Green: Priority Impact/High-Consequence Vulnerability

Human Sector

Urgent Priority Impact: Health and Cognitive Effects from Extreme Heat

Action Topic 1: Assess heat vulnerabilities, develop an outreach strategy, and address heat related human health risks

Description: This action topic focuses on addressing the priority impact of Health and Cognitive Effects from Extreme Heat to populations across the Commonwealth. Together, the following actions will mitigate risk associated with extreme heat through identifying populations vulnerable to heat stress, providing education and outreach to communities about heat risk, inventorying state assets, and making improvements to increase resilience against extreme heat. The action topic aligns with the cross-government actions regarding the development and implementation of a new heat flag system and identifying regulatory opportunities to improve cooling standards in buildings.
Partners: LWD, DCR, DCAMM, MassDEP, DPH, and AGO
Other priority impacts addressed by action topic: Increase in mental health stressors; reduced ability to work; health effects from degraded air quality; and reduction in state and municipal revenues; loss of life or injury due to high vulnerability dams, hurricanes, wildfires, extreme flooding, or extreme temperatures; disproportionate impacts on unhoused populations from extreme temperatures or extreme flooding.

ACTION 1a: Workforce Heat Exposure Outreach

Develop and provide annual outreach information to employers and employees on the dangers of exposure to environmental heat, and strategies for minimizing the risks posed by such exposures. Outreach to be done by email, and in-person and virtual presentations. Collaborate with internal and external stakeholders on the efforts.

Scale	Lead(s) & Partner(s)	Hazard(s) Addressed
Statewide, Workforce	Lead: DLS Partners: DPH, AGO	Extreme heat
Goal(s) Addressed		**Timeframe**
1, 3, and 6		Less than 3 years

ACTION 1b: Address risk of extreme heat to building occupants

Identify buildings in areas designated by RMAT-supported climate data sets as being at high risk of extreme heat and track these vulnerabilities in an asset management system (CAMIS). Refer to this information with client agencies during capital planning and at the outset of new projects to address risks of extreme heat to occupants, especially at buildings that house vulnerable populations within the DCAMM portfolio, when feasible. Prioritize use of heat pumps for heating and cooling.

Scale	Lead(s) & Partner(s)	Hazard(s) Addressed
Statewide, Buildings	DCAMM	Extreme heat
Goal(s) Addressed		**Timeframe**
2, 4, and 6		5+ years

<table>
<tr><td colspan="4">ACTION 1c: Inventory and categorize shade shelters on DCR sites, and strategically improve shading and cooling structures in parks, prioritizing those located in environmental justice communities</td></tr>
<tr><td rowspan="3">Use DCR's Asset Management Modernization Program to inventory shade shelters and cooling structures that exist on DCR sites. Work to increase and/or improve shade and cooling structures, prioritizing Environmental Justice communities that experience disproportionate exposure to extreme heat.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Park Assets</td><td>DCR</td><td>Extreme heat</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">2, 3, and 4</td><td>Less than 3 years</td></tr>
<tr><td colspan="4">Urgent Priority Impact: Health Effects from Degraded Air Quality</td></tr>
<tr><td colspan="4">No specific actions are tagged for this priority impact. The following action is broadly applicable.</td></tr>
<tr><td colspan="4">ACTION 2: Develop outreach materials for climate change and health</td></tr>
<tr><td rowspan="3">Leverage existing educational content, data tools, and resources to develop new web-based and public-facing outreach materials focused on prevention of climate-related health impacts in high-risk populations. Topics to include extreme heat and poor air quality, extreme storms and power outages, tick- and mosquito-borne diseases, worker health and safety, and the presence of harmful bacteria and algae in recreational waterbodies. If sufficient funding becomes available, this Action will include convening a DPH Stakeholder Advisory Group that supports representatives from community-based organizations in Environmental Justice areas to evaluate and provide feedback on DPH outreach materials and messaging about climate and health. This Action will include equitable community engagement activities that centers the lived experience of community members and elevates the knowledge and expertise of community-based organizations in Environmental Justice communities in the development and dissemination of culturally and linguistically appropriate DPH outreach materials and messaging about climate and health.
Other priority impacts addressed by action topic: Increase in mental health stressors; reduced ability to work; health effects from degraded air quality; and reduction in state and municipal revenues; loss of life or injury due to high vulnerability dams, hurricanes, wildfires, extreme flooding, or extreme temperatures; disproportionate impacts on unhoused populations from extreme temperatures or extreme flooding.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Environmental Justice</td><td>Lead: DPH
Partners: DOC, MDAR</td><td>All hazards addressed</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">1 and 2</td><td>3 – 5 years</td></tr>
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<tr><th colspan="4">Urgent Priority Impact: Emergency Service Response Delays and Evacuation Disruptions</th></tr>
<tr><td colspan="4">ACTION 3: Integration of climate change adaptation into EOPSS agencies programs, policies, and procedures</td></tr>
<tr><td rowspan="4">EOPSS in coordination with MEMA will work with all EOPSS agencies to establish a process by which agencies can consider climate change to the maximum extent possible. The following approaches could be considered: trainings, strategic planning, and other approaches to effectively integrate climate change and hazard mitigation into EOPSS agencies. A final product will be a how-to guide that can be used across all executive branch agencies to integrate climate change adaptation.
Other priority impacts addressed by action: All priority impacts listed in the Human sector.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Internal Capacity Building</td><td>Lead: EOPSS
Partner: MEMA,</td><td>All hazards</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">1, 2, 3, and 4</td><td>Less than 3 years</td></tr>
<tr><td colspan="4">ACTION 4: Statewide emergency management training needs assessment</td></tr>
<tr><td rowspan="4">To ensure the State's public safety officials are sufficiently trained to handled future emergencies, MEMA will need to understand what trainings are missing and which need enhancing to ensure natural hazards especially those exacerbated by climate change are woven into curriculum as appropriate. In addition, the assessment will ensure climate migration is a consideration when assessing training needs.

Once the Training Needs Assessment above is completed, MEMA will need assistance with course design, development, and then additional resources for course delivery.

MEMA recently launched the Northeast Emergency Management Training & Education Center (NEMTEC), designed to strengthen regional response to emergencies including those due to natural hazards exacerbated by climate change. This comprehensive training program will provide advanced education and expanded resources to New England’s emergency management professionals, who face evolving challenges due to the increasing complexity and frequency of natural disaster and climate change. Extreme storms cause delays in response time, potentially leading to loss of life. Extreme coastal storm surge events and inland flooding could flood evacuation routes, trapping residents, leading to increased loss of life and injuries.
Other priority impacts addressed by action: Emergency service response delays and evacuation disruptions; increase in demand for state and municipal government services; damage to electrical transmission and utility distribution infrastructure;</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Internal Capacity Building</td><td>Lead: MEMA</td><td>All hazards</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">1 and 6</td><td>Less than 3 years</td></tr>
</table>

<table>
<tr><td>inability to carry out mission and services due to damage, disruption, or loss of state assets and services.</td><td></td><td></td></tr>
<tr><td colspan="3">ACTION 5: Increase energy resilience of critical assets identified in the State Energy Security Plan</td></tr>
<tr><td rowspan="4">Work with state agencies responsible for critical physical assets to develop strategies to increase energy resilience. Consider including non-state assets that carry out critical statewide functions such as schools, hospitals, and public safety agencies. Fund vulnerability assessments for critical facilities and identify high priority energy resilience projects to fund and implement.
Other priority impacts addressed by action: Damage to electrical transmission and utility distribution infrastructure; emergency service response delays and evacuation disruptions; increase in demand for state and municipal government services; inability to carry out mission and services due to damage, disruption, or loss of state assets and services.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, energy assets</td><td>Lead: DOER
Partner: EEA</td><td>All hazards</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">All</td><td>3 – 5 years</td></tr>
<tr><td colspan="3">Priority Impact: Reduction in Food Safety and Security</td></tr>
<tr><td colspan="3">ACTION 6: Prioritize project proposals within the Food Security Infrastructure Grant Program (FSIG) that specifically support climate change mitigation and proposals that seek to address long-term resilience to drought or extreme weather events</td></tr>
<tr><td rowspan="4">In the FY24 round, $1 million was set aside for project proposals that specifically support climate change mitigation by reducing equipment energy use or generating renewable energy and $2 million was set aside for project proposals that seek to address long-term resilience to drought or extreme weather events, including by reducing water use or enhancing a water supply. For future rounds, conduct a survey to determine the effects of climate change on each sector and their food production and build out RFR to require projects to meet at least one of these objectives. Other priority impacts addressed by action: Soil erosion; decrease in agricultural productivity.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide,</td><td>Lead: EEA</td><td>Drought, extreme weather</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">All</td><td>Less than 3 years</td></tr>
<tr><td colspan="3">Priority Impacts: Increase in Mental Health Stressors</td></tr>
<tr><td colspan="3">ACTION 7: Provide municipal and local health climate equity training and technical support</td></tr>
<tr><td rowspan="2">Produce a Massachusetts-specific training module for local health officials to increase awareness about the disproportionate health impacts of exposure to climate change hazards, including impacts on mental health and unhoused populations, leveraging DPH’s existing relationships with local public health officials and experience and meaningfully engaging communities most vulnerable to climate impacts. The training</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Local Capacity Building</td><td>Lead: DPH
Partners: DOC, MDAR</td><td>All hazards</td></tr>
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<tr><td rowspan="2">module will cover a variety of climate hazards, including extreme temperatures, flooding, and mold, and will provide examples of environmental health interventions that local health officials can leverage as part of their work.
Other priority impacts addressed by action: Disproportionate impacts on unhoused populations from extreme temperatures or extreme flooding; health effects from aeroallergens and mold; reduced ability to work; reduction in food safety and security.</td><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">1, 2, 4, and 6</td><td>3 – 5 years</td></tr>
<tr><td colspan="4">Priority Impact: Health Effects from Aero Allergens and Mold</td></tr>
<tr><td colspan="4">ACTION 8: Strengthen DPH capacity to address health impacts of moisture and mold in public buildings, including schools</td></tr>
<tr><td rowspan="4">Develop focused outreach materials for operators of public buildings and schools that describe interventions for preventing and safely remediating moisture and mold growth inside the building envelope during extended periods of hot, humid weather, acknowledging the impact of climate change. The culturally and linguistically appropriate materials will be made publicly available on the DPH website and distributed according to a robust dissemination plan, which includes building managers as part of public building inspections and reports produced by the DPH Bureau of Environmental Health, Indoor Air Quality Program and other DPH tools and resources, including the DPH Bureau of Community Health and Prevention’s Clearing the Air Toolkit: An Asthma Toolkit for Healthy Schools.
Other priority impacts addressed by action: Health and cognitive effects from extreme heat; health effects from degraded air quality; increase in vector borne diseases incidence and bacterial infections; inability to carry out mission and services due to damage, disruption, or loss of state assets and services.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Public Buildings, Schools</td><td>Lead: DPH</td><td>Extreme heat, flooding, extreme precipitation</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">1, 2, 3, and 4</td><td>3 – 5 years</td></tr>
<tr><td colspan="4">Priority Impact: Health Effects of Extreme Storms and Power Outages</td></tr>
<tr><td colspan="4">Covered by actions for the following priority impacts:
Emergency Service Response Delays and Evacuation Disruptions
Loss of life or injury due to high vulnerability dams, hurricanes, wildfires, extreme flooding, or extreme temperatures
Damage to Electric Transmission and Utility Distribution Infrastructure
Inability to carry out mission and services due to damage, disruption, or loss of state assets and services</td></tr>
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Priority Impact: Damage to Cultural Resources

Action Topic 9: Develop an inventory of cultural resources and evaluate their vulnerability to hazards and climate change

Description: This action focuses on addressing the priority impact of Damage to Cultural Resources in addition to those listed below. The action will be implemented by performing the following actions, including conducting a vulnerability assessment of coastal cultural resources and creating repositories of information regarding the location of cultural resources. The action also considers promoting best practices for resource protection during disaster response and recovery and being inclusive of cultural resources that are currently underrepresented in the Massachusetts Cultural Resources Information System (MACRIS).

Partners: CZM, DCR, MHC, MOTT, MA Board of Underwater Archaeological Resources, and Mass Cultural Council

Other priority impacts addressed by action topic: Damage to tourist attractions and recreational amenities and priority impacts listed in the Natural Environment sector.

ACTION 9a: Assess vulnerability and preservation potential of coastal cultural resources from sea level rise and erosion

Coordinate with the MA Historical Commission, MA Board of Underwater Archaeological Resources, coastal communities, and federally- and state-recognized Tribes to support a vulnerability assessment of cultural resources along the coast including built resources, archaeological sites (pre- and post-contact period), and inundated and exposed coastal landforms. State agency, municipal, and tribal consultation is critical to increase our understanding of coastal cultural resource types, locations, and their vulnerability to identify opportunities for shoreline restoration and adaptive management responses to preserve these valuable natural resources.

Scale	Lead(s) & Partner(s)	Hazard(s) Addressed
Coastwide, Local	Lead: CZM Partners: MHC, MA Board of Underwater Archaeological Resources	Flooding, coastal erosion
Goal(s) Addressed		**Timeframe**
1, 2, 3, 4, and 6		Less than 3 years

ACTION 9b: Complete and integrate DCR's Cultural Resource Inventory

DCR's Office of Cultural Resources and GIS Program developed a GIS-based data layer and data collection app to enable DCR to inventory and map the cultural resources under its stewardship, with a goal of identifying those sites most vulnerable to climate change impacts. DCR will integrate its Cultural Resource Inventory data with the Asset Management Modernization Program to assist the agency with planning and prioritization efforts. DCR will share results of its inventory with CZM for consideration and integration into their Coastal Cultural Resources Vulnerability Assessment.

Scale	Lead(s) & Partner(s)	Hazard(s) Addressed
Statewide, Internal Capacity Building	Lead: DCR Partner: CZM	All hazards
Goal(s) Addressed		**Timeframe**
2 and 3		Less than 3 years

<table>
<tr><td colspan="4">ACTION 9c: Preserve vulnerable cultural resources</td></tr>
<tr><td rowspan="4">DCR’s Office of Cultural Resources will launch a pilot study to identify cultural resources under DCR’s care that are most vulnerable to climate change impacts. This pilot program will design and implement up to two protection measures, relocate, or/remove sensitive resources and/or interpret for future generations. DCR will thoroughly document Best Practices.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Cultural Resources</td><td>Lead: DCR</td><td>All hazards</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">2 and 3</td><td>Less than 3 years</td></tr>
<tr><td colspan="4">ACTION 9d: Promote best practices when planning for historic and cultural resources</td></tr>
<tr><td rowspan="4">Promote best practice guidance to reduce risk to historic and cultural resources from current and future hazards to other organizations and property owners and use internally. Best practices have been developed by organizations such as the National Park Service's "Guidelines on Flood Adaptation for Rehabilitating Historic Buildings" and "Illustrated Guidelines on Sustainability for Rehabilitating Historic Buildings". Incorporate a disaster response section into the sample local historic district bylaw produced by the MHC based on guidance from the National Park Service and National Alliance of Preservation Commissions. This will allow for faster response to disasters in local historic districts while still protecting historic resources.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Regional, and Local</td><td>Lead: MHC</td><td>All hazards</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">1, 2, and 3</td><td>3 – 5 years</td></tr>
<tr><td colspan="4">ACTION 9e: Update grant scoring to prioritize underrepresented and threatened resources</td></tr>
<tr><td rowspan="4">Explore amending the scoring for the MHC's Survey & Planning Grant program to encourage the documentation of underrepresented and threatened resources. This might include additional points for projects focused on environmental justice areas, floodplains, and cultures and resources currently underrepresented in the MHC's Inventory of the Historic and Archaeological Assets of the Commonwealth and the Massachusetts Cultural Resources Information System (MACRIS).</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Regional, Local, Environmental Justice</td><td>Lead: MHC</td><td>All hazards</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">4</td><td>3 – 5 years</td></tr>
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<tr><td colspan="4">Priority Impact: Increase in Vector Borne Diseases Incidence and Bacterial Infections</td></tr>
<tr><td colspan="4">ACTION 10: Host DPH internal climate equity working group</td></tr>
<tr><td rowspan="4">Convene internal agency working group tasked with assessing disproportionate impacts of climate change on program-specific assets and functions and developing an agency-wide rubric to guide pilot assessments and intervention projects that address inequities and promote climate justice in vulnerable populations served by DPH. Climate hazards and risks to be assessed include extreme temperatures, extreme weather (e.g., hurricanes), and inland and coastal flooding. Action may address food safety and security, chronic disease, and increase in vector borne disease, depending on which offices, bureaus, and programs engage in climate resilience activities through the DPH working group.
Other priority impacts addressed by action: Disproportionate impacts on unhoused populations from extreme temperatures or extreme flooding; health effects from aeroallergens and mold; reduced ability to work; reduction in food safety and security.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Disproportionate Impacts</td><td>Lead: DPH
Partners: DOC, MDAR</td><td>All hazards</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">1, 2, 3, and 6</td><td>3 – 5 years</td></tr>
<tr><td colspan="4">High-Consequence Vulnerability: Loss of Life or Injury due to High Vulnerability Dams, Hurricanes, Wildfires, Extreme Flooding, or Extreme Temperatures</td></tr>
<tr><td colspan="4">ACTION 11: Wildfire Management Infrastructure Improvements</td></tr>
<tr><td rowspan="4">Undertake a modernization of wildfire facilities and infrastructure used to support local fire departments with wildfire suppression and wildfire risk mitigation (prescribed fire). Project will include design and construction of a Wildfire Management Operations Facility at Hopkinton State Forest, Wildfire Management Operations Facility at Douglas State Forest, and a comprehensive facility climate resiliency needs assessment. The existing Hopkinton facility was destroyed by snow loads in 2013. The existing Douglas facility is incompatible with the growing need for wildfire support services and lacks basic sanitary facilities. Design of the Hopkinton facility create a standard plan set for Douglas and additional future facility replacements. Climate smart building materials including local engineered hemlock cross laminated timber developed by EEA, UMass, UNH, UMaine and the USFS will be used to demonstrate building with long lived wood products in support of the Clean Energy and Climate Plan.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide</td><td>Lead: DCR
Partner: DCAMM</td><td>Wildfire</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">1, 3, 5, and 6</td><td>3 – 5 years</td></tr>
</table>

Other priority impacts addressed by action: health and cognitive effects from extreme heat; health effects of extreme storms and power outages; disproportionate impacts on unhoused populations from extreme temperatures or extreme flooding; Damage or loss to homes and critical facilities in the wildland urban interface; forest health degradation		
High-Consequence Vulnerability: Disproportionate Impacts on Unhoused Populations from Extreme Temperatures or Extreme Flooding		
The following priority impacts/high-consequence vulnerabilities pertain to extreme temperatures and flooding but do not specifically address vulnerabilities for "unhoused populations." • Increase in Mental Health Stressors • Increase in Vector Borne Diseases Incidence and Bacterial Infections • Damage to Inland Buildings • Damage to Coastal Buildings and Ports • Loss of Urban Tree Cover • Health and Cognitive Effects from Extreme Heat • Loss of life or injury due to high vulnerability dams, hurricanes, wildfires, extreme flooding, or extreme temperatures.		

Infrastructure

Infrastructure Sector			
Urgent Priority Impact: Damage to Inland Buildings			
Action Topic 1: Reducing flood risk and supporting equitable restoration projects with communities			
Description: The action topic focuses on reducing flooding risk to communities in an equitable manner for Environmental Justice and Other Priority Populations. The actions address the Damage to Inland Buildings priority impact but are more broadly applicable to the hazards of inland and coastal flooding, coastal flooding and storm surge, coastal erosion, in addition to drought and enhancing stormwater management. Together, the collection of actions focusses on moving communities, structures, and assets from the floodplain to reduce risks and vulnerabilities and increasing equitable community access to grants for increasing resilient and improving water quality. **Partners:** MEMA, DCR, CZM, EEA, DER, and state and local floodplain managers and communities. **Other priority impacts addressed by action topic:** Increase in costs of responding to climate migration; emergency service response delays and evacuation disruptions; disproportionate impacts on unhoused populations from extreme temperatures or extreme flooding; reduction in clean water supply.			
ACTION 1a: Acquisition/Buyout program study			
MEMA will hire a vendor to study other successful state buyout programs such as NJ, OH and districts in NC as well as Florida's Wind Mitigation Program to understand best practices, gaps and opportunities of improvement. The study will result in a set of recommendations that best suits Massachusetts government structure to help us identify properties and create a program that best supports coastal and riverine cities and towns making it easier for them to obtain funding. Acquisition/Buyout programs are one method of property acquisitions in which private lands are purchased, existing structures demolished, and the land maintained in an undeveloped state for public use in perpetuity. Acquisition of a property in a floodway is intended to reduce the risk of future flooding for the property and/or those adjacent. A voluntary property acquisition/buyout program can enable homeowners to leave high-risk areas. This can be an especially important option for EJ and other priority populations who may not have the financial means to move or to repair/rebuild after floods.	**Scale**	**Lead(s) & Partner(s)**	**Hazard(s) Addressed**
	Statewide, Local, Site-Specific	Lead: MEMA Partners: DCR, State Floodplain Manager, local communities	All hazards
	Goal(s) Addressed		**Timeframe**
	1, 2, 3, 4, and 6		Less than 3 years

<table>
<tr><td colspan="4">ACTION 1b: Address impacts of flooding to infrastructure, natural resources and groundwater through better understanding of climate change</td></tr>
<tr><td rowspan="4">Main components of this action include: (1) Address flood vulnerability and (2) Enhance understanding of groundwater flooding. Part (1) includes developing flood map overlays to show increased flood vulnerabilities across the Commonwealth and in particular where these intersect with EJ populations and identifying areas of repeated flooding across the state, overlaying with EJ data, overlaying with potential causes (e.g., geology, land use and overlaying with potential mitigation options such as upland recharge areas, improved stormwater infrastructure, and removing impervious surfaces or similar. Advance implementation through pilot projects in prioritized areas. Part (2) includes continuing study of groundwater flooding, refining statewide groundwater model, applying output from EEA's Climate and Hydrologic Risk Project, and conducting recharge modeling to run new climate change scenarios and add sea level rise inputs for coastal areas.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Utilities</td><td>Leads: EEA and DCR-OWR</td><td>Drought, groundwater rise, inland flooding, coastal flooding, and storm surge</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">1, 2, 3, 4, and 6</td><td>Less than 3 years</td></tr>
<tr><td colspan="4">ACTION 1c: Develop and implement recommendations to increase community access and equity for grants targeting coastal water quality, habitat, and resilience</td></tr>
<tr><td rowspan="4">Undertake an equity analysis of grant funded projects to date through the Coastal Pollutant Remediation, Coastal Habitat and Water Quality, and Coastal Resilience grant programs. The analysis will include a review of previously funded projects, participating municipalities, stakeholders, and regions in addition to an assessment of potential barriers to funding. The analysis will inform the development of recommendations to increase equity and access to grant funding that will be implemented in future funding rounds of the Coastal Habitat and Water Quality and Coastal Resilience grant programs, which will help build capacity to improve and protect water quality, habitat, and resilience in underserved communities.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Coastwide, Local, Environmental Justice</td><td>Lead: CZM</td><td>Flooding, coastal erosion</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">3, 4, and 6</td><td>Less than 3 years</td></tr>
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<tr><td colspan="4">ACTION 1d: Update DER's environmental justice strategy</td></tr>
<tr><td rowspan="4">Review and improve how DER integrates environmental justice into its grant programs, restoration practices, policies, and other activities, as approximately 60% of DER's restoration-adaptation projects are in communities with EJ populations. The result of this action will be an updated DER EJ strategy consistent with DFG's and EEA's strategies. The strategy will identify new approaches and best practices and will guide DER in maximizing benefits of restoration-adaptation to underserved and disadvantaged communities statewide.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Restoration, Environmental Justice</td><td>Lead: DER</td><td>All</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">1, 4, and 6</td><td>Less than 3 years</td></tr>
<tr><td colspan="4">ACTION 1e: Increase funding, eligibility, and focus on environmental justice to and within municipal and agency resilience action</td></tr>
<tr><td rowspan="4">Launch MVP Planning 2.0 program and develop update to MVP 2.0 Action Program that addresses stakeholder feedback and improves program access and support to best practices.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Local, Environmental Justice</td><td>Lead: EEA</td><td>All hazards</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">All</td><td>Less than 3 years</td></tr>
<tr><td colspan="4">ACTION 2: Complete buildout of Statewide Hydraulic Model</td></tr>
<tr><td rowspan="4">Create a Statewide River Hydraulic Model, using paper printouts, microfiche, and modern LIDAR. This project will allow for projection of future river elevations for both high and low flows and will aid in estimating the effects of projects on river flooding. Phases 1, 2, and 2a included a feasibility study, tool development pilot in the Squannacook River Basin, and model calibration at additional sites. The last project phase (Phase 3) will complete the statewide model buildout.

The model will facilitate future updates to FEMA maps, including providing the ability to project the effects of changing and more intense hydrologic patterns on flooding elevations as well as project the river elevations during droughts. Other priority impacts addressed by action: Damage to roads and loss of road service; damage to coastal buildings and ports; damage, disruption, or loss of coastal infrastructure such as seaports, airports, and maritime industries; damage to rails and loss of rail/transit service.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Flood Modeling of Riverine Flood Risks</td><td>Lead: MassDEP</td><td>Flooding</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">2 and 3</td><td>Less than 3 years</td></tr>
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<tr><th colspan="4">Urgent Priority Impact: Damage to Electric Transmission and Utility Distribution Infrastructure</th></tr>
<tr><td colspan="4">ACTION 3: Resilient siting of new or modified jurisdictional transmission facilities</td></tr>
<tr><td rowspan="3">Ensure that new or substantially modified jurisdictional electric transmission facilities are designed, built, and operated for resiliency regarding flooding/sea level rise; severe weather events; and physical/cyber security threats. Refine use of forward-looking approval conditions that require periodic review of updated data and science, potential mitigation measures; required actions/modifications.
Other priority impacts addressed by action: Health effects of extreme storms and power outages; reduced ability to work; inability to carry out mission and services due to damage, disruption, or loss of state assets and services; increase in demand for state and municipal government services; reduction in state and municipal revenues.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Utilities</td><td>Lead: DPU
Partners: MEPA, MassDEP, CZM,</td><td>Flooding, extreme temperatures, hurricane tropical cyclone, winter storms/nor-easter, tornado, tsunami, other severe weather</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">2, 5, and 6</td><td>Less than 3 years</td></tr>
<tr><td colspan="4">ACTION 4: Ensure electric sector modernization plans consider climate impacts</td></tr>
<tr><td rowspan="3">On September 12, 2022, the DPU directed the investor-owned electric distribution companies’ electric sector modernization plans that will be filed with the Grid Modernization Advisory Council in September 2023 and with the DPU in January 2024 consistent with the requirements of the 2022 Climate Act (St. 2022, c. 179). The electric sector modernization plans will include a five-year plan for preparing for future climate-driven impacts on the transmission and distribution systems, including proposed improvements to the electric distribution system to increase reliability and strengthen system resiliency to address potential weather-related and disaster-related risks. The DPU will review the plans when filed in January 2024 and issue a decision within seven months of the submission of the plan.
Other priority impacts addressed by action: Health and cognitive effects from extreme heat; emergency service response delays and evacuation disruptions; health effects of extreme storms and power outages; Inability to carry out mission and services due to damage, disruption, or loss of state assets and services, loss of energy production and resources.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, electrical infrastructure</td><td>Lead: DPU</td><td>All hazards</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">3, 4, 5, and 6</td><td>5+ years</td></tr>
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<tr><td colspan="4">ACTION 5: Develop regulations to create a clean heat standard for heating fuels</td></tr>
<tr><td rowspan="4">The 2025/2030 Massachusetts Clean Energy and Climate Plan (CECP) tasks MassDEP with developing a Clean Heat Standard. MassDEP will initiate a stakeholder process with a goal of finalizing regulations in 2023 and implementing the requirements as early as 2024. The Commission on Clean Heat endorsed the creation of a Clean Heat Standard in its final report (https://www.mass.gov/info-details/commission-on-clean-heat-issues-final-report). The standard will incentivize electrification of the building sector, which will reduce GHG emissions and improve comfort of residents during extreme heat. It will reduce risk of fossil fuel/oil spills by reducing transport and delivery accidents. Reducing GHG emissions from the building sector supports resiliency.
Other priority impacts addressed by action: Health and cognitive effects from extreme heat; loss of energy production and resources.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Buildings</td><td>Lead: MassDEP
Partners: DOER, MassCEC, EOED</td><td>Extreme temperatures</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">4, 5, and 6</td><td>Less than 3 years</td></tr>
<tr><td colspan="4">ACTION 6: Prioritize mobile solar energy systems for emergency response</td></tr>
<tr><td rowspan="4">Shift from generators to investments in mobile solar energy storage systems that can be used during emergencies.
Other priority impacts addressed by action: Health effects of extreme storms and power outages; loss of energy production and resources; emergency service response delays and evacuation disruptions.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Emergencies</td><td>Lead: EEA
Partners: DOER, MEMA</td><td>All hazards</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">3, 5, and 6</td><td>3 – 5 years</td></tr>
<tr><td colspan="4">ACTION 7: Work with utilities to ensure solar and storage proposals address climate risk and vulnerability</td></tr>
<tr><td rowspan="4">Work with investor-owned electric and gas utilities to review geotargeted solar paired with energy storage proposals developed pursuant to the 2021 Climate Act (St. 2021, c. 8, section 77) designed to assist a municipality, including those with environmental justice communities, at high risk from the effects of climate change. The proposals must be supported by the municipality and designed to improve climate adaptation and resiliency.
Other priority impacts addressed by action: Health effects of extreme storms and power outages; loss of energy production and resources; emergency service response delays and evacuation disruptions.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide</td><td>Lead: DPU</td><td>All hazards</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">3, 4, 5, and 6</td><td>3 – 5 years</td></tr>
</table>

<table>
<tr><td colspan="4">ACTION 8: Work with electric utilities to assess critical infrastructure for climate vulnerability</td></tr>
<tr><td rowspan="4">Ensure that investor-owned electric utilities continue to appropriately assess critical infrastructure, high risk hazards, and system vulnerabilities in vegetation management plans, pre-storm assessments and through their emergency response plans.
Other priority impacts addressed by action: Health effects of extreme storms and power outages; loss of energy production and resources; emergency service response delays and evacuation disruptions.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide</td><td>Lead: DPU</td><td>All hazards</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">3 and 6</td><td>3 – 5 years</td></tr>
<tr><td colspan="4">ACTION 9: Integrate adaptation goals in clean energy projects</td></tr>
<tr><td rowspan="4">Assess Massachusetts’ clean energy projects to determine opportunities to increase adaptation and reduce risks by including hazard mitigation and climate adaptation goals wherever possible.
Other priority impacts addressed by action: Health effects of extreme storms and power outages; loss of energy production and resources; emergency service response delays and evacuation disruptions.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, energy assets and infrastructure</td><td>Lead: EEA
Partner: DOER</td><td>All hazards</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">All</td><td>Less than 3 years</td></tr>
<tr><td colspan="4">Urgent Priority Impact: Damage to Rails and Loss of Rail/Transit Service</td></tr>
<tr><td colspan="4">Action Topic 10: Assess risks to transportation assets and services and develop approaches to reduce risk</td></tr>
<tr><td colspan="4">Description: This action topic is focused on evaluating the risk to assets and services from hazard and climate change and methods for increasing resilience. The action topic primarily addresses the Damage to Rails and Loss of Rail/Transit Service priority impact but also addresses other priority impacts as highlighted below. Together, the actions focus on conducting vulnerability studies, utilizing live data to inform operational decisions, and identifying priorities for resilience projects to protect assets and services. The actions also focus on conducting research on resilience approaches and adopting standards to incorporate resilient design at the onset of projects.
Partners: MBTA, MassDOT, and EEA
Other priority impacts addressed by action topic: Damage to roads and loss of road service; inability to carry out mission and services due to damage, disruption, or loss of state assets and services; and emergency service response delays and evacuation disruptions; reduced ability to work.</td></tr>
</table>

<table>
<tr><td colspan="4">ACTION 10a: Conduct climate vulnerability assessments</td></tr>
<tr><td rowspan="4">Complete a Vulnerability Assessment of Critical Locations Across Commuter Rail System (esp. Historical flood locations) and assess the vulnerability of all 3 major Commuter Rail Facilities. Finish conducting Cabot Yard Vulnerability Assessment, and complete additional bus facility vulnerability assessments (in coordination with the Bus Modernization Program).</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Regional, Commuter Rail</td><td>Leads: MBTA</td><td>All hazards</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">3 and 6</td><td>3 – 5 years</td></tr>
<tr><td colspan="4">ACTION 10b: Updating the MBTA's emergency response plans and GIS viewer for real-time storm response</td></tr>
<tr><td rowspan="4">The MBTA will revise and update its Severe Weather Operations Plan, as well as its Snow + Ice Plan to reflect both the latest climate science and expectations about operating in severe weather. The completion of an updated Comprehensive Emergency Management Plan (CEMP) is underway as part of the MBTA's Tunnel Flood Mitigation program. The updated CEMP, which accounts for all climate hazards, will directly inform an update to the Severe Weather Operations plan, as well as the Snow + Ice Plan. The Severe Weather Operations Plan that is currently in place requires more robust coordination between different MBTA departments, and a verification that the resources that each department says it plans to rely upon, will be available in the event of a major storm. Having a GIS viewer for real-time storm response (a deliverable that is part of the Tunnel Flood Protection Program) will help with this coordination and revision of the plans.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Regional, Internal Capacity Building</td><td>Leads: MBTA/MassDOT Security & Emergency Management Dept</td><td>Extreme temperatures, hurricane, tropical cyclone, winter storms/nor’easter, tornado, tsunami, other severe weather</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">3 and 6</td><td>3 – 5 years</td></tr>
<tr><td colspan="4">ACTION 10c: Tunnel Flood Mitigation program</td></tr>
<tr><td rowspan="4">The MBTA's Tunnel Flood Mitigation program, which began in 2021, is presently working on conceptual designs for flood protection of the Alewife Storage Tracks and the Airport Portal. The program is also seeking to address upgrades to track dewatering pump rooms. By protecting portals the MBTA is seeking to keep coastal flood water out. Improving the pump rooms that handle everyday water on the tracks will help mitigate flooding internally. The next steps in this program will be addressing the D Street Portal on the Silver Line in the Seaport (designing flood protection), and addressing flood protection for the MBTA's lowest critical flood locations (especially the ones exposed to coastal flooding in the near term), such as vent shafts, manholes, emergency egresses, etc.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Regional, Transit Assets and Services</td><td>Leads: MBTA/Office of the Chief Engineer</td><td>Flooding, groundwater rise</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">3</td><td>5+ years</td></tr>
</table>

ACTION 10d: MBTA design standards update

The MBTA Office of the Chief Engineer is in the process of updating its design standards for the entire system. The design standards have been drafted to incorporate climate resiliency in all the standards. However, going into this year significant editing and revisions will be needed, as well as stakeholder engagement from departments across the MBTA. When this project is finally complete, the goal is to have climate resiliency considerations such as designing for extreme temperatures, managing stormwater for both improved water quality and resilience, addressing coastal flooding, designing for high winds, etc., incorporated into the design requirements. These will be the requirements that all new construction at the MBTA (and retrofits) must adhere to.

Scale	Lead(s) & Partner(s)	Hazard(s) Addressed
Regional, transit assets and services	Leads: MBTA/Office of the Chief Engineer	All hazards
Goal(s) Addressed		**Timeframe**
2 and 3		Less than 3 years

ACTION 10e: Resilient design research and planning

Research best practices and leading examples of transportation asset resilient designs and standards to inform future MassDOT initiatives and design guidance. Prepare a summary of findings.

Scale	Lead(s) & Partner(s)	Hazard(s) Addressed
Statewide, Transportation Assets	Lead: MassDOT	All hazards
Goal(s) Addressed		Timeframe
2, 3, and 6		3 – 5 years

Priority Impact: Damage to Roads and Loss of Road Service

Action Topic 11: Evaluate rockfall and landslide hazards

Description: The action topic is focused on evaluating hazards associated with rockfall and landslides to inform decision making, which overlaps with multiple priority impacts including those related to disruption of services and damages to assets as highlighted below.

Other priority impacts addressed by action topic: Damage to rails and loss of rail/transit service; inability to carry out mission and services due to damage, disruption, or loss of state assets and services; and emergency service response delays and evacuation disruptions; reduced ability to work; damage to inland buildings; damage to coastal buildings and ports.

<table>
<tr><td colspan="4">ACTION 11a: Identification of rockfall hazards</td></tr>
<tr><td rowspan="3">Identify rockfall hazards in MA, particularly along major state roads. With increased rainfall and more cycling of freezing and thawing under climate change, rockfall hazards poses an increased risk. Assess whether existing hazard rating systems could be employed to identify and prioritize this risk.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Rockfall, Landslide</td><td>Lead: MA Geological Survey</td><td>Landslides</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">3</td><td>3 – 5 years</td></tr>
<tr><td colspan="4">ACTION 11b: Update and produce a landslide inventory for Massachusetts to help identify vulnerable resources and infrastructure</td></tr>
<tr><td rowspan="3">The landslide susceptibility map completed in 2012 is outdated. With the availability now of 1 meter LiDAR statewide and expected delivery of 1/2 meter LiDAR in eastern MA shortly, conduct a comprehensive landslide inventory statewide.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Landslides</td><td>MA Geological Survey</td><td>Landslides, coastal erosion</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">3</td><td>3 – 5 years</td></tr>
<tr><td colspan="4">Action Topic 12: Screen for and incorporate resilience in transportation projects</td></tr>
<tr><td colspan="4">Description: This action topic focuses on addressing the Damage to Roads and Loss of Road Services priority impact and incorporates various actions proposed by MassDOT and partners. Together, these actions identify a strategy for screening projects for resilience aspects and incorporating them into projects to increase resilience and continuity of service.
Partners: MassDOT, MEMA, EEA, regional organizations, MVP program, and communities
Other priority impacts addressed by action topic: Damage to rails and loss of rail/transit service; inability to carry out mission and services due to damage, disruption, or loss of state assets and services; and emergency service response delays and evacuation disruptions; reduced ability to work; damage to inland buildings; damage to coastal buildings and ports.</td></tr>
<tr><td colspan="4">ACTION 12a: Resilience improvement prioritization</td></tr>
<tr><td>Screen and prioritize resilience improvements in vulnerable roadway/bridge assets utilizing information from the MassDOT Resilience Improvement Plan evaluation, CAVA, MaPIT, and similar sources. Coordinate with other agencies and engage stakeholders, as applicable, through the project development process. Ensure transparency to communities on process.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Roads, Bridges</td><td>Lead: MassDOT
Partners: municipalities and jurisdictions, regional organizations, MVP program</td><td>All hazards</td></tr>
</table>

<table>
<tr><td></td><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td></td><td colspan="2">1, 2, 3, and 6</td><td>5+ years</td></tr>
<tr><td colspan="4">ACTION 12b: Enhance resiliency screening in project development</td></tr>
<tr><td rowspan="4">Evaluate opportunities along the project development process to track or screen climate resilience, climate mitigation, hazard mitigation, and environmental justice data elements to support climate-informed project design and ensure alignment with funding sources and MassDOT goals. This includes evaluating the MassDOT MaPIT application inputs. Collaborate with EEA on similar efforts.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide</td><td>Lead: MassDOT
Partners: MEMA and EEA</td><td>All hazards</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">2, 3, 4, and 6</td><td>3 – 5 years</td></tr>
<tr><td colspan="4">ACTION 12c: Utilize TRB’s self-assessment tool in project development</td></tr>
<tr><td rowspan="4">Review the Transportation Research Board (TRB)'s self-assessment tool to identify opportunity to incorporate components into the project review process. This will focus on incorporating opportunities for reducing hazards and climate change concerns into the project screening and implementation process.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide</td><td>Lead: MassDOT</td><td>All hazards</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">2, 3, 4, 5, and 6</td><td>3 – 5 years</td></tr>
<tr><td colspan="4">ACTION 13: Complete climate change vulnerability assessment of DCR’s parkways system to support the DCR Parkways Master Plan</td></tr>
<tr><td rowspan="4">The Parkways Climate Vulnerability Assessment will provide a critical first step planning-level flood risk information specific for the historic DCR Parkways system by identifying risks from flooding under future climate scenarios, aligning with the 2022 Massachusetts Climate Assessment. This assessment will supplement the 2020 DCR Parkways Master Plan to add long-term considerations in the context of the exposure to extreme weather and climate effects, and adaptive capacity. The assessment will inform DCR's planning efforts to make these parkways resilient to the effects of climate change.
Other priority impacts addressed by action: Damage to inland buildings; damage to tourist attractions and recreation amenities.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Regional, Parkways</td><td>Lead: DCR
Partners: municipalities</td><td>Flooding, groundwater rise</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">2, 3, 4, 5, and 6</td><td>Less than 3 years</td></tr>
<tr><td colspan="4">ACTION 14: Develop the foundation for a Resilience Improvement Plan</td></tr>
<tr><td rowspan="2">Evaluate and prepare an outline for a statewide Resilience Improvement Plan, building upon asset resilience information in the MassDOT Climate Adaptation and Vulnerability Assessment (CAVA), Massachusetts Project Intake Tool (MaPIT), and other sources. Coordinate with other agencies as applicable to identify opportunities to collaborate.
Other priority impacts addressed by action: Damage to inland buildings; damage to</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Transportation</td><td>Lead: MassDOT
Partners: CZM, EEA, DCR,</td><td>All hazards</td></tr>
</table>

<table>
<tr><td rowspan="3">tourist attractions and recreation amenities; emergency service response delays and evacuation disruptions; increase in demand for state and municipal government services; inability to carry out mission and services due to damage, disruption, or loss of state assets and services.</td><td>Assets and Services</td><td>municipalities, regional organizations</td><td></td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">2, 3, and 6</td><td>Less than 3 years</td></tr>
<tr><td colspan="4">ACTION 15: Climate change adaptation training and guidance</td></tr>
<tr><td rowspan="4">Invest in internal and external training, including continuation of the fluvial geomorphology based "Rivers & Roads" training program which provides guidance on bridge and culvert design interaction with emerging fluvial geomorphology practices. Coordinate with resource agencies on this effort, as needed. Update existing guidance documents to ensure proposed bridge and culvert projects are appropriately sized. Conduct internal staff training to ensure compliance with the Massachusetts Stream Crossing Standards.
Other priority impacts addressed by action: Damage to inland buildings; emergency service response delays and evacuation disruptions; increase in demand for state and municipal government services; inability to carry out mission and services due to damage, disruption, or loss of state assets and services.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Bridges and Culverts</td><td>Lead: MassDOT
Partners: DCR, EEA, MassDEP</td><td>Inland Flooding</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">1, 2, 3, 4, and 6</td><td>3 – 5 years</td></tr>
<tr><td colspan="4">Priority Impact: Loss of Urban Tree Cover</td></tr>
<tr><td colspan="4">ACTION 16: Expand DCR’s Greening the Gateway Cities Program into four environmental justice communities to mitigate heat island effects as well as combat adverse effects of climate change, reduce energy costs, absorb and filter pollutants, and decrease water runoff</td></tr>
<tr><td rowspan="4">The Greening the Gateways Cities Program is currently in 23 out of the 26 Gateway cities. Within the next five years, the program will expand into additional cities that are EJ communities with low urban canopy cover. In total, the program’s ten tree planting and maintenance teams will be planting 400 trees per year, with an overarching goal to plant at least 4,000 trees per year in EJ neighborhoods within the Gateway cities.
Other priority impacts addressed by action: Health and cognitive effects from extreme heat; health effects from degraded air quality; increase in mental health stressors; loss of biodiversity, habitats, and native species due to climate change impacts; and other priority impacts in the Natural Environment sector.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Local, Environmental Justice</td><td>Lead: DCR
Partners: municipalities</td><td>Flooding, extreme temperatures</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">3, 4, 5, and 6</td><td>3 – 5 years</td></tr>
</table>

<table>
<tr><th colspan="4">Priority Impact: Damage to Coastal Buildings and Ports</th></tr>
<tr><td colspan="4">ACTION 17: Develop guidance on flow path analyses and impacts of channelized flow to buildings</td></tr>
<tr><td rowspan="4">Terrain alterations (e.g., fill and landscaping walls) can impact how floodwaters flow through floodplains. Low-cost methods for conducting flow path analyses through developed areas will be reviewed. Thresholds (e.g., velocities and depths) for damages to buildings due to channelized flow will be identified. This information will be presented in a guidance document or fact sheet for project proponents, consultants, and reviewers.
Other priority impacts addressed by the action: Damage, disruption, or loss of coastal infrastructure such as seaports, airports, and maritime industries; damage to coastal state and municipal buildings and land; and damage to inland buildings; and coastal erosion.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Coastwide, Buildings</td><td>Lead: CZM
Partners: EEA, DCR,</td><td>Flooding, coastal erosion</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">2 and 3</td><td>Less than 3 years</td></tr>
<tr><td colspan="4">ACTION 18: Develop best practices for the redesign of seawalls and revetments</td></tr>
<tr><td rowspan="4">Coastal structures like seawalls and revetments exist to protect buildings and infrastructure along the coast. Over 1,300 publicly owned coastal structures need to be repaired or reconstructed. Beaches, coastal banks, and other coastal landforms associated with these structures have also eroded. CZM will convene an interdisciplinary work group with expertise in coastal engineering, geology, ecology/nature-based approaches, and planning to: (1) review design plans for coastal structures at risk of failure and those recently repaired or reconstructed, and (2) recommend best practices for redesign of critical coastal structures and those with the potential for improvement of landform function. Structure height with respect to sea level rise and storm surge projections will be a focus of the review and recommendations. There will be opportunities for engagement with coastal communities.
Other priority impacts addressed by the action: Damage, disruption, or loss of coastal infrastructure such as seaports, airports, and maritime industries; damage to coastal state and municipal buildings and land; and damage to inland buildings; coastal erosion.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Coastwide, Shoreline Management Infrastructure</td><td>Lead: CZM
Partners: EEA Dam & Seawall Grant Program, DCR Waterways</td><td>Flooding, coastal erosion</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">2 and 3</td><td>Less than 3 years</td></tr>
</table>

Priority Impact: Reduction in Clean Water Supply

Action Topic 19: Evaluate and increase the resilience of drinking water supplies to drought

Description: This action aims to address the Reduction in Clean Water Supply priority impact and hazards associated with drought and water quality. The action topic focuses on improving hydraulic monitoring networks and information sharing to evaluate various vulnerabilities to drought and groundwater flooding, identify causes of low stream flow conditions, and develop approaches to increasing resilience to drought, including implementing water restrictions, and developing water conservation and drought management plans.

Agencies: MassDEP, EEA, DCR

Other priority impacts addressed by action topic: Freshwater ecosystem degradation; decrease in agricultural productivity; and other priority impacts related to the Natural Environment sector.

ACTION 19a: Enhance and make more robust and comprehensive hydrologic monitoring networks

Assess monitoring networks used for the Drought Indices to make them more robust and comprehensive (e.g., spatial representation, regional representation, hydrogeologic representation). Conduct a network analysis and expand the network by acquiring and installing new equipment.

Scale	Lead(s) & Partner(s)	Hazard(s) Addressed
Statewide, Regional, Utilities	Lead: EEA	Drought
Goal(s) Addressed		**Timeframe**
2 and 3		Less than 3 years

ACTION 19b: Identify causes of low stream flows (therefore decreased water availability) during a drought

Launch a study to identify the causes for low stream flows such as land use change, climate change, water use, etc. to identify and prioritize mitigation measures.

Scale	Lead(s) & Partner(s)	Hazard(s) Addressed
Statewide, Aquatic Resources	Lead: EEA	Drought
Goal(s) Addressed		**Timeframe**
2, 3, and 4		3 – 5 years

ACTION 19c: Utilize consistent climate change data and projections to complete a Division of Water Supply Protection (DWSP)–specific climate vulnerability assessment by 2028

Utilizing the latest climate data from the 2022 Massachusetts Climate Assessment and the DCR Climate Change Vulnerability Assessment, the DCR's Division of Water Supply Protection (DWSP) will initiate a sub-watershed scale assessment adding data for sensitivity and adaptive capacity measurements to match DWSP's specific mission and management goals. This assessment will inform prioritization of capital planning decisions and designs, identify opportunities for resilience and climate

Scale	Lead(s) & Partner(s)	Hazard(s) Addressed
Statewide, Regional Sub watershed, Utilities	Lead: DCR Partners: MWRA,	All hazards

<table>
<tr><td rowspan="2">adaptation, and identify hazards and constraints at the sub-watershed level. This assessment is the first step to make our water supply lands climate resilient.</td><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">2, 3, 4, and 6</td><td>5+ years</td></tr>
<tr><td colspan="4">ACTION 19d: Develop a statewide database and dashboard of water resources data</td></tr>
<tr><td rowspan="4">Develop a statewide database on water use and management in multiple sectors, such as municipal, district, commercial, institutional, industrial, public sector to help with water needs forecasts, streamflow analysis, TMDLs, etc. This would pull data from across agencies (such as MassDEP) to increase efficiency and timeliness of compilation and analysis of water capacity, allocations, and use.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Local, Utilities</td><td>Lead: EEA
Partner: MassDEP</td><td>All hazards</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">1, 2, and 3</td><td>3 – 5 years</td></tr>
<tr><td colspan="4">CTION 19e: Ensure resilient current and future water supplies</td></tr>
<tr><td rowspan="4">Launch a study to assess and map vulnerability of private wells and public water supply wells to stresses such as droughts. This project will assess and map these contributing areas for use as criteria in EEA land conservation programs.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, local, utilities</td><td>Lead: EEA</td><td>Drought</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">2 and 3</td><td>Less than 3 years</td></tr>
<tr><td colspan="4">ACTION 19f: Implement Water Management Act regulatory updates (including water restrictions during droughts)</td></tr>
<tr><td rowspan="4">Implement newly promulgated Water Management Act regulations for addressing water restrictions by issuing registrations with new water conservation conditions for registered withdrawers during declared droughts (conservation). When a drought is declared by the Secretary, affected registrants will be required to implement conservation measures. MassDEP will provide technical assistance to registrants and oversee and ensure compliance.

Approximately 800 registrations must be renewed by April 2023 will include conservation requirements for next ten-year term. MassDEP will continue to phase in adding conservation requirements into Water Management Act permits as they are renewed. Conservation requirements began to be added to permits in 2003.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Utilities</td><td>Lead: MassDEP
Partners: Registered water users, permittees</td><td>Drought</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">1, 2, 3, 4, and 6</td><td>5+ years</td></tr>
</table>

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<tr><td colspan="4">ACTION 19g: Increase water use efficiency through technical and financial assistance at the local level</td></tr>
<tr><td rowspan="4">Provide technical and financial assistance to cities and towns to develop better water conservation plans and drought management plans that meet state guidelines provided by EEA, establish water rate structures that promote conservation and efficiency, conduct statewide water/sewer rate surveys, enhance local capacity to perform system wide water audits; address and minimize outdoor water use; invest in enhanced education and outreach to the public and water suppliers and in particular to EJ communities and under-resourced communities on water efficiency and water conservation.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Local, Utilities, Environmental Justice</td><td>Lead: EEA</td><td>Drought</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">1, 2, 3, 4, and 6</td><td>3 – 5 years</td></tr>
<tr><td colspan="4">Priority Impact: Loss of Energy Production and Resources</td></tr>
<tr><td colspan="4">ACTION 20: Update the State Energy Security Plan</td></tr>
<tr><td rowspan="4">Update the 2023 State Energy Security Plan (SESP) in 2026 to include updating the state energy profile, the energy sector vulnerability and risk assessment, hazard mitigation approach and energy emergency response plan. This update will allow the Commonwealth to capture changes to the energy system (electric, natural gas and delivered fuels) as we work to decarbonize the economy, highlight shifting vulnerabilities and risks based on those changes, in addition to climate risks, and further develop a hazard mitigation approach as we get closer to 2030. As part of the SESP update process, DOER will work with DPU and MEMA on the update and development of a table-top exercise in 2026 to validate the plan.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide,</td><td>Lead: DOER
Partners: EEA, DPU, MEMA</td><td>All</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">2, 3, 5, and 6</td><td>3 – 5 years</td></tr>
<tr><td colspan="4">ACTION 21: Expand MassGIS capabilities to map land for renewable energy or space for other transformative climate adaptation infrastructure</td></tr>
<tr><td rowspan="4">MassGIS can collaborate with agencies, including MEMA and EEA agencies, to harness the MassGIS skills and existing mapping capabilities to meet the strategic objectives and requirements of climate adaptation projects. In particular, MassGIS is able to gather relevant data on topography, land use and infrastructure. This may involve using tools such as sustainability analysis, spatial analysis and 3D representation.
Other priority impacts addressed by action: Damage to electric transmission and utility distribution infrastructure and inability to carry out mission and services due to damage, disruption, or loss of state assets and services.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, energy planning</td><td>Lead: TSS
Partners: EEA, MEMA</td><td>All hazards</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">2 and 5</td><td>3 – 5 years</td></tr>
</table>

Priority Impact: Increased Risk of Dam Overtopping or Failure

Action Topic 22: Implement programs to mitigate risk from dams and improve dam safety, including dam removal and repair, and emergency preparedness for downstream communities

Description: This action is meant to address the priority impact Increased Risk of Dam Overtopping or Failure and to reduce flooding and risks associated with dams. The action topic focuses on MEMA and DCR working in coordination with EEA/Dam Safety to evaluate and mitigate dam risks, strengthen dam response planning, and implement related flood risk reduction and resilience projects, when feasible.

Agencies: MEMA, DCR, and EEA.

Other priority impacts addressed by the action topic: The action topic also addresses some elements of the loss of life or injury due to high vulnerability dams, hurricanes, wildfires, extreme flooding, or extreme temperatures; damage to coastal buildings and ports; and damage to inland buildings priority impacts. Where feasible, these actions may provide ecological restoration benefits and habitat connectivity, aligning with the priority impacts in the Natural Environment sector.

ACTION 22a: Finalize development of prioritization decision-making methodology to repair or remove dams to implement FEMA's High Hazard Potential Dam Program

Develop a screening-level, risk-based, decision-making methodology to prioritize the portfolio of DCR-Office of Dam Safety's eligible high hazard potential dams that are reported to be in poor or unsafe condition for repair or removal in order to mitigate risk and abate public safety threats associated with these dams.

Scale	Lead(s) & Partner(s)	Hazard(s) Addressed
Statewide, Dams	Leads: MEMA/DCR Partner: FEMA	Dam overtopping
Goal(s) Addressed		**Timeframe**
2, 3, 4, and 6		Less than 3 years

ACTION 22b: Dam safety planning improvements

MEMA will work with EEA/Dam Safety to strengthen dam response planning at the state level. There are gaps in the process of dam safety planning including establishing a regular update cycle. When a dam breaks or is breached it is these plans that MEMA and local officials will turn to understand the safety response, notification procedures, and other response-focused elements. This planning helps protect the infrastructure and populations downstream from dams. This is a stand-alone action as it is for emergency response rather than maintenance plans.

Scale	Lead(s) & Partner(s)	Hazard(s) Addressed
Statewide, Dams	Leads: MEMA Partners: DCR/Office of Dam Safety, EEA	Dam overtopping
Goal(s) Addressed		**Timeframe**
1, 3, and 6		Less than 3 years

<table>
<tr><td colspan="4">ACTION 22c: Implement climate resiliency measures for the New Charles River and Amelia Earhart dams</td></tr>
<tr><td rowspan="4">Design and construct flood resilience projects at Amelia Earhart Dam and associated lands, including Draw Seven Park. Complete Long-term Resiliency Study led by USACE for New Charles River Dam (anticipated completion: 2025).</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Regional</td><td>Lead: DCR
Partners: Charles River Watershed Association, MVP Program</td><td>Dam overtopping</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">1, 3, 4, and 6</td><td>Greater than 5 years</td></tr>
<tr><td colspan="4">ACTION 22d: Municipal and other dam removals year 1: feeding the project pipeline for strong ecological value and climate resilience benefit</td></tr>
<tr><td rowspan="4">Complete feasibility studies and develop preliminary designs for up to five high-priority dam removal projects, prioritizing high- and significant-hazard dams. This early-stage work will increase the Commonwealth's ability to support dam removal projects.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Dams</td><td>Lead: DER
Partner: DCR</td><td>Dam overtopping</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">2 and 4</td><td>Less than 3 years</td></tr>
<tr><td colspan="4">High-Consequence Vulnerability: Damage or Loss of Unreinforced Masonry Buildings Due to Earthquakes</td></tr>
<tr><td colspan="4">ACTION 23: Incorporate earthquake risk assessments into project planning</td></tr>
<tr><td rowspan="4">In an asset management system, identify buildings with particular risk from earthquakes, especially masonry bearing-wall buildings and buildings in identified soil liquefaction zones. Utilize these assessments during major renovation projects to identify and address specific high-priority threats to state buildings. Incorporate IEBC Chapter A1 earthquake risk assessments into the early-stages of major renovation projects on unreinforced masonry bearing-wall buildings. Other priority impacts addressed by action: Inability to carry out mission and services due to damage, disruption, or loss of state assets and services; increase in demand for state and municipal government services.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>State assets, Buildings, Liquefaction Zones</td><td>Lead: DCAMM</td><td>Earthquakes</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">3</td><td>Less than 3 years</td></tr>
</table>

High-Consequence Vulnerability: Damage to Infrastructure, Utilities, and Buildings in Liquefaction Zones Due to Earthquakes
No actions have been tagged to this priority impact. Elements of this High-Consequence Vulnerability may be addressed by actions from the following Priority Impacts/High-Consequence Vulnerabilities: • Damage or Loss of Unreinforced Masonry Buildings Due to Earthquakes
High-Consequence Vulnerability: Damage or Loss to Homes and Critical Facilities in the Wildland Urban Interface
No actions have been tagged to this High-Consequence Vulnerability. Elements of this High-Consequence Vulnerability may be addressed by actions from the following Priority Impacts/High-Consequence Vulnerabilities: • Loss of Urban Tree Cover • Forest Health Degradation

Natural Environment Sector

Action Description

Urgent Priority Impact: Freshwater Ecosystem Degradation

Action Topic 1: Ecological restoration partnerships and projects to evaluate and improve water quality

Description: This action topic addresses the freshwater ecosystem degradation priority impact and is related to hazards including groundwater flooding, inland flooding, drought, and invasive species. The action topic focuses on evaluating opportunities for capacity building and assessments to evaluate ecological restoration projects and their potential to improve water quality, resilience, and ecological habitat.

Partners: DER, DFG, MassWildlife, USGS, UMass-Amherst, NECASC, and other New England States

Other priority impacts addressed by action topic: Shifting distribution of native and invasive species; loss of biodiversity, habitats, and native species due to climate change impacts.

ACTION 1a: Increase regional capacity building to help communities plan and implement climate resilient ecological restoration projects

Increase DER's regional capacity building efforts by partnering with 3-5 new regional partners through the Regional Restoration Partnerships Program. The new regional partners will receive technical and funding assistance from DER to plan, design, and implement aquatic ecosystem restoration projects that increase climate resilience for human and natural communities.

Scale	Lead(s) & Partner(s)	Hazard(s) Addressed
Statewide, Regional, Restoration	Leads: DER/ DFG	All hazards
Goal(s) Addressed		**Timeframe**
1, 2, 4, and 6		Less than 3 years

ACTION 1b: Understand groundwater flow and associated water quality benefits of cranberry bog restoration projects

Support hydrologic and geochemical studies to better understand how effective cranberry bog restoration projects are at improving water quality, specifically looking at nitrogen. Restoration of former agricultural cranberry bogs alters groundwater flow and patterns of ground/surface water exchanges, but the nature and extent of altered flow patterns is likely site specific and potential reductions in nitrogen export are not well understood and difficult to characterize in the field. Increased frequency of high intensity rainfall, increased stormwater runoff and pollutants, and prolonged droughts lead to changes in hydrology within restored cranberry bog systems and an increased water quality impact to freshwater ecosystems. Understanding how effectively cranberry bogs "treat" water under various hydrological conditions will

Scale	Lead(s) & Partner(s)	Hazard(s) Addressed
Regional, Restoration, Water Quality	Leads: DER/DFG	Groundwater flooding, inland flooding, drought
Goal(s) Addressed		**Timeframe**
2 and 4		3 – 5 years

Natural Environment Sector

Action Description			
help advance scientific understanding of how cranberry bog restoration can mitigate the water quality impacts of climate change.			
ACTION 1c: Aquatic biodiversity conservation: fresh water mussels			
Freshwater mussels provide critical ecosystem services and yet are some of the most threatened animals in the state. Six of the 12 species found in Massachusetts are listed under the state's Endangered Species Act. They are critical to protecting water quality in freshwater systems. Each mussel can filter up to 15 gallons of water per day. As climate change continues to stress freshwater systems through increases in pollutant concentrations and algal blooms, freshwater mussels provide a nature-based solution to protect water quality and reverse freshwater ecosystem degradation. This project would seek to understand how changing environmental conditions are affecting freshwater mussel occupancy and resilience to develop effective conservation strategies.	**Scale**	**Lead(s) & Partner(s)**	**Hazard(s) Addressed**
	Statewide Eastern Inland Region Central Region, Conservation	Lead: MassWildlife Partners: USGS, UMass-Amherst, NECASC, biologists from New England states	Flooding, invasive species, coastal flooding, inland flooding
	Goal(s) Addressed		**Timeframe**
	1, 2, 3, 4, and 6		Less than 3 years
ACTION 2: Lake level management recommendations to abate cyanobacteria blooms			
MassWildlife has been working with partners (e.g., USGS, UMass-Amherst) to model how lake levels and climate change are likely to affect cyanobacteria blooms. However, little on-the-ground data has been collected to drive the models. This action would seek to collect empirical data in lakes throughout the state to validate and populate models. MassWildlife will coordinate with DCR and DPU when shared goals exist.	**Scale**	**Lead(s) & Partner(s)**	**Hazard(s) Addressed**
	Statewide, Lakes, Water Quality	Lead: MassWildlife Partners: DCR, DPU, USGS, UMass-Amherst, etc.	Flooding, drought, extreme temperatures
	Goal(s) Addressed		**Timeframe**
	1, 2, 3, 4, and 6		Less than 3 years
ACTION 3: Integrate DCR's Stormwater Best Management Practices (BMPs) into DCR's Design Review Process			
In October 2022, DCR created its Stormwater Design Handbook as a supplement to MassDEP's Stormwater Handbook. Formalizing incorporating these BMPs into DCR's Design Review Process will ensure that every single DCR project considers and manages stormwater in a way that responds to the anticipated increased precipitation	**Scale**	**Lead(s) & Partner(s)**	**Hazard(s) Addressed**
	Statewide, Stormwater Utilities, Water Quality	Lead: DCR	Other severe weather

Natural Environment Sector

Action Description		
from climate change that poses a threat to freshwater ecosystems under DCR's stewardship.	**Goal(s) Addressed**	**Timeframe**
	1, 3, and 6	3 – 5 years

Urgent Priority Impact: Coastal Wetland Degradation

Action Topic 4: Improve coastal wetland mapping, resilience planning, and restoration efforts

Description: This action aims to address the Coastal Wetland Degradation priority impact and will help to address coastal flooding hazards and improve habitats, among other benefits. The action topic focuses on developing tools and utilizing geospatial datasets to identify opportunities to prioritize resilient efforts for coastal wetland and salt marsh restoration project to improve habitat, accommodate marsh migration, manage stormwater, and mitigate impacts from sea level rise. These efforts will be shared with CZM in consideration of their salt marsh migration land acquisition strategy.

Partners: DER, DCR, MassDEP, CZM, and MassWildlife

Other priority impacts addressed by action topic: Damage to coastal buildings and ports; damage to coastal state and municipal buildings and land; damage, disruption, or loss of coastal infrastructure such as seaports, airports, and maritime industries; and all priority impacts in the Natural Environment sector.

ACTION 4a: Develop a GIS mapping tool for climate coastal and inland wetlands to identify resource area vulnerability corridors

Design, develop, and maintain a mapping tool of coastal and inland floodplains and other wetland resource areas that identifies current and future "climate vulnerability corridors". The mapping tool will include data layers for risks (such as storm damage, sea levels affecting marshes, and others), land use (such as infrastructure), and cadaster information (such as ownership, EJ populations, wetlands restrictions, and conservation easements). The mapping tool will help identify opportunities and prioritize resilience efforts at a regional /watershed scale—moving beyond a project-by-project approach. The tool's GIS and modeling components will be integrated into relevant state mapping platforms and may require a field component for development and periodic updates. MassDEP will coordinate with CZM and DCR to ensure the tool meets the overall needs of the collective agencies.

Scale	**Lead(s) & Partner(s)**	**Hazard(s) Addressed**
Statewide, Wetlands	Lead: MassDEP Partner: CZM	Inland flooding, other severe weather, coastal erosion, coastal flooding
Goal(s) Addressed		**Timeframe**
All		Less than 3 years

<table>
<tr><td colspan="4">ACTION 4b: Identify and prioritize tidal restoration projects using the DER tidal crossing geodatabase</td></tr>
<tr><td rowspan="3">In 2020, DER developed a coast-wide geodatabase containing data on tidal crossings in Massachusetts. Through GIS analysis and field assessments DER will use the tidal crossing geodatabase to identify and prioritize new salt marsh restoration projects that consider multiple criteria including climate resilience, marsh migration potential, and future impacts of sea level rise.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Coastwide, Utilities, Restoration</td><td>Leads: DER/ DFG
Partner: CZM</td><td>Coastal flooding</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">2 and 4</td><td>Less than 3 years</td></tr>
<tr><td colspan="4">ACTION 4c: Conduct coastal wetland modeling and restoration assessments for DCR’s coastal wetlands to support planning and restoration efforts</td></tr>
<tr><td rowspan="3">Assessments documenting and analyzing hydrology, existing conditions, watershed functions, and existing stormwater capacity will be paired with future projections for stormwater and sea level rise. These assessments will help identify mitigation and restoration actions, such as naturalizing the stream, managing stormwater, and improving hydrology of saltmarshes. In 2023, DCR will begin assessments in Belle Isle Marsh Reservation and Town Line & Linden Brook. DCR's coastal wetlands assessment results will be shared with CZM for consideration and integration into their salt marsh migration land acquisition strategy.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Regional, Utilities, Restoration</td><td>Lead: DCR
Partner: CZM</td><td>Coastal flooding, other severe weather</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">2, 3, 4, 5 and 6</td><td>3 – 5 years</td></tr>
<tr><td colspan="4">ACTION 4d: Advance salt marsh conservation and restoration</td></tr>
<tr><td rowspan="3">Advance the conservation and restoration of salt marshes, coordinating closely with partners (EEA, MassDEP, DER) and stakeholders, through the following activities: (1) Facilitation of Land Acquisition for Marsh Migration - CZM will utilize existing tools and data (SLAMM) to prioritize undeveloped areas that are modeled to be suitable for future salt marsh migration and pursue federal funding opportunities to support acquisition of priority parcels; (2) Advance understanding of beneficial reuse of sediments to restore and maintain salt marsh habitat - CZM will convene an expert stakeholder group to explore the science and practice of beneficial reuse of dredged sediments for salt marsh restoration. Opportunities for beneficial reuse that are environmentally sound, economically feasible, and permittable in Massachusetts will be the focus; (3) Implement new grant program to support monitoring and adaptive management of applied salt marsh restoration techniques - CZM will build capacity for salt marsh restoration through a targeted grant program to specifically support monitoring and adaptive management of novel</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Coastwide, Salt Marshes</td><td>Lead: CZM
Partners: EEA, MassDEP, DER, DCR (WBNERR)</td><td>Coastal flooding, inland flooding, coastal erosion</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">All</td><td>3 – 5 years</td></tr>
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<table>
<tr><td colspan="2">restoration strategies to improve understanding of these techniques, ensure scientific rigor, and improve the ability to evaluate success.</td><td></td><td></td></tr>
<tr><td colspan="4">ACTION 4e: Great Marsh ecosystem recovery project</td></tr>
<tr><td rowspan="3">Project partners have begun restoration of some of the Great Marsh Ecosystem. However, only a fraction of the ecosystem has been restored. This action will continue monitoring and restoration efforts to reestablish marsh elevations and tidal connections to the system.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Regional, Restoration</td><td>Lead: MassWildlife
Partners: Trustees, NPS, Mass Audubon, and municipalities</td><td>Coastal flooding, coastal erosion</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">1, 2, 3, 4, and 6</td><td>3 – 5 years</td></tr>
<tr><td colspan="4">ACTION 4f: Develop updated wetlands restoration guidance and regulations to improve climate resilience</td></tr>
<tr><td rowspan="3">Develop updated inland and coastal wetlands protection and restoration guidance and/or regulations that improve climate resilience at project, local, and regional /watershed scales. Establish permitting pathways, policies, or guidance to encourage (1) protection / restoration of coastal wetland resource areas including education on new coastal floodplain standards, removal of tidal flow restrictions to restore full extent of salt marshes, restoration of salt marsh ecosystem functionality, migration of salt marshes, dunes, and other coastal resource areas, and address other related challenges; and (2) protection and restoration of inland floodplains, including better alignment with FEMA requirements, consideration of future precipitation data for stormwater and floodplain boundaries, and other strategies. MassDEP will coordinate with CZM and DCR in this effort.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Coastwide, restoration</td><td>Lead: MassDEP
Partners: CZM, DER, DCR, Conservation Commissions, other state and federal agencies, non-profits, private property owners, consultants, developers</td><td>Coastal erosion, coastal flooding and storm surge, groundwater rise, huriane/tropical cyclone, inland flooding, invasive species, landslide, other severe weather</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">All</td><td>3 – 5 years</td></tr>
</table>

ACTION 4g: Support adaptation of roads in salt marshes

Roads exist coast-wide in salt marshes to provide access to homes, businesses, and recreational areas. These roads have impacted coastal resources, restricted tidal flow, and altered hydrology. Sea level rise and coastal storms will flood many of these roads at increasing frequency and depths in the future. There is a need to characterize the problem to support management efforts. CZM will conduct a GIS analysis to identify roads through salt marshes, length, ownership, purpose, ACEC jurisdiction, elevation, vulnerability, and other relevant factors. This information will be summarized in a fact sheet. The fact sheet will also describe impacts of traditional methods to elevate roads in salt marshes.

Scale	Lead(s) & Partner(s)	Hazard(s) Addressed
Coastwide North and South Shores Region Cape, Islands, and South Coast Region, Transportation Infrastructure	Lead: CZM Partners: MassDEP, MassDOT	Coastal flooding, inland flooding, coastal erosion
Goal(s) Addressed		**Timeframe**
2, 3, and 4		Less than 3 years

Urgent Priority Impact: Marine Ecosystem Degradation

Action Topic 5: Evaluate the impacts of ocean acidification

Description: This action is meant to address the Marine Ecosystem Degradation priority impact and includes providing technical support and expanding monitoring networks to gather data and evaluate long term trends in temperature, dissolved oxygen, and ocean acidification.
Partners: CZM, DMF, DAR, SAP, and local municipalities
Other priority impacts addressed by action topic: Decrease in marine fisheries and aquaculture productivity and all priority impacts under the Natural Environment sector.

ACTION 5a: Support new program to initiate coastwide monitoring of ocean acidification, water temperature, and dissolved oxygen

Develop and implement a coastwide monitoring network to observe long term trends in water temperature, dissolved oxygen, and ocean acidification.

Scale	Lead(s) & Partner(s)	Hazard(s) Addressed
Coastwide	Lead: CZM Partner: DMF	Coastal flooding
Goal(s) Addressed		**Timeframe**
2		Less than 3 years

<table>
<tr><td colspan="4">ACTION 5b: Support ocean acidification monitoring efforts</td></tr>
<tr><td rowspan="4">Advance the development of an ocean acidification monitoring network through collaborations with local shellfish departments and shellfish aquaculturists.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Coastwide</td><td>Lead: DMF
Partners: DAR, SAP, municipalities</td><td>Coastal flooding</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">All</td><td>5+ years</td></tr>
<tr><td colspan="4">ACTION 5c: Ocean bottom temperature database</td></tr>
<tr><td rowspan="4">Advance the utility of the DMF Bottom temperature database in addressing ocean warming.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Coastwide</td><td>Lead: DMF
Partners: EEA IT, DFG IT</td><td>Coastal flooding</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">All</td><td>3 – 5 years</td></tr>
<tr><td colspan="4">ACTION 6: Integrate climate change and decarbonization considerations into oil spill preparedness and response activities under Massachusetts Oil Spill Prevention & Response Act (MOSPRA)</td></tr>
<tr><td rowspan="4">MassDEP and its contracted consultant have met with climate experts and other stakeholders to identify and prioritize impacts of climate trends, projections, and policies and programs for oil spill risk, prevention, and response. The final report, anticipated in December 2023, will include findings and recommendations. Recommendations may affect the deployment of resources from funds collected through MOSPRA to the highest risk areas or activities. Recommendations may also include updating geographic response strategies for vulnerable coastal areas and may address response practices and preparation actions that require other modifications as a result of sea-level rise and other climate impacts.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Coastwide, Maritime Industry</td><td>Lead: MassDEP
Partners: USCG, EPA, municipalities</td><td>Coastal Flooding, Sea Level Rise</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">All</td><td>3 – 5 years</td></tr>
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<table>
<tr><th colspan="4">Urgent Priority Impact: Forest Health Degradation</th></tr>
<tr><td colspan="4">ACTION 7: Enhance the Continuous Forest Inventory program by integrating collection and analysis of forest soils data, as well as increase the application of CFI data to promote data-driven, adaptive, and strategic forest planning</td></tr>
<tr><td rowspan="3">In the next five years, expand and increase funding of the Continuous Forest Inventory (CFI) program to include sampling forest soils for physical and chemical properties to better understand the effects of climate change and forest management strategies on soil properties, health, and carbon dynamics. The new soil data collected by DCR’s CFI program will also inform the implementation of the Commonwealth’s Healthy Soils Action Plan and Resilient Lands Initiative. The CFI program is a strategic, systematic sample of forests under DCR’s stewardship. The program started in the late 1950s and provides over 6 decades of data, including information on the status and trends of DCR’s forest land and enables projections of future scenarios to evaluate tradeoffs. It also provides data on resiliency and adaptive capacity; forest health; and growth, yield, and mortality of attributes including carbon. CFI data play a critical role in understanding the resiliency of our forests to stressors and disturbances at a broad scale; and will be used in/with a variety of decision support tools to prioritize strategic action to reduce vulnerabilities.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Forests</td><td>Lead: DCR</td><td>Wildfire, drought, invasive species</td></tr>
<tr><td colspan="2">Goal(s) Addressed
2, 4, 5, and 6</td><td>Timeframe
5+ years</td></tr>
<tr><td colspan="4">ACTION 8: Increase public outreach and education around forest health impacts and DCR’s Forest Health program</td></tr>
<tr><td rowspan="3">Over the next five years, the Forest Health program will expand their public outreach capabilities, increase the number of citizens reached through direct messaging, and streamline public reports of forest threat issues. To achieve these goals, there is a need to increase GIS support for the Forest Health program to respond to the increased need for interpretive materials for public education and integrating public reports into field staff digital mapping tools. DCR’s Forest Health Program monitors and manages forests within DCR’s state forests, parks, and reservations for forest health issues, including non-native pathogens and insects. Early detection and swift mitigation action of forest disturbance events, including invasives pest, pathogens, and invasive plants is the best way to limit a shift in range of invasive species and prevent them from becoming established in the landscape to the detriment of native species. For instance, this program’s identification of Beech Leaf Disease and early detection efforts and swift treatment of Southern Pine Beetle earlier in 2023, successfully prevented invasive species from expanding into the state.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Forests</td><td>Lead: DCR
Partners: MDAR, MassWildlife</td><td>Invasive species, drought, coastal flooding, inland flooding, extreme heat, drought, erosion, landslides</td></tr>
<tr><td colspan="2">Goal(s) Addressed
1 and 2</td><td>Timeframe
3 – 5 years</td></tr>
</table>

<table>
<tr><td colspan="4">ACTION 9: Implementation of regional conservation plans for turtle SGCN (Species of Greatest Conservation Need)</td></tr>
<tr><td rowspan="3">Restoring turtle species in Massachusetts is important for improving forest health. Terrestrial turtles are prolific seed dispersers for many plants, including trees, and fungi, because they are long-lived, widespread, and travel between habitats. Their eggs are also an important food source for other species, such as snakes and small mammals. Unfortunately, six of the ten native terrestrial and aquatic species are listed under the Massachusetts Endangered Species Act. The factors threatening the persistence of turtles are complex and include disease, illegal collections, and habitat degradation. Climate change is expected to amplify many of the factors already adversely impacting turtles. Furthermore, standardized assessments have not been completed and there is scarce information on which to base status evaluations and effective conservation measures. This action will hire seasonal temporary herpetologists to collect data in the state as well as organize biologists within the region to complete status assessments.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Forests, Endangered Species</td><td>Lead: MassWildlife
Partners: northeastern state biologists</td><td>Invasive species, coastal flooding, inland flooding, extreme heat, drought, erosion, landslides</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">1, 2, 3, 4, and 6</td><td>3 – 5 years</td></tr>
<tr><td colspan="4">ACTION 10: Restore forest ecosystem health to bolster climate change resiliency</td></tr>
<tr><td rowspan="3">MassWildlife will continue to coordinate forest health projects with sister agencies such as DCR and MassDEP. However, MassWildlife projects may be developed and prioritized with different goals and methods and at different locations to meet the agency’s mission.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Forests</td><td>Lead: MassWildlife
Partners: DCR, USGS, NIACS</td><td>Wildfire, invasive species, coastal flooding, inland flooding, extreme heat, drought, erosion, landslides</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">All</td><td>Less than 3 years</td></tr>
<tr><td colspan="4">Priority Impact: Shifting Distribution of Native and Invasive Species</td></tr>
<tr><td colspan="4">Action Topic 11: Developing an approach for detecting and responding to invasive species management</td></tr>
<tr><td colspan="4">Description: This action topic addresses the Shifting Distribution of Native and Invasive Species priority impact and overlaps with various priority impacts in the Natural Environment sector in addition to those listed below. The action topic addresses hazards associated with invasive species in addition to aspects of the coastal and inland flooding, extreme heat, drought, and landslide hazards. Although the actions presented below separately pertain to invasive plants, marine species, and forestry, these actions together present a framework for conducting assessments to detect and evaluate impacts from invasive species and creating partnerships to develop and implement effective strategies for invasive species management.</td></tr>
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Partners: CZM, MassWildlife, and DCR,

Other priority impacts addressed by action theme: Decrease in agricultural productivity; reduction in food safety and security; in addition to all priority impacts under the Natural Environment sector.

ACTION 11a: Assessment and management plan for invasive plants

Invasive species are the biggest threat to ecosystems in the state, after habitat destruction and degradation. Their impacts are getting increasingly worse as a result of climate change. Habitats important for carbon sequestration (forests, salt marshes), clean water, and protection from inland flooding are all threatened by the pervasive and largely uncontrolled impacts from invasive species. Management and eradication of invasive species takes early detection, years of treatments, and continued funding which most agencies don't have due to limitations on staff capacity and budget allocations. Making this a statewide action led by EEA will provide much needed coordination and leadership. Organizations like the Northeast Climate Adaptation Center can provide a lot of guidance with this action.

Scale	Lead(s) & Partner(s)	Hazard(s) Addressed
Statewide, Ecosystems	Lead: MassWildlife	Invasive species, coastal flooding, inland flooding, extreme heat, drought, coastal erosion, landslides

Goal(s) Addressed	Timeframe
1, 2, 3, 4, and 6	3 – 5 years

ACTION 11b: Conduct Rapid Assessment Survey for marine species

Conduct a Rapid Assessment Survey focusing on the Gulf of Maine and Buzzards Bay regions. Roughly every five years since 2000, CZM has helped coordinate teams of scientific experts to periodically conduct a rapid assessment of marine species, including invasive animals and plants that have been introduced by human activity and have the capacity to harm the environment, economy, and public health. The last survey was conducted in 2018.

Scale	Lead(s) & Partner(s)	Hazard(s) Addressed
Coastwide, Regional	Lead: CZM Partners: DCR, DMF	Invasive species, coastal flooding, inland flooding, extreme heat, drought, coastal erosion, landslides

Goal(s) Addressed	Timeframe
2	Less than 3 years

ACTION 11c: Develop an Invasive Species Emergency Response Plan for invasive pest species, including federally regulated species, that pose a significant risk to forest resources by 2025

DCR's Bureau of Forestry will develop a detailed response plan for newly introduced invasive species, as well as those pests of regulatory concern with high risk of introduction. The plan will outline emergency response operations to respond to emerging pests, including the eradication or mitigation actions to be taken, long term goals, and key programs and positions involved.

Scale	Lead(s) & Partner(s)	Hazard(s) Addressed
Statewide, Forests	Lead: DCR Partners: MDAR, MassWildlife, Federal agencies	Invasive species, coastal flooding, inland flooding, extreme heat, drought, coastal erosion, landslides
Goal(s) Addressed		**Timeframe**
2, 4, and 5		3 – 5 years

Priority Impact: Coastal Erosion

Action Topic 12: Evaluate impacts from coastal erosion and align restoration projects accordingly

Description: This action topic addresses the Coastal Erosion priority impact in addition to aspects of all priority impacts in the Natural Environment sector in addition to those listed below. The action topic primarily addresses the coastal erosion and coastal flooding and storm surge hazards. The action topic focuses on updating mapping and incorporating new data to evaluate rates of coastal erosion to best inform decision makers and identifying projects for restoration and to reduce coastal erosion, such as the restoration of Ram Island Wildlife Sanctuary.

Partners: CZM and MassWildlife, DCR, MassDEP, EEA, and others (including USGS and The Trustees of Reservations)

Other priority impacts addressed by action topic: Damage to coastal buildings and ports; damage to coastal state and municipal buildings and land; damage, disruption, or loss of coastal infrastructure such as seaports, airports, and maritime industries; and all priority impacts in the Natural Environment sector.

ACTION 12a: Update the Shoreline Change Project and erosion hot spots

Delineate a new mean high-water shoreline for the MA coast (post 2018) and update rates of change. Add new data to the MA Coastal Erosion Viewer. Also, use the erosion rates and other data (e.g., coastal bank erosion hazards and MyCoast reports) to update the erosion hot spots identified in the 2015 Report of the Coastal Erosion Commission.

Scale	Lead(s) and Partner(s)	Hazard(s) Addressed
Coastwide, Erosion Hot Spots	Lead: CZM Partner: USGS	Coastal erosion, coastal flooding, storm surge
Goal(s) Addressed		**Timeframe**
2, 3, and 4		3 – 5 years

<table>
<tr><td colspan="4">ACTION 12b: Update coastal bank erosion hazard mapping and integrate with the MA Coastal Erosion Viewer</td></tr>
<tr><td rowspan="4">Coastal bank erosion and vulnerability are not reflected in existing coastal hazards maps for Massachusetts such as shoreline change maps. CZM will update a pilot 2016 coastal bank erosion hazard mapping product for the Massachusetts coastline. The update will include analysis using 2018 LIDAR data and more recent elevation data, if it becomes available, to look at areas of the coast experiencing high, moderate, and low magnitudes of coastal bank erosion, and have the potential to affect existing and future land uses. This coastal bank erosion hazard mapping product will be integrated into the MA Coastal Erosion Viewer. CZM will conduct outreach on the final product to coastal municipalities and organizations.</td><td>Scale</td><td>Lead(s) and Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Coastwide</td><td>Lead: CZM
Partner: MassDEP</td><td>Coastal erosion, coastal flooding, storm surge</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">2, 3, and 4</td><td>3 – 5 years</td></tr>
<tr><td colspan="4">ACTION 12c: Coastal erosion adaptation project for endangered birds: restoration of Ram Island Wildlife Sanctuary</td></tr>
<tr><td rowspan="4">This project would stabilize and restore Ram Island for the benefit of rare terns and saltmarsh habitat. The island in Buzzard’s Bay is a state-owned wildlife sanctuary that supports 20% of the N. American population of the federally endangered Roseate Tern as well as MA's second-largest Common Tern (MA-listed: Special Concern) colonies. Maximum elevation of 3-acre island is <9 feet above Mean Low Water. It is rapidly eroding and threatened by climate change, including sea-level rise. An alternatives analysis to explore approaches to protecting the island was completed in January of 2023. Preferred approaches include saltmarsh creation and restoration, intertidal cobble berms, coastal dune enhancement, and offshore boulderfields. The next steps are completing detailed design and engineering plans ($200K) and permitting ($300K). Construction costs are likely to run at least $6M and additional sources of funding are being explored.</td><td>Scale</td><td>Lead(s) and Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Regional, Restoration</td><td>Lead: MassWildlife
Partners: Trustees, DCR, MassDEP, EEA, CZM</td><td>Coastal erosion, coastal flooding, storm surge</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">1, 2, 3, 4, and 6</td><td>5+ years</td></tr>
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<table>
<tr><th colspan="4">Priority Impact: Soil Erosion</th></tr>
<tr><td colspan="4">ACTION 13: Update Erosion and Sediment Control Guidelines and other policies to minimize erosion from work in Wetlands Resource Areas</td></tr>
<tr><td rowspan="3">Update the Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas (1997, reprinted in 2003), and develop a policy to reinforce that controls during construction are required when alterations occur in wetland resource areas and promote implementation of controls outside of wetland resource areas—to dovetail with MS4 requirements.
Other priority impacts addressed by action: Decrease in agricultural productivity; reduction in food safety and security; coastal erosion; freshwater ecosystem degradation; forest health degradation; marine ecosystem degradation; and reduction in clean water supply.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Wetland Resource Areas</td><td>Lead: MassDEP</td><td>Coastal erosion, inland flooding, landslide</td></tr>
<tr><td>Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">1, 2, 3 and 6</td><td>3 – 5 years</td></tr>
<tr><th colspan="4">High-Consequence Vulnerability: Loss of Biodiversity, Habitats, and Native Species due to Climate Change Impacts</th></tr>
<tr><td colspan="4">Action Topic 14: Conducting culvert removal and replacement projects to improve habitat connectivity and water quality</td></tr>
<tr><td colspan="4">Description: The action topic focuses on the Loss of Biodiversity, Habitats, and Native Species due to Climate Change Impacts high-consequence vulnerability in addition to other priority impacts in the Natural Environment sector, as indicated below. Together, the actions focus on identifying and prioritizing culvert replacement projects to improve water quality, habitat, assist ecologically sensitive species, and improve public health and safety. The actions focus on creating habitat connectivity for freshwater and coastal species and environments and restoring habitats.
Partners: DER, DFG, MassWildlife, DCR, USFWS, and Conservation Commission
Other priority impacts addressed by action topic: Damage to tourist attractions and recreation amenities and all priority impacts under the Natural Environment sector.</td></tr>
<tr><td colspan="4">ACTION 14a: Develop culvert replacement project pipeline to advance high priority ecologically sensitive restoration projects</td></tr>
<tr><td rowspan="3">Advance strategies to help communities and partnering agencies identify and prioritize ecologically sensitive culvert replacement projects. This effort provides early phase planning services to prepare high value ecological projects for future implementation assistance. DER will build on criteria developed to score projects for its Culvert Replacement Municipal Assistance Grant Program with a particular focus on high value ecological projects and municipalities/regions that have historically had less culvert projects in partnership with DER. DER will work with landowners of potential sites which may include private landowners, municipalities and land-holding agencies such as DCR, MassWildlife and MassDOT.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Regional, Local, Restoration</td><td>Lead: DER</td><td>Flooding, dam overtopping</td></tr>
<tr><td>Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">2 and 4</td><td>Less than 3 years</td></tr>
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<tr><td colspan="4">ACTION 14b: Transitional crossings year 1: testing standards for evaluation, feasibility and design of culverts and bridges that will experience the impacts of sea level rise in the next 50 to 75 years</td></tr>
<tr><td rowspan="4">Apply the draft Phase 1 climate resilience guidance developed for stream crossings in coastal and near-coastal environments, document the site assessment processes, obtain site-specific model data, develop preliminary designs for up to three high-priority “transitional” culvert sites, and to use these case studies and feedback from a Technical Advisory Committee to finalize technical guidance for stream crossings in transition.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Coastwide, Transportation Infrastructure, Stormwater Utilities, Restoration</td><td>Leads: DER/DFG</td><td>Coastal flooding, sea level rise</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">2 and 4</td><td>Less than 3 years</td></tr>
<tr><td colspan="4">ACTION 14c: Restore water quality and habitat connectivity in coastal streams</td></tr>
<tr><td rowspan="4">This action will seek to assess culverts in tributaries to Buzzards Bay, complete upgrades or replacements of culverts in Fresh Brook (Wellfleet, MA) and Red Brook, as well as complete restoration of the Upper Coonamesset River.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Regional, Restoration</td><td>Lead: MassWildlife Partners: DER, DCR, USFWS, Conservation Commission</td><td>Coastal flooding, other severe weather</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">1, 2, 3, 4 and 6</td><td>Less than 3 years</td></tr>
<tr><td colspan="4">ACTION 14d: Priority dam assessments and dam removals</td></tr>
<tr><td rowspan="4">MassWildlife has identified several projects important for restoring habitats for cool-water and warm-water fisheries. These include the removal of Salmon Brook Dam (partially funded) and Riley Grist Dam (Mill River). Although much emphasis is placed on cold-water fishes, the Commonwealth's aquatic biodiversity also includes cool-water and warm-water species. The action will also complete assessments of MassWildlife-owned dams statewide.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Asset, Dams</td><td>Lead: MassWildlife</td><td>Coastal flooding, dam overtopping</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">1, 2, 3, 4 and 6</td><td>Less than 3 years</td></tr>
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<tr><td colspan="4">ACTION 15: Monitor and restore climate refugia aquatic ecosystems</td></tr>
<tr><td rowspan="2">Climate change refugia are habitats naturally more resilient to climate change as they change at a much slower pace than the habitats around them. They are important as anchors to restoration efforts because individuals will recolonize restored areas from these habitats. This action will collect streamflow and temperature data necessary to evaluate impacts to climate change refugia (e.g., at headwater ponds and streams flowing into coldwater habitats). Three projects have also been identified as important to protect climate refugia, including restoration projects in the Hoosic River, Hamant Brook and Upper Quashnet River.

Other priority impacts addressed by action: This action addresses all priority impacts within the Natural Environment sector and is closely related to the shifting distribution of native and invasive species priority impact.</td><td>Scale</td><td>Lead(s) and Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Regional, Restoration</td><td>Lead: MassWildlife
Partners: DCR, USGS, Conservation Commission</td><td>Drought, inland flooding, invasive species, other severe weather</td></tr>
<tr><td></td><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td></td><td colspan="2">1, 2, 3, 4, and 6</td><td>Less than 3 years</td></tr>
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Governance

Governance Sector			
Action Description			
Urgent Priority Impact: Reduction in State and Municipal Revenues			
ACTION 1: Program Administration by States (PAS)			
MEMA will seek Federal Emergency Management Agency (FEMA) PAS designation which will allow MEMA/State to review and approve Local Hazard Mitigation Plans at the State level. This will greatly expedite the review process. MEMA will need additional resources to establish and maintain the program. **Other priority impacts addressed by action:** Loss of life or injury due to high vulnerability dams, hurricanes, wildfires, extreme flooding, or extreme temperatures; damage to inland buildings; damage to coastal buildings and ports; in addition to all priority impacts listed under the Governance sector.	**Scale**	**Lead(s) and Partner(s)**	**Hazard(s) Addressed**
	Statewide, Local Support	Lead: MEMA Partner: FEMA	All hazards
	Goal(s) Addressed		**Timeframe**
	1, 4, and 6		Less than 3 years
ACTION 2: Integrate climate resilience considerations into the FEMA Public Assistance Program			
The Climate Resilience Design Standards Tool will be integrated into FEMA HMA programs starting in FY23. MEMA will then work to Integrate the Tool into FEMA's PA Recovery Program. **Other priority impacts addressed by action:** This action has the potential to address elements of all priority impacts.	**Scale**	**Lead(s) and Partner(s)**	**Hazard(s) Addressed**
	Statewide, Local	Lead: MEMA Partner: municipalities	All hazards
	Goal(s) Addressed		**Timeframe**
	3, 4, and 6		Less than 3 years
ACTION 3: Redesign, configure and implement a strategic capital planning and capital project delivery			
Redesign the existing capital planning process and invest in technology to support improved planning and project delivery. This critical redesign will increase transparency and incorporate metrics for decision making including climate impacts. **Other priority impacts addressed by action:** This action has the potential to address elements of all priority impacts.	**Scale**	**Lead(s) and Partner(s)**	**Hazard(s) Addressed**
	Statewide, capital planning, state assets	Lead: DCR	All hazards
	Goal(s) Addressed		**Timeframe**
	2, 3, 4, 5 and 6		Less than 3 years

<table>
<tr><td colspan="4">ACTION 4: Explore the feasibility of creating a competitive state and local IT Climate Resilience and/or Awareness Program</td></tr>
<tr><td rowspan="4">Explore the feasibility of creating a new competitive State and Local IT Climate Resilience and/or Awareness Program and explore the possibility of adding IT climate resilience as either a Community Compact IT Best Practice or an eligibility area for the Community Compact IT Grant. Based on the funding/program source, EOTSS may provide technical guidance to municipalities regarding the climate impacts on local IT infrastructure.
Other priority impacts addressed by action: Reduced ability to work.</td><td>Scale</td><td>Lead(s) and Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, IT infrastructure</td><td>Lead: EOTSS</td><td>All hazards</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">1 and 3</td><td>3 – 5 years</td></tr>
<tr><td colspan="4">Urgent Priority Impact: Increase in Costs of Responding to Climate Migration</td></tr>
<tr><td colspan="4">ACTION 5: Conduct a climate migration assessment</td></tr>
<tr><td rowspan="4">Based on Massachusetts’s lower relative climate risks compared to other parts of the country and world it is likely that the Commonwealth may experience in-migration due to climate change. Conduct an assessment that include the following analysis: (1) Likely sources of in-migration from other states within the USA and outside of the country; (2) Likely settlement sites within Massachusetts based on housing availability and job centers, as well as support services.; (3) Effects of in-migration on natural environment, utilities, schools, and other community resource needs; (4) Effects of in-migration on affordability of housing, and potential displacement of environmental justice and other priority populations; (5) Effects of in-migration on Massachusetts industries, sectors, and jobs. Opportunities to grow economy, new workers, and innovation for growing industries such as climate, technology, and healthcare; and (6) develop two to three likely climate migration scenarios and the adaptation pathways to prepare for each scenario.
Other priority impacts addressed by action: Reduction in the availability of affordably priced housing; emergency service response delays and evacuation disruptions; damage to cultural resources; and all priority impacts listed in Governance sector.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide</td><td>Lead: EEA
Partners: OCIR, MEMA, EOED, HHS</td><td>All hazards</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">2, 3, and 4</td><td>Less than 3 years</td></tr>
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Urgent Priority Impact: Increase in Demand for State and Municipal Government Services

Action Topic 6: Develop a strategy to identify resilience funding needs and leverage federal funding to support adaptation projects

Description: This action topic aims to address the Increase in Demand for State and Municipal Government Services priority impact and has the potential to address elements of all priority impacts, as many proposed actions and adaptation projects identified lack of funding as a barrier to project implementation. Together, the actions focus on collaboratively identifying funding needs for resilience projects and obtaining federal funding sources to support CIP Investments, including adaptation projects.

Partners: A&F EO and DCAMM, MEMA, EEA, OCIR, Gov Office Director of Federal Funds and Infrastructure, and EOED/HLC

Priority impacts addressed by action topic: Providing additional funding to statewide resilience, adaptation, and mitigation projects has the potential to address elements of all priority impacts.

ACTION 6a: Standardize approach to identifying resiliency needs for state capital planning purposes

Work with agency experts to develop a standard approach for easily identifying the resiliency need(s) a proposed Capital Investment Plan (CIP) investment is helping to address and the anticipated resiliency outcomes associated with the investment.

Scale	Lead(s) & Partner(s)	Hazard(s) Addressed
Statewide, State Agencies	Lead: A&F Partners: DCAMM, MEMA, EEA, OCIR	All hazards
Goal(s) Addressed		**Timeframe**
1, 3, 4, and 5		Less than 3 years

ACTION 6b: Standardize approach to aggressively leveraging federal resources

Develop a coordination strategy to effectively pursue federal funding opportunities related to climate and resiliency, focusing on new opportunities, such as those stemming from BIL/IIJA and IRA.

Scale	Lead(s) & Partner(s)	Hazard(s) Addressed
Statewide	Lead: A&F Partners: Director of Federal Funds and Infrastructure, EEA, MassDOT, EOED/HLC, OCIR	All hazards
Goal(s) Addressed		**Timeframe**
1, 3, 4, and 5		Less than 3 years

<table>
<tr><td colspan="4">ACTION 6c: Increase access to state resilience funding</td></tr>
<tr><td rowspan="4">Develop a one-stop grant clearinghouse that streamlines climate/environment grant application process for applicants and ensures efficiency in the distribution of funding to local projects. In coordination with MEMA, update and maintain the ResilientMass website (resilient.mass.gov, formerly "Resilient MA Climate Change Clearinghouse for the Commonwealth") based on stakeholder feedback; build out new pages and resources related to example projects, funding sources, metrics, and topic-specific toolkits; and revise and expand data and GIS maps and tools to better serve stakeholders.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Local</td><td>Lead: EEA
Partner: MEMA</td><td>All hazards</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">All goals</td><td>3 – 5 years</td></tr>
<tr><td colspan="4">ACTION 7: Divert solid waste by increasing local capacity and infrastructure to reduce emissions and vulnerability and promote increase resiliency</td></tr>
<tr><td rowspan="4">Solid waste disposal capacity is becoming increasingly limited in Massachusetts and throughout the Northeast US. As a result, more than 1/3 of Massachusetts’ trash—about 2 million tons per year—is sent to landfills in other states for disposal. This waste is moved primarily by rail; even a brief rail outage could cause severe disruptions to solid waste collection and disposal. MassDEP would support the development of local infrastructure that advances the Commonwealth's Solid Waste Master Plan waste reduction goals, including: (1) increasing composting and anaerobic digestion facilities; (2) installing more in-state outlets for construction waste materials; (3) developing small-scale publicly-owned materials recovery facilities; (4) improving systems to better sort recyclables and organics from mixed wastes; and (5) encouraging facilities to collect and divert household hazardous wastes from the solid waste stream. MEMA is currently updating the Disaster Debris Plan.
Other priority impacts addressed by action: Heath effects from degraded air quality; emergency service response delays and evacuation disruptions; health effects of extreme storms and power outages; damage to rails and loss of rail/transit service; and increase in demand for state and municipal government services.</td><td>Scale</td><td>Lead(s) and Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Solid Waste Disposal</td><td>Lead: MassDEP
Partner: MEMA</td><td>All hazards</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">3 and 6</td><td>3 – 5 years</td></tr>
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<tr><th colspan="4">Priority Impact: Damage to Coastal State and Municipal Buildings and Land</th></tr>
<tr><td colspan="4">ACTION 8: Update Chapter 91 regulations to improve resiliency of public trust tidelands and waterways</td></tr>
<tr><td rowspan="3">Develop and promulgate updated chapter 91 regulations to ensure potential impacts of sea level rise are considered in the project review and licensing process. Initiate technical development and stakeholder consultation for policy and/or regulatory revisions to address broader climate resilience issues to protect public trust interests in tidelands and waterways, such as implications of sea level rise for ground floor facilities of public accommodation. MassDEP will consider collaborating with other state agencies on resilient codes, floodplain management improvements, and other regulations and policies for a package of building code, zoning, and regulations designed to reduce risks from hazards and climate change.

Other priority impacts addressed by action: Damage, disruption, or loss of coastal infrastructure such as seaports, airports, and maritime industries and Inability to carry out mission and services due to damage, disruption, or loss of state assets and services.</td><td>Scale</td><td>Lead(s) and Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Coastwide, Public Trust</td><td>Lead: MassDEP
Partners: CZM, waterfront institutions, non-profit organizations, developers, others</td><td>Coastal erosion, coastal flooding, storm surge</td></tr>
<tr><td colspan="2">Goal(s) Addressed
1, 2, 3, 4, and 6</td><td>Timeframe
3 – 5 years</td></tr>
<tr><th colspan="4">Priority Impact: Increase in Need for State and Municipal Policy Review and Adaptation Coordination</th></tr>
<tr><td colspan="4">ACTION 9: Division restructuring and expansion</td></tr>
<tr><td rowspan="3">Implement a division restructuring and expansion plan with the following goals: expand and improve DER's ecological restoration work; strengthen DER's internal capacity; expand external capacity; and learn and share knowledge about restoration outcomes and best practices. The expansion plan includes specific actions related to hazard mitigation and climate adaptation including: promoting ecological restoration as an integral part of the Commonwealth's climate adaptation programs participating in emerging policy, program, and funding initiatives on the issue of climate adaptation and hazard mitigation; and improving and documenting our understanding of how restoration practices relate to climate adaptation benefits. Completing the DER restructuring and expansion plan will result in an increased capacity to directly implement aquatic ecosystem restoration projects and to increase the capacity of municipalities, regional organizations, and sister agencies to plan and implement these types of projects. Restoration projects (e.g., dam removals, culvert replacements, riparian and flood zone restoration, tidal restoration, and cranberry bog restoration) increase the resilience and ecosystem health of freshwater and coastal rivers and wetlands, and reduce risks to people, buildings, and transportation infrastructure.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Agency Internal Capacity</td><td>Leads: DER/DFG</td><td>All hazards</td></tr>
<tr><td colspan="2">Goal(s) Addressed
1, 2, and 4</td><td>Timeframe
Less than 3 years</td></tr>
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<tr><td colspan="2">Other priority impacts addressed by action: All priority impacts under the Natural Environment sector and other cross-government actions.</td><td></td><td></td></tr>
<tr><td colspan="4">Priority Impact: Damage to Inland State and Municipal Buildings and Land</td></tr>
<tr><td colspan="4">ACTION 10: Incorporate hazard and climate change vulnerability into capital planning, master planning, and facilities management functions</td></tr>
<tr><td colspan="2" rowspan="4">Incorporate climate change vulnerability, resilience, and adaptation standards into capital planning and at the outset of projects with client agencies. Complete the RMAT's Climate Resilience Design Standards Tool and DCAMM climate resilience assessments during project planning. Refer to these assessments during project design and master planning exercises to identify planning horizons and specific high-priority threats.

Continue to revise and update the existing DCAMM resilience assessment process as appropriate utilizing RMAT-supported climate data sets, and integrate climate change and natural hazard vulnerability information into an asset management system (CAMIS).
Other priority impacts addressed by action: This action has the potential to address elements of all priority impacts.</td><td>Scale</td><td>Lead(s) and Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, state assets</td><td>Lead: DCAMM</td><td>All hazards</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">3 and 4</td><td>5+ years</td></tr>
<tr><td colspan="4">High-Consequence Vulnerability: Inability to Carry Out Mission and Services Due to Damage, Disruption, or Loss of State Assets and Services</td></tr>
<tr><td colspan="4">ACTION 11: Massachusetts Continuity of Government Plan</td></tr>
<tr><td colspan="2" rowspan="4">In coordination with the Governor's Office and EOPSS, MEMA is leading the development of the whole of Government Continuity of Government (COG) plan. This plan will provide direction to the Executive, Legislative, and Judicial Branches of Government in the event governmental services are heavily impacted by an emergency including natural disasters and those that are exacerbated by climate change. The COG will provide all Branches of Massachusetts Government the steps and processes needed to maintain critical services during and after an emergency in order to maintain minimum essential functions.
Other priority impacts addressed by action: Reduction in state and municipal revenues; reduced ability to work.</td><td>Scale</td><td>Lead(s) and Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, State Non-Physical Functions/Services</td><td>Lead: MEMA
Partners: Governor’s Office, Cabinet Secretaries, EOPSS</td><td>All hazards</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">1 and 3</td><td>Less than 3 years</td></tr>
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<tr><td colspan="4">ACTION 12: Amend the Massachusetts Contingency Plan to require consideration of climate change impacts as reasonably foreseeable site conditions during site cleanup and remedy selection</td></tr>
<tr><td rowspan="4">MassDEP is incorporating the evaluation and mitigation of potential climate change vulnerabilities at waste sites into the Massachusetts Contingency Plan, the regulations that govern the assessment and cleanup of oil and hazardous material disposal sites in the Commonwealth. Proposed amendments have been published for comment and finalization of the changes is expected to happen in 2023. The new rule will require consideration of reasonably foreseeable site conditions including potential impacts from climate change in evaluating a site and selecting resilient remedies.
Other priority impacts addressed by action: Emergency service response delays and evacuation disruptions; health effects from degraded air quality; increase in mental health stressors; reduction in clean water supply; freshwater ecosystem degradation; marine ecosystem degradation; forest health degradation; and increase in need for state and municipal policy review and adaptation coordination.</td><td>Scale</td><td>Lead(s) and Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Environmental Justice</td><td>Lead: MassDEP</td><td>Groundwater rise, coastal flooding, storm surge, coastal erosion, other severe weather</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">1, 2, 3, 4, and 6</td><td>Less than 3 years</td></tr>
<tr><td colspan="4">ACTION 13: Study the feasibility of establishing FEMA's Safeguarding Tomorrow Revolving Loan Fund Program</td></tr>
<tr><td rowspan="4">MEMA will review other state agency revolving loan funds to identify which, if any, revolving loan funds can be partnered with to support the STORM Act requirements. MEMA will also identify best practices from other states which have successfully implemented the STORM Act to replicate those processes where possible within existing MA structures.
Other priority impacts addressed by action: Damage, disruption, or loss of coastal infrastructure such as seaports, airports, and maritime industries; in addition to all priority impacts listed under the Governance sector.</td><td>Scale</td><td>Lead(s) and Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide</td><td>Lead: MEMA</td><td>All hazards</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">1, 4, and 6</td><td>Less than 3 years</td></tr>
</table>

<table>
<tr><td colspan="4">ACTION 14: Utilizing EOTSS videography team to professionalize climate coordination training videos and other digital products</td></tr>
<tr><td rowspan="4">Utilizing EOTSS digital services, including strategy, digital, data and videography experts, to work with content creators and subject matter experts across agencies to create professional-level content. The EOTSS videography team will produce professional-level training videos and other digital awareness products that can significantly enhance the quality and impact of these materials. The video team will support development of production plans that align with the goals and objectives of each campaign and bring technical expertise to ensure high quality of work. They will apply editing techniques to polish the final product that effectively communicates important messages to the intended audiences.</td><td>Scale</td><td>Lead(s) and Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Education and Outreach</td><td>Lead: EOTSS</td><td>All hazards</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">1</td><td>Less than 3 years</td></tr>
</table>

Economy

Economy Sector			
Action Description			
Urgent Priority Impact: Reduced Ability to Work			
ACTION 1: LWD Climate Change Impact Risk Assessment			
Assess the risk to Labor and Workforce Development (LWD) operations and facilities posed by climate change. Prioritize risks and develop mitigation strategies. Estimate costs of capital mitigation measures. **Other priority impacts addressed by action:** Health and cognitive effects from extreme heat; increase in vector borne diseases incidence and bacterial infections; reduction in state and municipal revenues; increase in demand for state and municipal government services; damage to coastal state and municipal buildings and land; damage to inland state and municipal buildings and land; inability to carry out mission and services due to damage, disruption, or loss of state assets and services.	**Scale**	**Lead(s) & Partner(s)**	**Hazard(s) Addressed**
	Statewide, Workforce	Lead: Dept. of Labor Standards Partner: EEA	All hazards
	Goal(s) Addressed		**Timeframe**
	1, 3, and 6		Less than 3 years
ACTION 2: Enhance the mobility of the state workforce through the continued deployment (and refresh) of devices to implement COOP plans impacted by climate			
Deploying laptops can help the state and employees by enabling remote work during extreme weather events, reducing energy consumption, and generating less heat when compared to legacy desktop systems, facilitating paperless work, and supporting sustainable procurement practices. By using laptops, the state can reduce our carbon footprint, support environmental sustainability, and improve the overall climate resilience. **Other priority impacts addressed by action:** Health and cognitive effects from extreme heat; increase in vector borne diseases incidence and bacterial infections; reduction in state and municipal revenues; and inability to carry out mission and services due to damage, disruption, or loss of state assets and services.	**Scale**	**Lead(s) & Partner(s)**	**Hazard(s) Addressed**
	Statewide, State Agency Internal Capacity	Lead: EOTSS	Extreme temperatures, hurricane, tropical cyclone, winter storms, nor'easters, tornado, tsunami, other severe weather
	Goal(s) Addressed		**Timeframe**
	3		3 – 5 years
ACTION 3: Continue to identify and to migrate business applications and systems to the cloud			
Migrate the MA21 mainframe-based system into the cloud for the resiliency of a key One Health Integrated Eligibility system. **Other priority impacts addressed by action:** Health and cognitive effects from extreme heat; increase in vector borne diseases incidence and bacterial infections;	**Scale**	**Lead(s) & Partner(s)**	**Hazard(s) Addressed**
	Statewide	Lead: EOTSS	Extreme temperatures, hurricane, tropical cyclone, winter storms,

Economy Sector			
Action Description			
reduction in state and municipal revenues; and inability to carry out mission and services due to damage, disruption, or loss of state assets and services.			nor'easters, tornado, tsunami, other severe weather
	Goal(s) Addressed		**Timeframe**
	3		3 – 5 years
Urgent Priority Impact: Decrease in Marine Fisheries and Aquaculture Productivity			
ACTION 4: Enhance environmental monitoring capabilities for HAB's and shellfish borne illness			
Improve monitoring capabilities for HAB's and shellfish borne diseases. **Other priority impacts addressed by action:** Marine ecosystem degradation; freshwater ecosystem degradation; coastal wetland degradation.	**Scale**	**Lead(s) & Partner(s)**	**Hazard(s) Addressed**
	Coastwide	Lead: DMF Partners: DAR, SAP, municipalities	Extreme temperatures, coastal erosion, landslide, other severe weather, inland flooding, coastal flooding, storm surge
	Goal(s) Addressed		**Timeframe**
	All		5+ years
ACTION 5: Increase fishing vessel tracking program support			
Support for research and implementation of vessel tracking for monitoring and assessing shifts in fishing effort. **Other priority impacts addressed by action:** Marine ecosystem degradation; freshwater ecosystem degradation; coastal wetland degradation.	**Scale**	**Lead(s) & Partner(s)**	**Hazard(s) Addressed**
	Coastwide	Leads: DMF Partners: EEAIT, DFG, Massachusetts Lobstermen's Association	other severe weather, coastal flooding, storm surge
	Goal(s) Addressed		**Timeframe**
	2, 3, and 6		3 – 5 years

<table>
<tr><th colspan="4">Economy Sector</th></tr>
<tr><th colspan="4">Action Description</th></tr>
<tr><td colspan="4">ACTION 6: Increase training and workforce diversification</td></tr>
<tr><td rowspan="3">Support training and work force diversification programs for fishers and farmers.
Other priority impacts addressed by action: Marine ecosystem degradation; freshwater ecosystem degradation; coastal wetland degradation; decrease in agricultural productivity.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Coastwide</td><td>Lead: DMF
Partners: Massachusetts Lobstermen’s Association; Urban Harbors Institute; Gloucester Fishermen’s Wives Association</td><td>Coastal erosion, other severe weather, coastal flooding, storm surge</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">3 and 6</td><td>5+ years</td></tr>
<tr><td colspan="4">Action 7: Increase Program Support</td></tr>
<tr><td rowspan="3">Enhance support for existing programs such as BIG / CVA. Provide support to industry through grant opportunities for shore-based seafood processors and dealers for renewable energy and clean energy conservation improvements to their businesses.
Other priority impacts addressed by action: Marine ecosystem degradation; freshwater ecosystem degradation; coastal wetland degradation; decrease in agricultural productivity.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Coastwide</td><td>Lead: DMF</td><td>Coastal erosion, other severe weather, coastal flooding, storm surge</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">All</td><td>5+ years</td></tr>
</table>

<table>
<tr><th colspan="4">Urgent Priority Impact: Reduction in the Availability of Affordably Priced Housing</th></tr>
<tr><td colspan="4">ACTION 8: Incorporate climate resilience into the Commonwealth's sustainable development principles</td></tr>
<tr><td rowspan="3">Incorporate climate resilience into the Commonwealth's sustainable development principles, resulting in further integration of resilience goals into EOED funding programs that support housing production and economic growth, including capital grant programs offered through the Community One Stop for Growth.
Other priority impacts addressed by the action: Economic losses from commercial structure damage and business interruptions; damage to inland buildings; damage to coastal buildings and ports; disproportionate impacts on unhoused populations from extreme temperature or extreme flooding.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Housing and Buildings</td><td>Lead: CPRO</td><td>All hazards</td></tr>
<tr><td>Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">4</td><td>Less than 3 years</td></tr>
<tr><td colspan="4">ACTION 9: Implement resiliency strategy at state-aided public housing</td></tr>
<tr><td rowspan="3">Conduct five to seven feasibility studies annually to identify improvements which will make vulnerable state-aided Public Housing developments more resilient. Create capital projects annually to implement the recommendations of the feasibility studies as funding allows.
Other priority impacts addressed by action: Damage to inland buildings; damage to coastal buildings and ports.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Public Housing</td><td>Lead: HLC
Partners: EEA, MEMA, DPH</td><td>All hazards</td></tr>
<tr><td>Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">2, 3, 4, and 6</td><td>Less than 3 years</td></tr>
<tr><td colspan="4">Priority Impact: Economic Losses from Commercial Structure Damage and Business Interruptions</td></tr>
<tr><td colspan="4">ACTION 10: Investments to take advantage of opportunities presented by climate change</td></tr>
<tr><td rowspan="3">This Action will (1) Provide workforce training assistance and funding to help workers gain skills, reskill, and upskill in an evolving workplace and labor market in the pursuit of climate ready goals; (2) Collaborate with the Massachusetts Clean Energy Center (MassCEC) to leverage opportunities to blend and braid state-funded workforce initiatives through EOLWD and MassCEC. Combined funding will augment recruitment, wrap-around support services, and technical and on-the-job training experience to build a talent pipeline for the Commonwealth's clean energy industry; (3) Increase coordination with labor unions to assist in climate-critical training and to retrain workers transitioning from other sectors and/or fossil fuel-based roles; and (4) Increase integration across industry, academia, and workforce programming through the</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, work force development</td><td>Lead: LWD
Partners: EEA, EOED, MassCEC, Commonwealth Corporation, Labor Unions</td><td>All hazards</td></tr>
<tr><td>Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">1, 5, and 6</td><td>5+ years</td></tr>
</table>

Workforce Skills Cabinet, which has established clean energy among statewide priority industries.

Other priority impacts addressed by action: Loss of energy production and resources; reduction in state and municipal revenues; reduced ability to work.

Priority Impact: Damage to Tourist Attractions and Recreation Amenities

ACTION 11: Incorporate climate resilience criteria into capital grants for tourism assets

Incorporate climate resilience criteria into capital grant programs that support the construction, restoration, or renovation of tourism assets, such as the Massachusetts Destination Development Capital Grant Program. Utilize the Commonwealth's Climate Resilience and Design Standards Tool to apply these criteria to grant evaluations.

Other priority impacts addressed by action: Damage to cultural resources; decrease in agricultural productivity.

Scale	Lead(s) & Partner(s)	Hazard(s) Addressed
Statewide, Tourism Resources	Lead: MOTT Partners: DCR, CZM, MHC	All hazards
Goal(s) Addressed		**Timeframe**
2 and 4		Less than 3 years

Priority Impacts: Decrease in Agricultural Productivity

Action Topic 12: Establishing grant programs to support farmers and agricultural productivity

Description: This action topic addresses the Decrease in Agricultural Productivity; Reduction in Food Safety and Security; and Soil Erosion priority impacts due to the inter-related nature of soil health, agricultural sustainability, and food production. This group of actions also address additional priority impacts, as highlighted below. Together, these actions aim to implement grant funding programs to support sustainable approaches to soil management, agriculture, and provide various ecosystem services. The grants will also assist farmers will evaluating their vulnerability to climate change and implementing practices to increase resilience. Similarly, MassDEP's proposed grant program can assist farmers with incorporate energy efficient and clean energy conservation into food production activities.

Partners: MDAR, MassDEP, and DFG

Other priority impacts addressed by action topic: Increase in mental health stressors; increase in need for state and municipal policy review and adaptation coordination; reduction in clean water supply; freshwater ecosystem degradation; damage to tourist attractions and recreation amenities; and economic losses from commercial structure damage and business interruptions.

ACTION 12a: Climate Smart Ag Program, sustainable soil management and grant programs

MDAR's Climate Smart Ag Program helps farmers transition to sustainable approaches to soil management such as reduced or no-till planting; the Agricultural Soil Health program that funds AFT to provide technical assistance to farmers around soil health through the Coordinated Soil Health Program. The Farm Viability Programs provide farmers with technical assistance, business planning and funding to ensure that the farms remain productive and viable. Climate Smart Ag grants and

Scale	Lead(s) & Partner(s)	Hazard(s) Addressed
Statewide, Agriculture	Lead: MDAR	All hazards
Goal(s) Addressed		**Timeframe**
6		Less than 3 years

FSIG grants assist farmers with climate resiliency and drought mitigation projects thus creating sustainable agriculture production.

ACTION 12b: Grants for private Agriculture Preservation Restrictions

This program will build on the existing Agricultural Preservation Restriction (APR) program as recommended in the Farmland Action plan. The expanded program could support inclusion of riparian buffers on farms, affordable dwellings for farmers, and climate friendly best practices. These grants will be designed to support resilience-focused APR projects that the existing APR program does not cover, while maintaining consistency with and complementing the APR program.

The APR program is not legislatively authorized to fund private entity acquisition of APRs. Establish a grant program for acquisition and stewardship of APRs by private entities. This will aid in significantly increasing the pace of farmland conservation and the associated public benefits and protections of food security and agricultural production, water supply, soil erosion, freshwater ecosystems, biodiversity and habitat, avoidance of damages to tourist attractions. An increase in the number of APRs will increase capacity of the agricultural system to withstand the effects of climate change.

Scale	Lead(s) & Partner(s)	Hazard(s) Addressed
Statewide, Agriculture	Lead: MDAR	All hazards
Goal(s) Addressed		**Timeframe**
All		Less than 3 years

ACTION 12c: Farm Climate Resiliency Program

Program grants will provide free "climate audits" for agricultural operations that will assess the risks to their operations from climate change and recommend practices to reduce those risks. Practices may range from opportunities in energy efficiency and resource conservation to climate friendly practices addressing crop management, soil management, pest and disease management, water conservation, and wildlife habitat. Phase 2 grants will provide free business planning to address how the identified opportunities can realistically be implemented. Phase 3 grants will provide funding to implement items recommended via the business planning covering costs of adoption and implementation. The grants will continue to invest and protect state assets (APRs) as well as the broader agricultural system (other farms). These funds can be leveraged with federal dollars providing a strong incentive for farmers to utilize the program. While there are existing and emerging Agricultural Best Management Practices (BMPs) to address climate change, a major barrier to implementation is the cost associated risk to farmers. Such practices often

Scale	Lead(s) & Partner(s)	Hazard(s) Addressed
Statewide, Agriculture	Lead: MDAR	All hazards
Goal(s) Addressed		**Timeframe**
All		Less than 3 years

involve use of additional equipment, letting less productive land go fallow, and come with legitimate fears of risk of reduction in crop production. Another major barrier is the time it takes for farmers to learn and understand the practices, assess how they may be incorporated into their operation, and then figuring out how to implement it.

ACTION 12d: Grant opportunities for food/agriculture sectors to improve energy efficiency, adopt renewable energy, and reduce GHG emissions (CERP)

Increase access to reliable energy for food-producing and food-distribution entities through the Clean Energy Results Program's Gap Energy Grant. The grant supports installation of reliable energy-efficient equipment and access to renewable energy generation project benefits. DEP can work with its sister agencies MDAR and MassWildlife to reach more food producing entities so that they can incorporate energy efficient and clean energy conservation measures into their businesses. The existing program includes criteria encompassing energy resilience and climate resilience and adaptation efforts.

Scale	Lead(s) & Partner(s)	Hazard(s) Addressed
Statewide, Agriculture	Leads: MassDEP Partners: MDAR, DFG	All hazards
Goal(s) Addressed		**Timeframe**
5 and 6		Less than 3 years

Action Topic 13: Mapping and tool development to support agricultural decision-making and land management

Description: This action topic addresses the Decrease in Agricultural Productivity; Reduction in Food Safety and Security; and Soil Erosions priority impacts due to the inter-related nature of soil health, agricultural sustainability, and food production. This group of actions also address additional priority impacts, as highlighted below. Together, these actions aim to develop maps and tools to assist with identifying vulnerabilities and their locations and making land use management decisions to protect natural resources. Specifically, the actions include mapping existing floodplains that intersect with agricultural land to identify hotspots with a high probability of soil erosion and freshwater ecosystem degradation. The actions also include developing tools to evaluate agricultural vulnerability based on climate change projections and a method for prioritizing agricultural lands for protection.

Partners: MDAR, DCR, DFG, MEMA, EEA, and federal partners

Other priority impacts addressed by action topic: Coastal wetland degradation; freshwater system degradation; marine ecosystem degradation; shifting distribution of native and invasive species; loss of biodiversity, habitats, and native species due to climate change impacts.

<table>
<tr><td colspan="4">ACTION 13a: Improve mapping to enhance resilience and emergency preparedness of agricultural land</td></tr>
<tr><td rowspan="4">Utilize and build off hydrologic data and modeling to design, develop, and maintain a mapping tool of “climate vulnerability corridors” for agriculture. The model will identify existing and projected coastal and inland river floodplains that intersect with agricultural land. This will enable users to observe existing hotspots for high probability soil erosion and freshwater ecosystem degradation as well as predict future areas of concern based on projected changes to precipitation and flooding due to climate change. Once hotspots are identified, further climate planning and mitigation actions can be pursued (planning around projected floodplains and risk of erosion, implementing riverbank restoration/buffers etc.). The mapping tool will include not only flooding/inundation, storm damage, sea levels affecting saltwater intrusion, and other risk data layers but also sufficient cadaster data (ownership, APR restrictions, conservation easements, etc.) to identify opportunities and prioritize resilience efforts at a regional/watershed scale (move beyond project-by-project approach). The tool’s GIS and modeling components will be integrated into relevant state mapping platforms and may require a field component for development and periodic updates. MDAR GIS team to coordinate with other agencies engaged in similar work.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Agriculture</td><td>Leads: MDAR, Partners: DCR, DFG, federal partners</td><td>All hazards</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">All</td><td>3 – 5 years</td></tr>
<tr><td colspan="4">ACTION 13b: Model future challenges for specific agricultural commodities</td></tr>
<tr><td rowspan="4">Predicting specific climate related challenges to specific agricultural sectors and commodities and linking that with a projected timeline will enable producers and service providers to best navigate and facilitate required shifts in agriculture due to climate change. Having this information will help farmers make informed business decisions and assist service providers in identifying future needs and rolling out programs early enough to allow adoption and implementation in a timely manner that minimizes climate impacts.</td><td>Scale</td><td>Lead(s) & Partner(s)</td><td>Hazard(s) Addressed</td></tr>
<tr><td>Statewide, Agriculture</td><td>Lead: MDAR Partners: EEA, MEMA</td><td>All hazards</td></tr>
<tr><td colspan="2">Goal(s) Addressed</td><td>Timeframe</td></tr>
<tr><td colspan="2">All</td><td>3 – 5 years</td></tr>
</table>

ACTION 13c: Farmland prioritization tool

Develop and maintain a farmland prioritization tool similar to BioMap. Agriculture is the only natural resource in the Commonwealth that does not have a prioritization tool. The Farmland Action Plan recommends development of such a tool. MDAR will consult with agricultural and natural resource experts, review existing prioritization tools and develop, maintain, and disseminate a tool for prioritizing agricultural land for protection. It will incorporate climate risk and resiliency considerations and compliment prioritization schemes of other natural resources. The tool will be scaled at state, county, and municipal level for use by a broad range of partners and compatibility and consistency with goals at various scales. Once completed the tool can be adopted by MDAR and other entities such as municipalities, non-profits and land trusts into their planning efforts around farmland protection. Farmland protection enhances our food security by protecting valuable soils from development. Farmland provides critical green infrastructure, sequestering carbon through conservation practices and regenerative agriculture practices which include cover crops, crop rotations, reduced tillage, various livestock grazing strategies, and more.

Scale	Lead(s) & Partner(s)	Hazard(s) Addressed
Statewide, Agriculture	Lead: MDAR Partner: EEA	All hazards
Goal(s) Addressed		**Timeframe**
All		3 – 5 years

High-Consequence Vulnerability: Damage, Disruption, or Loss of Coastal Infrastructure Such as Seaports, Airports, and Maritime Industries

ACTION 14: Incorporate climate resilience criteria into Seaport Economic Council (SEC) capital grants

Incorporate climate resilience criteria into Seaport Economic Council (SEC) capital grants to promote local adaptation projects that reduce climate risks for ports, harbors, and maritime assets in Massachusetts. Utilize the Commonwealth's Climate Resilience and Design Standards Tool to apply these criteria to grant evaluations.

Other priority impacts addressed by action: Decrease in marine fisheries and aquaculture productivity; damage to coastal buildings and ports; coastal wetland degradation; marine ecosystem degradation; coastal erosion.

Scale	Lead(s) & Partner(s)	Hazard(s) Addressed
Coastwide	Lead: EOED-SEC	Coastal erosion, coastal flooding and storm surge, other severe weather
Goal(s) Addressed		**Timeframe**
2, 4, and 6		Less than 3 years

7.1.8 2023 Plan Implementation and Maintenance

The 2023 MA SHMCAP is an adaptable, action-based document with the primary purpose of identifying the most consequential risks and taking actions to reduce those risks. The efficacy of the 2023 MA SHMCAP depends on active implementation of actions across state agencies and in partnership with local, regional, and community organizations. Through routine maintenance, the plan will be reviewed, revised, and updated as actions are completed, science and data are updated, and engagement with other partners warrants changes. The following subsections highlight the roles, responsibilities, timeline, dates, and process for maintaining and implementing the 2023 MA SHMCAP, as well as outlining the engagement and involvement of partners and interested parties at all scales.

7.1.8.1 Roles and Responsibilities

While all Massachusetts state agencies have a role in hazard mitigation planning, two executive offices have the strategic and policy responsibility for the SHMCAP: the Executive Office of Public Safety and Security (EOPSS) and the Executive Office of Energy and Environmental Affairs (EEA). The Massachusetts Emergency Management Agency (MEMA), in partnership with EOPSS and EEA, is responsible for the following:

- Making the current version of the SHMCAP accessible to state, Tribal, regional, local, and community organizations and the public in all formats needed, including the online version at the Resilient MA website.
- Provide opportunities for state agencies and Tribal, local, regional, community, and other interested parties to engage and provide comments and input on the plan during updates, reviews, and as actions are implemented.
- Provide support for interagency mitigation, preparedness, response, and recovery actions before and after disaster events, including the review and recommendation of projects for the Hazard Mitigation Grant Program.
- Update the SHMCAP every five years, establish the update schedule, and ensure compliance with federal requirements.

The RMAT, led by Climate Change Coordinators, was created by Executive Order 569, *Establishing an Integrated Climate Change Strategy for the Commonwealth.* This Executive Order has been carried out by Governor Healey and plays a significant role in designing and implementing the actions in the 2023 MA SHMCAP. One of the RMAT's key roles and responsibilities is monitoring and tracking SHMCAP implementation progress, as well as providing recommendations and support for plan updates and supporting collaborations and partnerships across the Commonwealth with local municipalities, regional organizations, private sector and industry, community members and groups, Tribal representatives, and others. The RMAT, through leadership and support from EOPSS and EEA, will also carry out the following activities to ensure the plan is maintained and implemented:

- Develop and implement cross-government and state agency actions.
- Participate in quarterly meetings to track progress, identify opportunities, and respond to challenges. Determine need for revisions or additional resources to support SHMCAP implementation.
- Provide state agency information to the SHMCAP Action Tracker at least annually and attend annual SHMCAP reviews. Identify any needed changes based on new information and data, changed state or federal policies, or new opportunities.
- Participate in post-disaster reviews of the SHMCAP to determine needed changes and to highlight actions that are applicable to post-disaster recovery.
- Participate in scheduled five-year plan reviews and updates.
- Ensure robust engagement throughout all phases of the SHMCAP, including plan updates, plan reviews, and especially action implementation. Coordinate with municipalities, regional and community organizations, Tribal representatives, and others to coordinate and collaborate on hazard mitigation and climate adaptation research, planning, and implementation.
- Incorporate the SHMCAP into state agency plans and programs and use it to inform updates to codes, regulations, policies, and guidance.

7.1.8.2 Plan Implementation

The RMAT provides an important forum for capacity building and collaboration to support action implementation. As a team, the RMAT is well-positioned to advance the actions in the strategy, identify and address challenges, and ensure that risks are reduced equitably across the Commonwealth. The implementation of the actions developed as part of the 2023 MA SHMCAP Strategy is critical to building resilience throughout the Commonwealth in a way that addresses the most consequential risks. The 2023 Strategy was designed to provide a clear path for state agencies to make plan implementation easier, with actions grouped together under action topics to identify collaborative opportunities between state agencies and partners. Organizing state agency actions by priority impacts and vulnerabilities provides agencies with an understanding of any disproportionate impacts and of which lifelines, critical assets, and geographic hotspots may be at the greatest risk.

System for Monitoring Plan Implementation

Performance metrics are important, as they help the Commonwealth evaluate the progress and success of action implementation, identify barriers to implementation, and inform decision-making about action development. For the 2023 MA SHMCAP, the Commonwealth will measure implementation progress through performance metrics developed with the RMAT.

As with the 2018 MA SHMCAP, the RMAT will primarily use the SHMCAP Action Tracker to track progress on climate adaptation and hazard mitigation actions and performance metrics. The Action Tracker will also provide a way to track larger action topics that

multiple agencies are contributing to with individual actions and how those collaborations are increasing resilience on priority impacts and vulnerabilities. The Action Tracker will give the RMAT with an easy-to-use tool to track progress, communicate issues, and collaborate to meet the goals and objectives of the 2023 MA SHMCAP.

The state agencies identified as leading actions will be required to update the Action Tracker at least annually as part of the annual implementation process but will be encouraged to do so prior to the quarterly RMAT meetings. The information provided in the Action Tracker will be used to track progress, identify barriers to implementation, assess completion timelines, and support reporting procedures to inform RMAT meetings.

The Action Tracker presents the following fields to track progress:

- Status of the action (e.g., initiated, in progress, percent completed, complete, deferred, delayed, or request for cancellation).
- Description of challenges, resources needed, reason for delays in implementation.
- Requests for deferral or cancellation, as well as progress made, and any other relevant details of action implementation.

Plan Integration, Partner Engagement, and Coordination

The 2023 MA SHMCAP is the Commonwealth's primary climate adaptation and hazard mitigation planning document; in combination with the MA Climate Assessment, it serves as the risk assessment for natural hazards and climate change in Massachusetts. In addition to its primary purpose of action identification, prioritization, and implementation, the 2023 MA SHMCAP serves as a resource for state, regional, local, Tribal, and community organizations and agencies to use when designing their own plans; assessing risks; and understanding near, mid-, and long-term conditions due to climate change.

The MA Climate Assessment and the 2023 MA SHMCAP integrate data and information from a number of documents and studies, which can be reviewed in each 2023 MA SHMCAP chapter. Some specific plans and programs that are directly integrated with the SHMCAP include:

- Commonwealth of Massachusetts Five-Year Capital Investment Plan, fiscal year 2023–2028
- The Office of Coastal Zone Management's StormSmart Coasts Program and Coastal Resilience Grants
- The Massachusetts *Clean Energy and Climate Plan for 2050*
- The Municipal Vulnerability Preparedness (MVP) program
- The Department of Conservation and Recreation's Flood Hazard Management Program

The Resilient MA website is the home for the MA Climate Assessment and the 2023 MA SHMCAP and includes a range of information, tools, and data such as the SHMCAP Action Tracker, a resource clearinghouse, a maps and data center, and the Massachusetts Climate Resilience Design Standards Tool. The website is used as a hub for collaboration and includes the Massachusetts MVP program and its planning and action grants. The website is designed to support and catalyze local, regional, community, Tribal, and state agency action on resilience and serves as a portal to provide the information and data needed to advance planning and implementation at all scales, including the development of local hazard mitigation plans and local climate action/adaptation plans.

At a federal level, Massachusetts coordinates and participates with FEMA and other federal agencies on hazard mitigation and climate adaptation efforts and programs. This includes participation and accreditation in the Emergency Management Accreditation Program, which ensures that the Commonwealth is in compliance with national standards for risk assessment and reduction, as well as other emergency and disaster management programs. Additionally, Massachusetts will continue to partner and integrate with other federal programs and plans, including the National Climate Assessment, the 2022–2026 FEMA Strategic Plan, the National Mitigation Framework, and the Natural Disaster Recovery Framework.

7.1.8.3 Plan Maintenance

Just as the 2023 MA SHMCAP was developed in partnership with broad participation from state, local, regional, community, and federal agencies, the ongoing maintenance of the plan will be conducted in the same way. To ensure the coordinated implementation of the 2023 MA SHMCAP and support state agencies as they advance individual and cross-government actions, the plan is actively managed and maintained throughout the five-year planning horizon. This maintenance includes procedures for review and minor revisions and updates over the course of the plan's five-year duration, and the comprehensive update and adoption that occurs every five years or less. Quarterly RMAT meetings will provide a venue for the maintenance of the plan over the next five years, allowing for revisions to agency or cross-government actions at minimum annually or as needed. Additionally, the plan can be modified based on new data and information, policy changes at the state or federal level, or needs that arise during plan implementation—or in the event of a disaster.

Schedule for Plan Maintenance

The requirements to ensure adequate maintenance and timely implementation and update of the SHMCAP include an annual review, post-disaster review after each disaster, and a five-year plan review and update. In addition to this standard schedule, the RMAT's quarterly meetings provide additional opportunities to increase engagement and collaboration; consider new funding sources; and discuss updated climate data, tools, and resources.

7.1.8.3.1 Annual Plan Review

The objective of the annual review is for the Commonwealth to evaluate progress on the state agency actions, the cross-government actions, and the overall 2023 MA SHMCAP Strategy. The annual review is an opportunity to evaluate progress on addressing the priority impacts and vulnerabilities and the action topics for the actions to be coordinated among state agencies. It will take place each August and will be coordinated by EEA and MEMA with participation from the RMAT. The annual plan review will include the following:

- Make updates to the SHMCAP Action Tracker (from state agency leads) for each state agency action and cross-government action, in coordination with action partners where appropriate.
- Assess progress for cross-government actions, state agency actions, and action topics overall; determine trends and identify any emerging issues.
- Determine the opportunities and challenges, including barriers to implementation and approaches to overcoming them—funding, capacity, permitting, technical, community support, or other.
- Evaluate changes to federal or state policies, laws, regulations, guidance, or funding opportunities that result in the need to revise the 2023 MA SHMCAP.
- Prepare a document summarizing the annual review process—progress on the SHMCAP state agency actions and cross-government actions, additional capabilities or capacities developed, new research or data, federal and state funding provided for state and local hazard mitigation and climate adaptation efforts, and any needs to revise the SHMCAP to ensure that it can be effectively implemented.

If necessary, the RMAT can amend the 2023 MA SHMCAP to respond to changes in conditions since its adoption. Minor revisions can be made to actions to increase effectiveness or likelihood of implementation without an amendment process. For changes that are not urgent, documentation of changes to be considered in the next five-year update is another option to use over amending the existing plan. If it is determined that the best option is to amend the plan, annexes can be used to document the changes.

7.1.8.3.2 Post-Disaster Plan Review

If a Presidentially Declared Disaster happens in the Commonwealth, the RMAT will convene to conduct a post-disaster plan review and determine if the disaster has resulted in needs or opportunities that could be addressed by the current actions in the SHMCAP or by revised or new actions. Post-disaster reviews allow the RMAT to identify opportunities to leverage or focus resources to address the needs that have emerged due to the disaster, as well as to better understand the impacts resulting from the disaster including climate influences on duration, intensity, and areas affected. The RMAT should also determine whether the post-disaster plan review will replace the regularly scheduled annual review for the year.

7.1.8.3.3 Five-Year Plan Review and Update

At least once every five years, the SHMCAP will undergo a comprehensive review, update, and adoption process in accordance with federal regulations. The comprehensive, five-year review is managed by EEA and MEMA with close coordination and support from the RMAT. MEMA manages the administrative details of the update process, including coordination with FEMA and submitting the plan to FEMA to ensure approval process is done within the allotted timeframe and that the plan is consistent with FEMA's latest requirements and guidance. The minimum requirements for a five-year update include:

- Assess changes in development in the Commonwealth that may have increased or decreased risk exposure to populations, lifelines, and critical assets.
- Assess progress on hazard mitigation and climate adaptation actions and efforts that may have reduced risks.
- Quantify and qualify the changes to the Commonwealth's hazard and climate risks, based on actions taken to reduce risks, new information and data, new climate projections based on an updated National Climate Assessment or other sources, new modeling, or new information based on recent hazard events in the region. Evaluate whether changes to actions are needed based on new information from recently completed vulnerability assessments at the state agency, local, or regional scale or based on other recently completed studies that change the understanding of the risks.
- Conduct a risk and vulnerability assessment to evaluate changes and the need for modifications to the Strategy to address new or modified risks.
- Assess changes in state and federal priorities since the last SHMCAP update.
- Investigate information and data developed since the last SHMCAP update based on new research; recent hazard events; or other experiences at the state, local, or regional scales. This includes any plans that were in progress but not completed in time to be incorporated into last SHMCAP update.

In addition to the above requirements, the RMAT will use the following questions to guide future five-year updates:

- Are the plan's goals still representative of the Commonwealth's priorities? How well were the goals integrated into action implementation?
- What meaningful progress has been made on addressing priority impacts and vulnerabilities? On completing the state agency actions and cross-government actions?
- Did completed actions result in resilience benefits and risk reduction? In what way? For which assets, geographies, populations?
- Did completed actions address disproportionate effects on environmental justice and other priority populations?

- As actions have been implemented, have adaptation gaps identified by the MA Climate Assessment been reduced? Which gaps?
- For actions that were not completed, what were the barriers and challenges that impeded progress on those actions?
    - Should these actions be included in the next SHMCAP?
    - Should incomplete actions be revised to increase likelihood of completion?
    - Are more resources needed to complete actions?
- Are actions that are still in progress going to be completed or become ongoing capabilities?
- Which actions were most effective in addressing priority impacts and vulnerabilities? In what ways have they been effective?
- How have state agency capabilities and capacities changed since the last update? Do these changes present new opportunities for the update?
- Overall, how many actions were completed?
    - How many actions are still in progress?
    - How many were not initiated?
    - Given this overall view, did the state agencies have the capacities and capabilities needed to complete the 2023 MA SHMCAP Strategy? What was missing? How can those issues be addressed in the next update?
- What changes have been made to federal and state laws, regulations, guidance, or funding opportunities since the last update? How should the plan be revised to respond to those changes?
- Has knowledge of the hazards and climate change effects changed due to new data, information, modeling, or hazard events?
- Has exposure from current and future hazards and climate impacts changed due to the location or method of development?
    - Have new codes and regulations reduced risks?
    - Has new development increased exposure?
- Have there been any revisions or amendments to the 2023 MA SHMCAP? What were those amendments? Did they improve the plan?
- Did the approach to the maintenance of the 2023 MA SHMCAP effectively implement the plan, strengthen collaboration and partnerships, and provide support and resources to increase progress on actions and include broad engagement in plan implementation?

Annual Consultation with FEMA

On an annual basis, FEMA will meet with Massachusetts representatives, including MEMA and EEA, to coordinate on the maintenance and implementation of the SHMCAP and any needed updates to the plan. FEMA's State Mitigation Program provides support to states that includes reviewing activities, plans, and programs to assist in the effective implementation of mitigation and adaptation planning and implementation. The meetings are coordinated with FEMA and scheduled to inform the annual review of the SHMCAP. FEMA will provide a State Mitigation Program Consultation summary that describes the Commonwealth's program's strengths, opportunities for improving capabilities, and challenges in advancing mitigation.

2023–2028 Plan Maintenance Schedule

The implementation and maintenance approach described above will be carried out based on the general schedule presented in Table 7-2. The 60-month time span will help to ensure that the 2028 MA SHMCAP can be prepared, adopted, and published within the five-year required timeframe.

Table 7-2. Schedule for Plan Maintenance (2023–2028)

Task	Responsibility	Month/Year
Final SHMCAP published	MEMA and EEA	September 2023
Quarterly RMAT meetings	RMAT	October 2023 January 2024 April 2024 July 2024
Annual implementation updated (using the Action Tracker)	All lead state agencies	May 2024
Annual plan review	RMAT	August 2024
Summary of progress	EEA	September 2024
Annual consultation with FEMA	MEMA, EEA, and FEMA	Fourth quarter 2024
Quarterly RMAT meetings	RMAT	October 2024 January 2025 April 2025 July 2025
Annual implementation updated (using the Action Tracker)	All lead state agencies	May 2025
Annual plan review	RMAT	August 2025
Summary of progress	EEA	September 2025
Annual consultation with FEMA	MEMA, EEA, and FEMA	Fourth quarter 2025

Task	Responsibility	Month/Year
Quarterly RMAT meetings	RMAT	October 2025 January 2026 April 2026 July 2026
Annual implementation updated (using the Action Tracker)	All lead state agencies	May 2026
Annual plan review	RMAT	August 2026
Summary of progress	EEA	September 2026
Annual consultation with FEMA	MEMA, EEA, and FEMA	Fourth quarter 2026
Quarterly RMAT meetings	RMAT	October 2026 January 2027 April 2027 July 2027
Annual implementation updated (using the Action Tracker)	All lead state agencies	May 2027
Five-year plan review and update	RMAT	September 2026–2028
Summary of progress	EEA	September 2027
Annual consultation with FEMA	MEMA, EEA, and FEMA	Fourth quarter 2027
Quarterly RMAT meetings	RMAT	October 2027 January 2028 April 2028 July 2028
Final SHMCAP update (2028) published	RMAT	September 2028

7.1.8.4 Ongoing Engagement and Coordination

While it is critical to have robust and active engagement during the five-year review and update of the SHMCAP, collaboration among state agencies and strong engagement with municipalities, regional organizations, community groups, and Tribal representatives remains necessary during the implementation and maintenance of the plan. During the five-year update process, engagement opportunities include the ability to review and provide input on draft actions, plan goals, and risk assessment findings. During plan implementation, the collaboration and engagement opportunities broaden to participation in project and program development, input on the SHMCAP's effectiveness in addressing local needs, and tangible partnerships to advance action.

Other opportunities to engage and increase participation during the implementation and maintenance of the 2023 MA SHMCAP could include:

- Invite participation from municipalities, regional organizations, community groups, federal agencies, and Tribes to an RMAT meeting after the 2023 MA SHMCAP is finalized, possibly in an open house forum. The meeting/forum would provide a SHMCAP update, identify opportunities to participate and partner on project implementation, discuss needs and support, and hear perspectives on how SHMCAP implementation could benefit these partners and participants. It could be an annual event, held in the spring before the annual review in August (to inform that review) or in the early fall after the annual review (to set direction for the next year).
- Upon approval of the 2023 MA SHMCAP, share MA Climate Assessment and 2023 MA SHMCAP documents broadly with partners; highlight actions, funding opportunities, technical assistance, and opportunities to stay engaged.
- Provide a way for participants and partners to stay informed and engaged in the process through access to the updated Action Tracker, notices on action implementation, and an opportunity to leave comments and input at the Resilient MA website.
- Provide updates on SHMCAP action implementation to state, municipal, regional, and community organizations and Tribal representatives. When actions are geographically focused, hold an early open house to learn how the project will reduce community risk and increase resilience.
- Identify business and industry organizations to provide SHMCAP updates to and identify how the actions in the plan are increasing economic resilience and reducing risks to their industries.

To effectively implement the 2023 MA SHMCAP and build capacity and capability at all scales, engagement should be ongoing across multiple opportunities and venues to better understand the plan and its purpose. Over the next five years, EEA and MEMA will find ways to engage, partner, and collaborate while highlighting the ways that the MA Climate Assessment and the 2023 MA SHMCAP are increasing Massachusetts resilience. This ongoing engagement will build a strong foundation for the next five-year update in 2028.

7.1.9 Summary and Status of Actions from the 2018 SHMCAP

The RMAT, through the 2018 MA SHMCAP planning and implementation processes, identified 108 priority actions to increase resilience and address the Commonwealth's risks and vulnerabilities related to hazards and projected climate change impacts. However, due to consolidation and refinement of actions, 107 total actions were carried forward. Therefore, the number of 2018 actions and their status are evaluated based on a total count of 107 actions. According to information provided by RMAT during the 2018 MA

SHMCAP implementation and the 2023 updates, key highlights of progress on actions and action status include the following:

- 29 out 107 (~27%) actions were completed by state agencies and partners.
- 53 out of 107 (~50%) actions were identified as in progress, meaning that the actions are currently being implemented.
- 6 out of 107 (~6%) actions were in development and were being prepared for implementation.
- 8 out of 107 (~8%) actions were identified as needing modification or were deferred (due to COVID response efforts and associated priority shifting/staffing shortages), meaning that the project scope has been slightly changed or the action has been postponed.
- 7 out of 107 (~7%) actions had not started.
- 4 out of 107 (~4%) actions were deleted because they were no longer applicable or plausible.
- 68 out of 107 (~64%) actions presented in the 2018 SHMCAP were reviewed and revised to be more relevant and effective and were carried over to the 2023 SHMCAP.

Additional information about the action development process between the 2018 and 2023 SHMCAP is provided in Chapter 2 (Planning Process) and Chapter 4 (State Capability and Adaptive Capacity Analysis). Lastly, the 2023 Action Development Worksheet, including the status and additional information on the 2018 SHMCAP actions, and information on funding source and status are presented in Appendix 7.A.