FEMA Hazard Mitigation Assistance Culverts

Introductory Workshop

Massachusetts Emergency Management Agency
May 2021

Objective for the Day

- COMFORTABILITY with HMA Culvert application process
- UNDERSTANDING of how HMA can help your community
- KNOWING where to access information and resources

TAKE AWAY

Start with Massachusetts Emergency Management Agency (MEMA)

Agenda

- Regulation and Guidance
- Eligibilities and Requirements
- Project Identification
- MA Stream Crossing Standards
- Application Elements and Considerations
- Additional Resources and Funding

Opportunities for Questions and Discussion Between Every Section

FEMA Hazard Mitigation Assistance

"FEMA Hazard Mitigation Assistance grant programs provide funding for **eligible activities** that **reduce or eliminate long-term risk** to **people and property** from future disasters…Eligible applicants of these grants include **states, local, tribal and territorial governments**"

Guidance

2015: Hazard Mitigation Assistance Guidance

2015: Hazard Mitigation Assistance Guidance Addendum

2015-2021: Job Aids, Fact Sheets, Circulars, Notice of Funding Opportunities (NOFOs), Specific Guidance

Hazard Mitigation Assistance Programs

- Hazard Mitigation Grant Program (HMGP)
- Flood Mitigation Assistance (FMA)
- Building Resilient Infrastructure and Communities (BRIC)
  - Replaces Pre-Disaster Mitigation(PDM)
- Hazard Mitigation Grant Program Post Fire (HMGP Post Fire)

- *Rehabilitation of High Hazard Potential Dam (HHPD) Grant Program*

Building Resilient Infrastructure and Communities (BRIC)

- Hazard mitigation funding for states, tribal governments, and local communities
- Replaces Pre-Disaster Mitigation (PDM) Program
- Establishes an annual national competitive award
  - Qualitative and quantitative evaluation criteria
  - ~$500 Million in grant funding awarded annually
  - Funds projects up to $50 Million
  - Projects can be up to 36 (or 48) months
- Annual Notice of Funding Opportunity (NOFO)

Why BRIC

- Intended to create consistent predictable funding stream and promote local investment
- BRIC Priorities:
  - Public infrastructure projects
  - Projects that mitigate risk to one or more FEMA lifelines
  - Projects that incorporate nature-based approaches
- Reducing the risk to vulnerable populations
- Building code updates (2015/2018 IBC standards) and enforcement

MA Open/Rolling Statement of Interest (SOI) Period	Open and Ongoing
Sub-applicant Register with FEMA GO	Ongoing
Federal Notice of Funding Opportunity (NOFO)	August 2021
Federal Grant Application Period Opens	September 2021
Iterative State Pre-Application and Review	October - December 2021
Sub-application Final Submittal	Early December 2021
State Review Committee	December 2021 – January 2022
Submittal to FEMA for National Competitive Review	January 2022
Award Notification for FFY21 Cycle	Summer 2022
Project Initiation	~Spring 2023

Expected BRIC/FMA FFY21 Cycle

Technical Assistance

Direct Technical Assistance Available

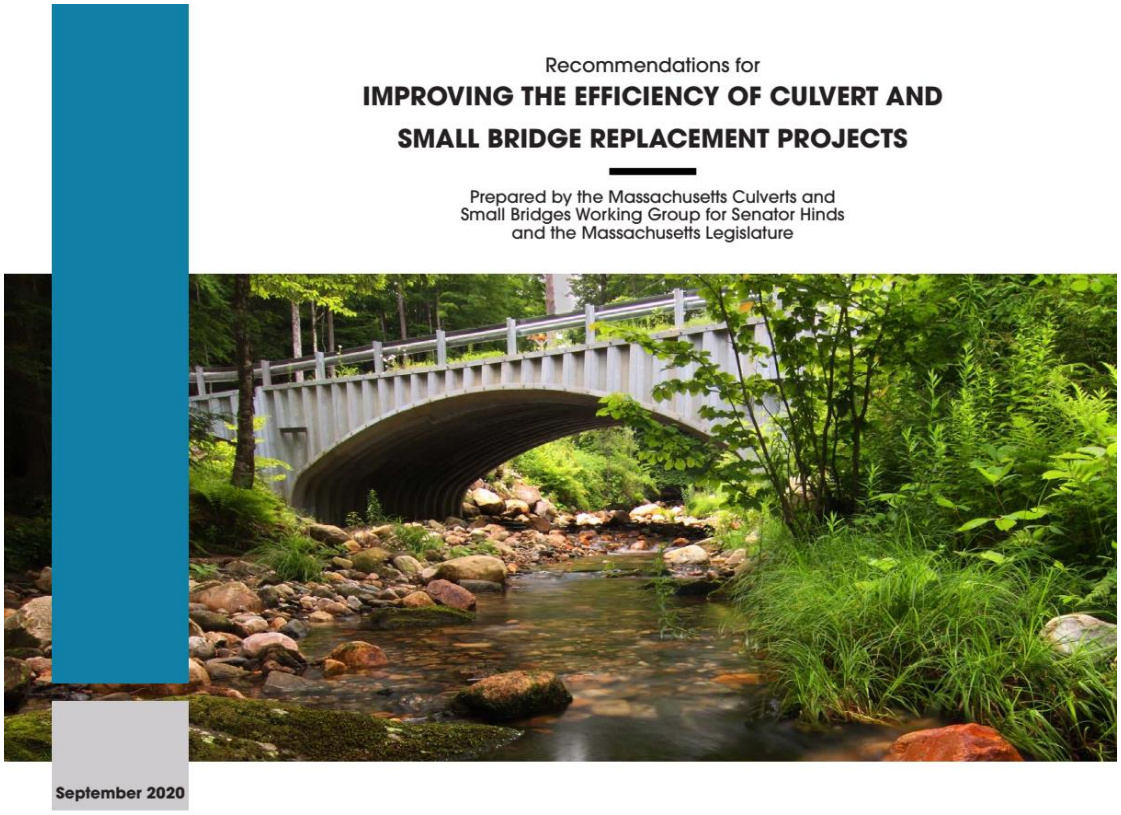
Now - June 30th

Submit a Statement of Interest (SOI) For BRIC/FMA

on MEMAs Website

Questions on HMA Regulation, Guidance, and Programs

Massachusetts Culverts



Findings of Culvert and Small Bridge Committee (Sept 2020)

- Approximately 25,000 culverts and small bridges in Massachusetts, many are:
  - Outside expected useful life
  - Undersized and unable to handle stream's current water flow
  - Not designed to current standards
- Climate change is creating more intense stream events that is exacerbating risk
- Culverts that are too small can be barriers to fish and wildlife movement and cause flood hazards for communities
- Massachusetts regulations call for culverts to meet the Stream Crossing Standards

HMA Project Requirements

Mitigate a Natural Hazard

Improved Level of Protection (LOP)

Feasible to Implement

- Regulatory
- Design
- Construction

Cost Effective

Environmental and Historic Preservation (EHP)

Culvert Associated Hazards

- Natural Hazard Types
  - Coastal flooding
  - Riverine flooding
- Hazard Impacts
  - Roadway inundation/pooling
  - Structural flooding
- Exacerbating Factors (Secondary Impacts/Hazards)
  - Scouring
  - Erosion

Culvert Mitigation Solutions

- Mitigation Type
  - Local Flood Risk Reduction
- Mitigation Actions
  - Improved Storage or Retention
  - Increased Culvert Size/Capacity
  - Culvert Realignment
  - Erosion Control/Slow Stabilization

What is not Eligible for HMA?

- Projects that do not reduce the risk to people, structures, or infrastructure.
- Projects that are dependent on another action to be effective.
- Projects which are considered repair, deferred maintenance, or replacement of existing infrastructure.
- Projects where actual physical work has already started.
- Projects that involve land that is contaminated with hazardous waste.
- Projects that primarily address ecological or agricultural issues.

Not Eligible

- Culvert Replacing, Repairing, Removal
- Removing debris, sediment, beaver dams
- Environmental connectivity/restoration
- Aging or crumbling infrastructure (culvert or road)
- Flooding that does not significantly impact people or structures

Questions on HMA Culvert Requirements and Eligibility

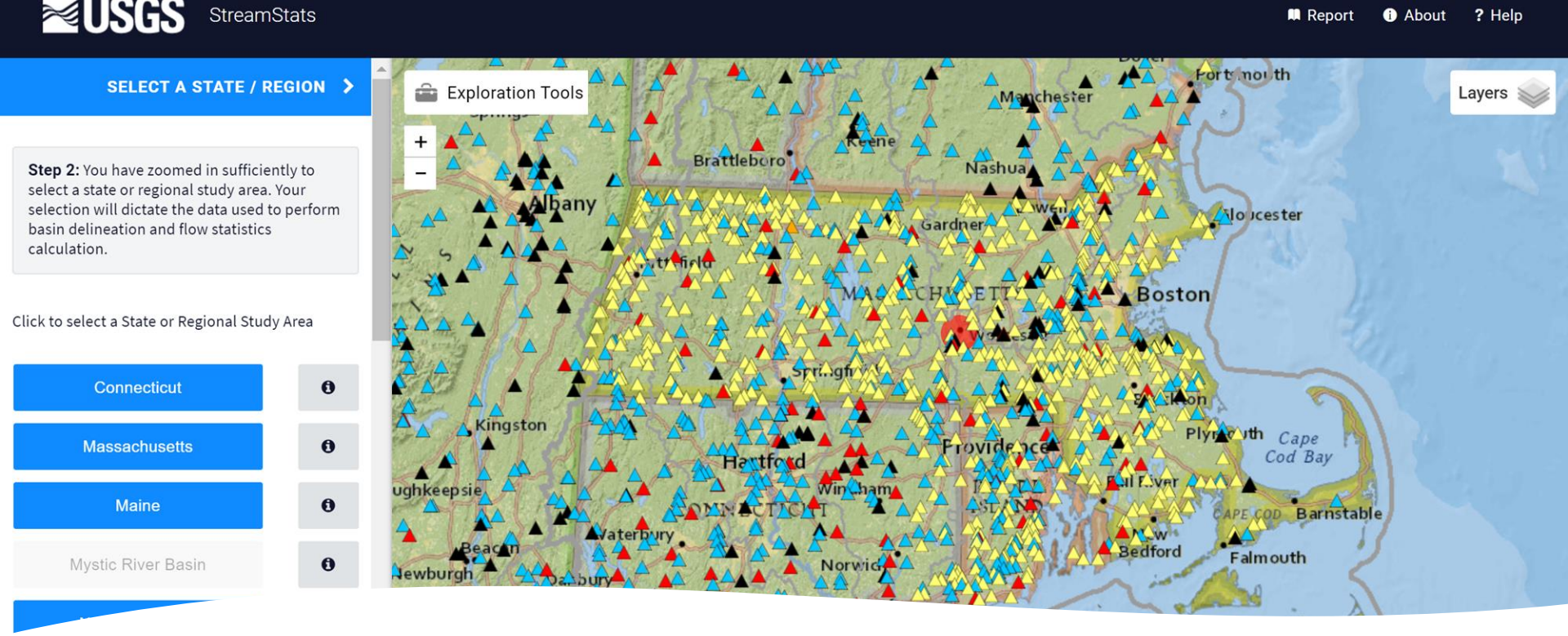
Project Considerations

- Identify the level of inundation and upgrade needed to mitigate risk to structures and infrastructure
- Consider future risk, including area development and climate change
- If appropriate, include bar screen to prevent debris blockage (may conflict with passage access)
- Identify if additional drainage components (detention and/or retention basins, or enlarged channels) are required to sufficiently solve flooding problem
- Demonstrate that the proposed project will not cause flooding downstream
- Make sure that any needed land for the project is available through right-of-way, outright ownership, or easement.

Best Practices

FEMA Map Service Center

- Flood Insurance Rate Maps (FIRM)
- Flood Insurance Studies (FIS) – may include relevant flow rates in the Summary of Discharge Table
- National Flood Hazard Layer (NFHL)/***Special Flood Hazard Area (SFHA)***
- https://msc.fema.gov/portal/advanceSearch



StreamStats (USGS)

- USGS Streamgaging Stations
- Estimates on Streamflow Statistics and Drainage-Basin Characteristics
- Generate Scenarios and Build Reports
- **Flows Computed Using Regression Equations**

Culvert Modeling (Free and Public)

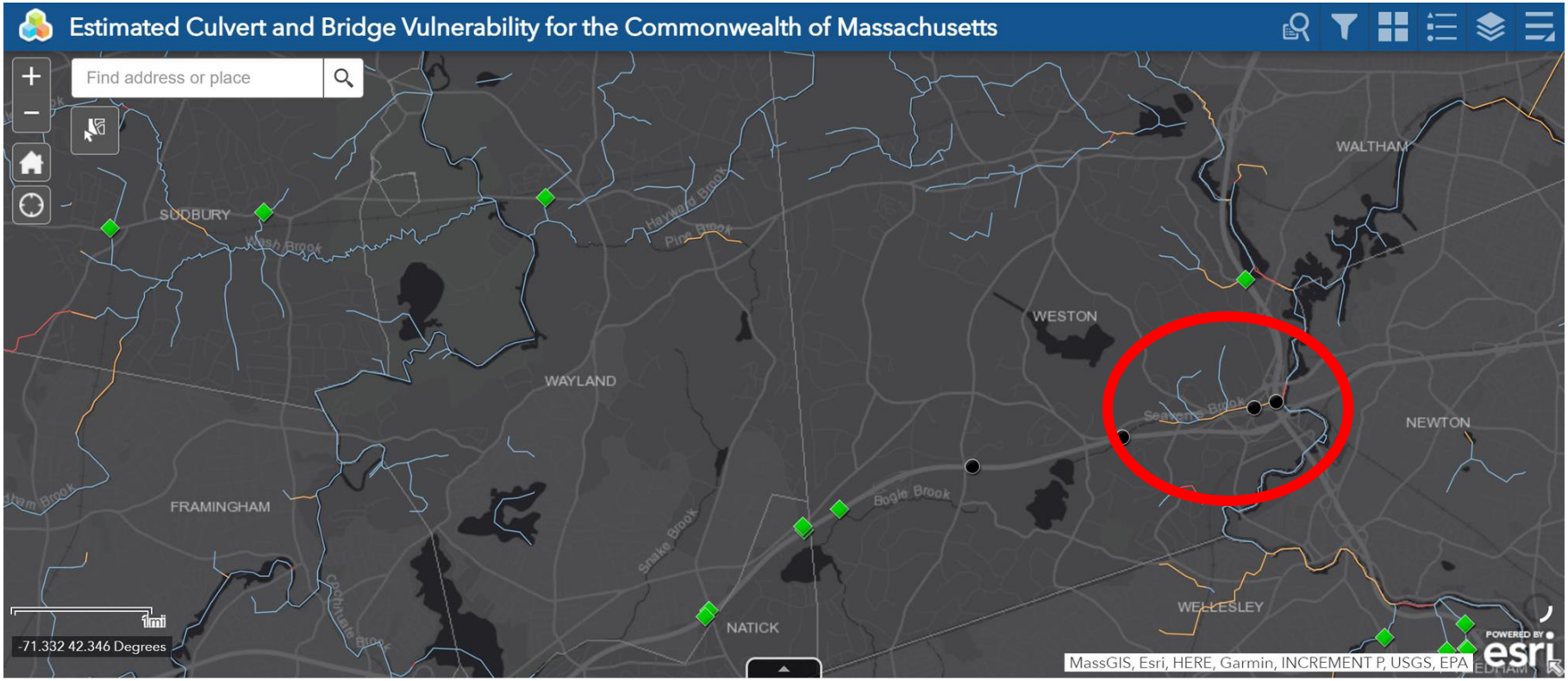
- Hydrologic Engineering Center's River Analysis System (HEC-RAS – USACE)
  - The HEC-RAS manual includes info on the appropriate modeling parameters to use with different culverts shapes, layouts, etc.
  - Chapter 6 – Performing a Steady Flow Analysis
  - Produces
    - Velocity
    - Depth
    - Flood mapping
  - Requires
    - Riverbed
    - Cross Sections
    - Water Flow Lines

Culvert Modeling (Free and Public)

- HY-8 Culvert Hydraulic Analysis Program (HY-8 – Federal Highway)
  - Analysis the performance of culverts
    - Velocities
    - Water Depths
    - Flow Profile
  - Compare different designs
  - Requires
    - Flow
    - Cross Section
    - Slope
    - Roadway
    - Culvert Design

MassDOT Vulnerability Estimates

Estimates for about ~2,000 of MassDOTs 6,000 culverts



Federal Highway Authority

Transportation infrastructure at risk from flood impacts

Guidance on assessing vulnerability and best approaches

- Coastal Zones (January 2020)
- Riverine Areas (June 2016)

MA Stream Crossing Standards

- Massachusetts River and Stream Crossing Standards (MRSCP, 2011)
- Provide fish passage, stream continuity, and wildlife passage.
- All new and, where feasible, replacement crossings adhere to stream crossing guidelines
- Includes General and Optimum Standards
- Compliance:
  - Wetlands Protection Act 2014/2017
  - 401 Water Quality Certification
  - Local bylaws
- Enforcement:
  - MassDEP
  - local conservation commission

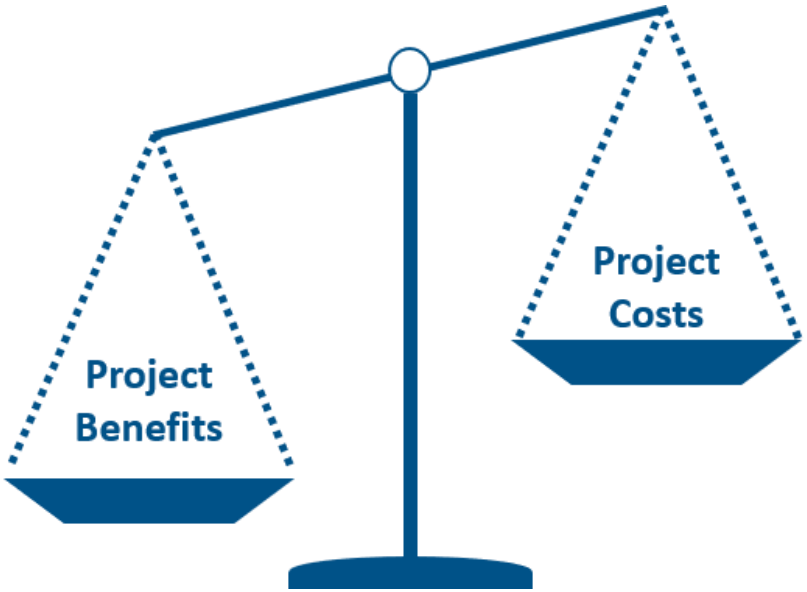
Stream Crossing Standard and Design References

- Massachusetts River and Stream Crossing Standards – River and Stream Continuity Partnership (2011)
- Massachusetts Stream Crossing Handbook (May 2018)
- Improving the Efficiency of Culverts and Small Bridge Replacement Projects – Culvert and Small Bridge Working Group (2020)
- MassDOT's Design of Bridges and Culverts for Wildlife Passage at Freshwater Streams (2010 ???)
    - Technical Guidance
    - Prototype Design Templates

Questions on HMA Culvert Project Considerations

Application Elements

Applicant Information	Hazard Mitigation Plan Information	Scope of Work
Project Schedule	Detailed Budget	Source of Local Cost Share
FEMA Benefit-Cost Analysis (BCA)	Environmental Considerations	Additional documentation may be required depending on the specific project type.



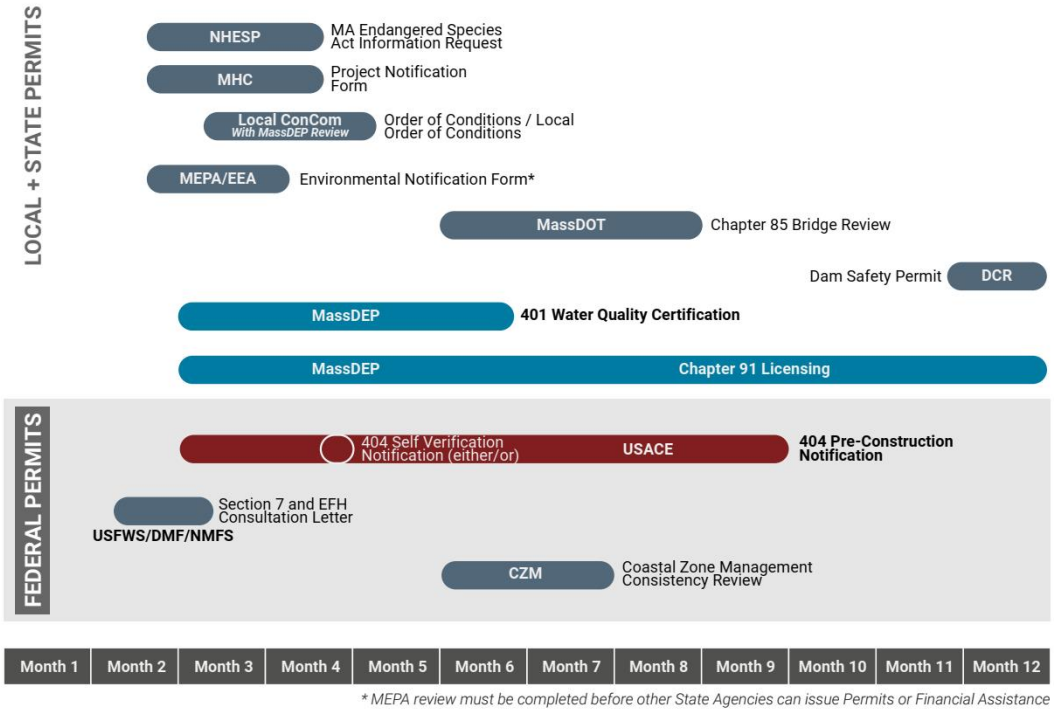
What is a Benefit Cost Analysis (BCA) ?

- Benefit-Cost Analysis (BCA) is a method that quantifies the benefits of a mitigation project compared to its costs.
- Establishes Cost Effectiveness

Goal: break the cycle of damage, reconstruction, and repeated damage

Permitting Requirements

- Massachusetts Culvert and Small Bridge Working Group
- Improving the Efficiency of Culvert and Small Bridge Replacement Projects (September 2020)
- Pages 27-30



EHP Requirements

- NEPA Categorical Exclusion (CatEx)
  - Upgrading existing culvert or constructing a small culvert under a road
  - Activities with no disturbance or adverse effects outside the currently disturbed area or the footprint of an existing facility.
- FEMA NEPA Desk Reference (February 2013)

Application Approach

- Culverts are traditional considered “Gray Infrastructure”
- Nature Based Solutions (NBS)
  - Flood Friendly Culverts – Naturally Resilient Communities (NRC)
    - Co-Benefits – Ecological Benefits – restoration of habitat, reconnection of rivers for migratory species.
  - Climate-Friendly Stream Crossings Toolkit – North Atlantic Aquatic Connectivity Collaborative
- State Priorities
  - Executive Order 569 – Integrated Climate Change Strategy
  - State Hazard Mitigation and Climate Adaptation Plan (2018)
  - Local Hazard Mitigation Plan
  - MA Culverts and Small Bridges Working Group – Recommendations of Improving the Efficiency of Culvert and Small Bridge Replacement Projects
  - Stream Crossing Standards

State Funding Opportunities

- Culvert Replacement Municipal Assistance Grant Program (CRMA - DER)
  - replacing an undersized, perched, and/or degraded culvert located in an area of high ecological value
  - Meet goals of Stream Crossing Standards
- Technical Assistance (DER)
  - One-on-one technical assistance consultation on new municipal culvert replacement projects.
  - In person trainings covering various phases of the culvert replacement process.
  - Tools and resources to support culvert replacements.
  - Brian Kelder, DER, Brian.Kelder@mass.gov, 617-626-1541
- Municipal Small Bridge Program (MassDot)
  - Spans between 10’ and 20’
  - Not eligible for federal aid
- Municipal Vulnerability Preparedness (MVP – EEA)
  - Climate change resilience
  - Program participation
- Community One Stop for Growth – Commonwealth Grant Portal

Other Stream Crossing Funding

- U.S. Fish and Wildlife Service's National Fish Passage Program
- National Oceanic and Atmospheric Administration's Restoration Center
- National Fish Habitat Partnerships
- National Fish and Wildlife Foundation
- Wildlife Conservation Society Climate Adaptation Fund

Contact MEMA

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MEMA Hazard Mitigation Website