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# Leveraging FEMA Hazard Mitigation Funding Opportunities for Green Infrastructure:

## A Process Guide for Massachusetts Communities

Green Infrastructure (GI) is a nature-based solution for managing stormwater runoff from buildings, roads, and other impervious surfaces. Common GI practices include rain gardens, bioswales, green roofs, tree wells, and floodplain restoration. GI not only beautifies your community but can improve water quality and increase resilience to hazards such as flooding and droughts.

GI reduces stormwater runoff, helps flatten flood peaks and increases the storage capacity of your community's drainage system. The Federal Emergency Management Agency (FEMA) recognizes the value of GI for mitigating flood hazards and offers Hazard Mitigation Assistance (HMA) programs that can fund GI projects. GI can also provide many co-benefits, such as ecosystem service benefits, to the area. The text box to the right highlights some of these co-benefits.

This guide provides an overview of these FEMA HMA programs, basic steps you can follow to position your community for funding, and success stories from other communities that have installed GI to mitigate flooding. Please explore the technical resources presented at the end of this guide and pursue other funding for GI in addition to FEMA programs to leverage multiple funding sources.

### Benefits of Green Infrastructure

- Flood mitigation
- Improved aesthetics
- Public green space
- Improved water quality
- Improved habitat
- Air quality improvements
- Heat island effect reduction
- Groundwater recharge

**Nature-based solutions** are defined as the conservation, enhancement, and restoration of nature to reduce emissions and enhance resiliency. These types of solutions use natural systems, mimic natural processes, or work in tandem with traditional engineering approaches to address natural hazards like flooding, erosion, drought, and heat islands.

**Green Infrastructure** is defined in Section 502 of the Clean Water Act as the range of measures that use plant or soil systems, permeable pavement or other permeable surfaces or substrates, stormwater harvest and reuse, or landscaping to store, infiltrate, or evapotranspire stormwater and reduce flows to sewer systems or to surface waters. <https://www.epa.gov/green-infrastructure/what-green-infrastructure>.

## FEMA Hazard Mitigation Assistance Programs

FEMA's Hazard Mitigation Assistance (HMA) has five grant programs within it. The three HMA programs relevant to GI projects are described below.

1. [Building Resilient Infrastructure in Communities \(BRIC\)](#). The primary goal of this program is to reduce overall risk to the population and structures from future hazard events. This program replaces the previous Pre-Disaster Mitigation Program and is a great fit for GI projects designed to mitigate future flood events.
2. [Flood Mitigation Assistance Grant Program \(FMA\)](#). The primary goal of this program is to reduce or eliminate the long-term risk of flood damage to buildings and other structures insured under the National Flood Insurance Program (NFIP).
3. [Hazard Mitigation Grant Program \(HMGP\)](#). In the event of a **Presidential declaration of emergency or natural disaster**, other FEMA funding programs, such as the HMGP, may become available to decrease the risk of future flooding impacts on property and loss of life.

The BRIC and FMA programs are administered on an annual basis.<sup>1</sup> Both programs pay up to 75% of the total project cost, require a benefit-cost analysis to show that the project is a good investment, and require project work schedules and cost estimates as part of the grant submittal. More information on these and other funding programs is provided below.

## Is Your GI Project Eligible for Hazard Mitigation Assistance Funding?

HMA grants require you to demonstrate that the GI project will reduce or eliminate flood risk to people and property in an area vulnerable to flooding. Your project must meet the following funding requirements:

- HMA grants cannot be awarded for repair, replacement, or deferred maintenance activities, and cannot be used to supplement other federal funding sources. Eligible activities funded by the BRIC, FMA, and HMGP are provided in Table 1.
- The benefits of your project must exceed the costs (see Step 2, below).
- Your community must have a FEMA-approved Hazard Mitigation Plan (HMP) that includes the GI initiative or project(s) that you are seeking to fund (see Step 3, below). Demonstrating broad-based support for GI projects in local regulations, master plans, policies, etc. will improve your case for HMA funding.
- HMA grant funding programs can pay for the associated administrative costs such as program management and mitigation planning. FMA funding may be used for technical assistance (i.e. contractors), however HMGP and BRIC funding cannot. FEMA's website includes a [comprehensive list of eligible activities](#) for each of the HMA grant programs.

*You can apply for HMA grants as a **sub-applicant** with neighboring communities or organizations which can help demonstrate widespread support for your project, improving your case for a grant award.*

<sup>1</sup> Funding schedules and deadlines can vary from year to year. For the most up to date information, contact Massachusetts Emergency Management Agency (MEMA) at [mitigation@mass.gov](mailto:mitigation@mass.gov).

**Building Resilient Infrastructure in Communities (BRIC)** is an annual FEMA HMA grant that aims to support proactive investment in projects that will increase community resilience and decrease risk from natural hazards. BRIC grants can be used to fund infrastructure projects and activities focused on capability and capacity building.

Complete a Statement of Interest (SOI) form to determine basic eligibility for the BRIC grant. A member of the MEMA grant staff will respond following submittal of the SOI. <https://www.mass.gov/service-details/building-resilient-infrastructure-and-communities-bric-flood-mitigation-assistance>.

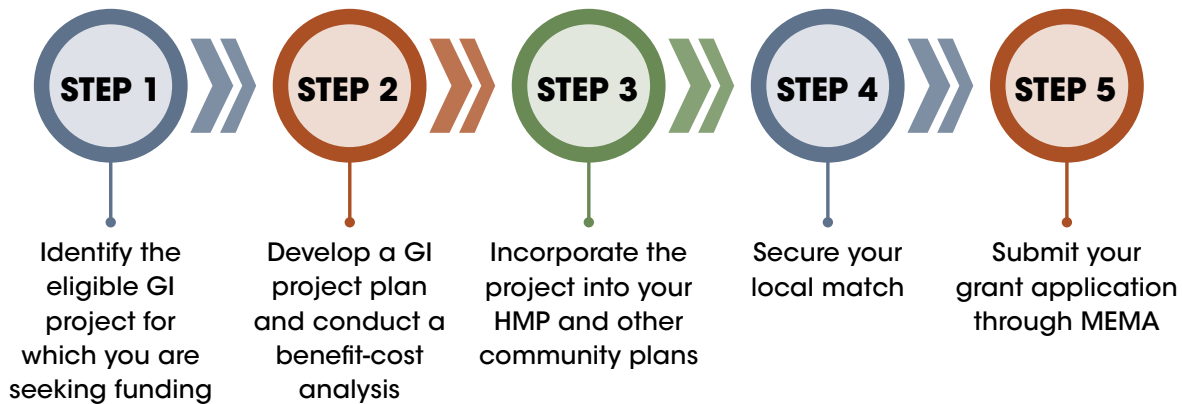
Be sure to review the BRIC Qualitative Criteria and BRIC Technical Criteria documents prior to submittal to make sure your application is as strong as possible. <https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities/resources>.

**Table 1: Eligible Activities for HMA Grant Programs**

|                                              | HMGP | BRIC | FMA |
|----------------------------------------------|------|------|-----|
| <b>Mitigation Projects</b>                   |      |      |     |
| Property Acquisition                         | ✓    | ✓    | ✓   |
| Structure Elevation                          | ✓    | ✓    | ✓   |
| Mitigation Reconstruction                    | ✓    | ✓    | ✓   |
| Flood Risk Reduction Measures                | ✓    | ✓    | ✓   |
| Stabilization                                | ✓    | ✓    | ✓   |
| Dry Floodproofing Non-Residential Buildings  | ✓    | ✓    | ✓   |
| Safe Rooms                                   | ✓    | ✓    |     |
| Wildfire Mitigation                          | ✓    | ✓    |     |
| Retrofitting                                 | ✓    | ✓    | ✓   |
| Generators                                   | ✓    | ✓    |     |
| Innovative Mitigation Projects               | ✓    | ✓    | ✓   |
| Repair, Replacement, or Deferred Maintenance |      |      |     |
| <b>Capability and Capacity Building</b>      |      |      |     |
| New Plan Creation and Updates                | ✓    | ✓    | ✓   |
| Planning-Related Activities                  | ✓    | ✓    | ✓   |
| Project Scoping/Advance Assistance           | ✓    | ✓    | ✓   |
| Financial Technical Assistance               |      |      | ✓   |

## The Basic Process of Applying for HMA Grants

Obtaining grants from each of the HMA programs will entail a slightly different process. The Massachusetts Emergency Management Agency (MEMA) is available ([mitigation@mass.gov](mailto:mitigation@mass.gov)) for guidance and support as you move through the five steps presented in this guide.



**Step 1: Identify the eligible GI project for which you are seeking funding.** Your community may have already identified GI opportunities as part of roadway improvement projects or other plans. To compete favorably for HMA funding, you must demonstrate that the project will provide an increased level of protection from flood hazards and verify that it meets the eligibility criteria described above.

If your community has not done any GI planning, you can start by identifying frequently flooded areas. Characterize the flooding hazard (nature, extent, frequency, damages) and how GI can be used to mitigate it. For tips on how to identify suitable sites for GI, refer to the general GI siting tips below. Some communities report that it is much easier to secure local support for GI if it is included in a project already being planned, such as road/drainage system project, rather than a “stand-alone” project.

When selecting a project for HMA funding, consider how the project may fit into watershed management objectives. There may be a watershed organization with whom you can collaborate. Community buy-in is essential when making the case for federal funding, so demonstrating broad-based support will help your project stand out. Also keep in mind that GI has shown to be most effective for flood mitigation when applied at larger scales, but town-wide smaller scale GI can also be effective.

### General GI Siting Tips

- Avoid steep slopes and existing wetlands.
- Class A and B soils are best for infiltration, but Class C soil is also feasible.
- Infiltrating practices should be 2-3 ft above the high water table.
- Consider integrating green and gray infrastructure, such as connecting underdrains to existing stormwater systems.
- GI can be incorporated in small spaces along rights-of-way. Look for opportunities when other work is being planned.
- Explore GI on a range of public land (e.g., schools, parks, libraries, DPW yards, parking lots).
- Avoid utility conflicts (e.g., water, sewer, gas, electric, etc.).
- GI to mitigate flooding is often effective when sited adjacent to headwater streams.
- Use GIS analysis to identify suitable GI sites (public property, pervious soils, no shallow bedrock or wetlands, gentle slopes).
- Conduct site visits to verify suitable sites.



Figure 1. The range of scales at which green infrastructure can be implemented.

## Step 2: Develop a GI project plan and conduct a benefit-cost analysis.

To demonstrate that your project will be a good investment, you need to develop a project plan with a cost estimate and schedule.

Once you have developed a project plan, you must use benefit-cost analysis (BCA) to demonstrate that the economic benefits of the GI project will outweigh the costs. BCA compares the direct and indirect benefits of a project against the estimated costs to show FEMA that it is a good investment of federal funds. Use [FEMA's Benefit-Cost Analysis Toolkit](#) to navigate the process, and contact MEMA ([mitigation@mass.gov](mailto:mitigation@mass.gov)) if you have questions.

*Steps 2 and 3 may be completed concurrently. Developing a project plan will help you describe the project in your local HMP. Likewise, including the project in your HMP will help foster awareness and support for the project, which may be necessary for local leaders to prioritize the project.*

When conducting the BCA, be sure to quantify all direct and indirect benefits of your GI project, including ecosystem service benefits, to show the total project value. For direct flood mitigation benefits, you will quantify flood damages before mitigation (the "as-is" situation) and after mitigation. For indirect benefits, tally up all ancillary costs that your community will avoid once the project is complete. These can include damages over time, insurance claims, disruption of services (e.g., road closures), loss of business revenue, emergency response expenses, loss of recreational land, property value impacts, and others. Build the case for GI in your community by collecting data and information well in advance of the HMA application process, preferably documenting multiple years of costs. For ecosystem service benefits, you will provide the project area and the land use type after project completion (see text box below for additional information).

## Accounting for Ecosystem Service Benefits (Co-Benefits) of GI in the FEMA BCA Toolkit

The FEMA BCA Toolkit allows you to add ecosystem service benefits to your cost-benefit analysis. The benefit is calculated by multiplying the area of land in each land use type by the economic value of that land (see right). As of Spring 2021, however, the BCA Toolkit 6.0 does not give significant credits for these co-benefits. The credit calculations may change in the future, so it is important to become familiar with co-benefits credits and consider including them in your project co-benefit calculations when there are enough credits to warrant the effort.

Contact [bchelp@fema.dhs.gov](mailto:bchelp@fema.dhs.gov) or call 1-855-540-6744 for assistance.

Economic values for each land use type included in the BCA Toolkit:

- Green Open Space: \$8,308/acre/yr
- Riparian: \$39,545/acre/yr
- Wetlands: \$6,010/acre/yr
- Forests: \$554/acre/yr
- Marine & Estuary: \$1,799/acre/yr



### Step 3: Incorporate the project into your HMP and other community plans.

First and foremost, your HMP needs to effectively capture the *vulnerability* to flooding hazards in the area(s) that you are targeting. Including a general description of the flood-prone area and the GI solution(s) demonstrates your community's commitment to GI as a means of mitigating the hazard. Incorporate this information into the *Mitigation Strategy* within your HMP. Specific details of your GI project(s) are not necessary to include in the *Mitigation Strategy*—a list of possible projects will suffice—however any information you have should be included (as an appendix if necessary).

It is important for the HMP to broadly include GI as a *Goal*, outline how specific *Actions* will be determined, and provide examples of those *Actions*, including any site-specific GI installations that have been proposed. Refer to FEMA's [Local Mitigation Planning Handbook](#) for additional guidance.

GI may be incorporated into traditional stormwater infrastructure (or "gray" infrastructure) projects. In fact, when it comes to flood mitigation projects, GI is most commonly incorporated as a vital addition to gray infrastructure.

If possible, your HMP should reference any applicable local regulations or bylaws,<sup>2</sup> environmental plans, and public outreach campaigns to demonstrate community-wide support for GI. You should also mention any volunteer organizations, watershed groups, or other entities who support installing GI in your community.

Once you have incorporated the GI project(s) into your HMP, submit it to MEMA for approval. If you are updating your HMP prior to the full 5-year update process, you can amend the existing HMP and send to MEMA without going through the entire HMP update process.

The Town of Framingham, Massachusetts [Multiple Hazard Mitigation Plan 2017 Update](#) shows how an HMP can effectively incorporate GI without presenting too much technical detail about specific installations. As part of the Town's *Mitigation Strategy*, Table 5.2 presents the Town's *Mitigation Project List* which includes several examples of GI projects. Table 5.3 presents the Town's *Action Plan for Priority Mitigation Projects* which includes actions such as developing GI bylaws and regulations and implementing a mitigation plan specific to flooding hazards.

### Tips to Strengthen HMPs for FEMA Grant Funds

- Emphasize local/regional partnerships.
- Identify vulnerable flooding locations.
- Align mitigation actions with identified risks/vulnerability.
- Express need for additional stormwater capacity.
- Incorporate GI concepts/projects into Mitigation Goals, Risk/Vulnerability Assessment, and Capability Assessment sections.



Figure 2. Mitigation Strategy. Source: FEMA's *Local Mitigation Planning Handbook*, March 2013

<sup>2</sup> Your community may have existing local regulations and/or bylaws that encourage or require low-impact development, climate resiliency, nature-based solutions, or even GI specifically

It is important that elements of hazard mitigation and GI be integrated into existing watershed plans and/or your community's Stormwater Management Plan. GI goals and initiatives should be included in your Post-Construction Stormwater Management minimum control measures. Figure 3 below presents the overlapping elements of hazard mitigation planning and watershed planning.

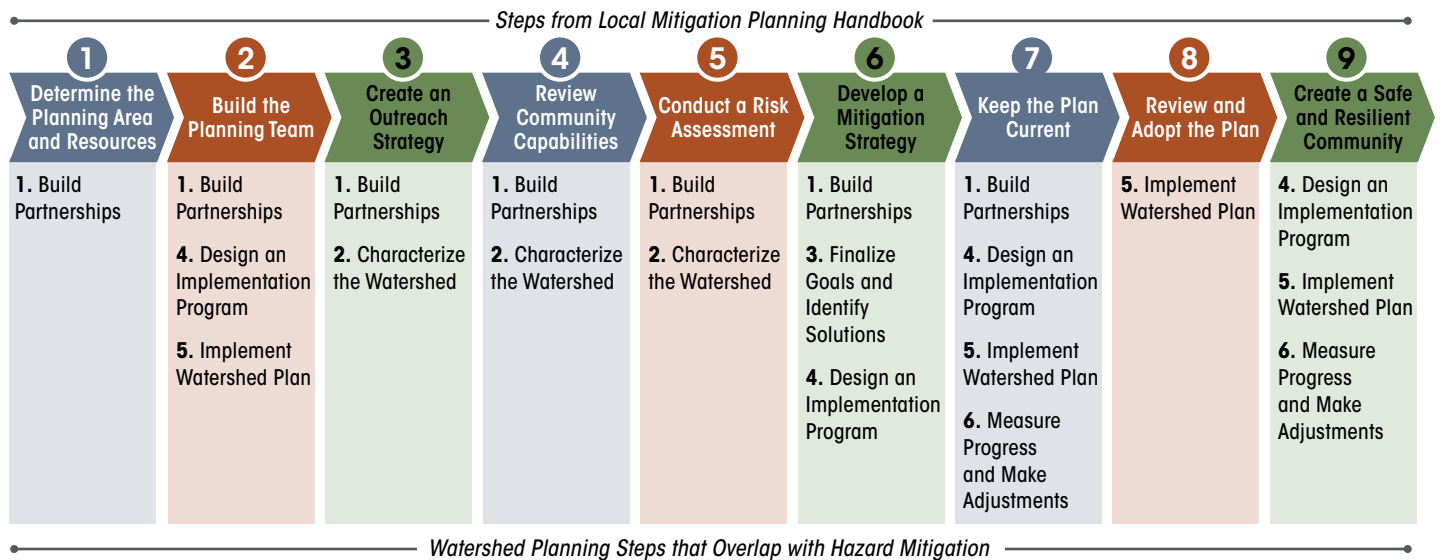


Figure 3. Water Quality Watershed Planning/Local Hazard Mitigation Planning Crosswalk, EPA, 2019

#### Step 4: Secure your local cost share

If awarded, HMA grants will cover up to 75% of the financial expenditures associated with your project. The remaining costs are referred to as the "non-federal cost share." When you apply for funding, FEMA will need to see that your community has already secured a funding source for the local cost share. While HMA grants cannot be combined with other federal funding sources,<sup>3</sup> they can be combined with state grant funds. For example, the Massachusetts [Municipal Vulnerability Preparedness](#) (MVP) financial support program can be a cost share source, minimizing local expenses. Other options for non-federal cost share include philanthropic contributions or in-kind materials and services.

HMA grants are issued on a reimbursement basis. As such, costs must be incurred by the community prior to a request to MEMA for grant funding payment. MEMA will reimburse according to the match requirements of the particular grant program. Details can be found in the Notice of Funding Opportunity (NOFO) on [MEMA's website](#).

#### Step 5: Submit your grant application through MEMA

Applications for the BRIC, FMA, and HMGP programs can be initiated and submitted through MEMA's website (see links below). Remember that MEMA is standing by for assistance ([mitigation@mass.gov](mailto:mitigation@mass.gov)) with the application process and to help you position your community for a successful grant award. If your

<sup>3</sup> There are some Federal awards that have an authorizing statute that explicitly allows funds to be used as a match for other Federal grants in certain situations. See [https://www.fema.gov/sites/default/files/2020-08/fema\\_hma\\_cost-share-guide.pdf](https://www.fema.gov/sites/default/files/2020-08/fema_hma_cost-share-guide.pdf) for additional information and examples.

community does not have the in-house capacity to develop all the necessary application components, consider procuring a consultant for additional support. The closer your project is to being shovel-ready, the better case you can make for an HMA grant.

- To apply for BRIC and/or FMA funding, complete the Statement of Interest Form on MEMA's website: <https://www.mass.gov/service-details/building-resilient-infrastructure-and-communities-bric-flood-mitigation-assistance#%3A%7E%3Atext%3DBRIC%20is%20a%20new%20FEMA%2C203%20of%20the%20-Robert%20T>
- To apply for HMGP funding, complete the Grant Sub-Application Package for HMGP-4372-MA/ HMGP-4379-MA on MEMA's website: <https://www.mass.gov/service-details/hazard-mitigation-grant-program-hmgrp-program-hmgrp>

**Table 2: Comparison of HMA Grant Application Components**

| Application Component                           | BRIC/FMA Statement of Interest | HMGP/BRIC/FMA Sub-application Package |
|-------------------------------------------------|--------------------------------|---------------------------------------|
| Scope of work                                   | Yes                            | Yes                                   |
| Project photos                                  | No                             | Yes                                   |
| Project location and floodplain maps            | No                             | Yes                                   |
| Project drawings                                | No                             | Yes                                   |
| Work Schedule                                   | Yes                            | Yes                                   |
| Project cost estimate                           | Yes                            | Yes                                   |
| Environmental compliance information            | No                             | Yes                                   |
| Benefit-cost analysis                           | Yes*                           | Yes                                   |
| Elevation and acquisition documentation package | No                             | Yes                                   |
| Hazard mitigation plan status                   | Yes                            | Yes                                   |
| Approximate project site address                | Yes                            | Yes                                   |
| Anticipated benefits/avoided losses             | Yes                            | No                                    |
| Anticipated non-federal cost share              | Yes                            | Yes                                   |

\*You can submit the Statement of Interest without it. MEMA can assist with Benefit-Cost Analysis if needed.

## Success Stories From Other Communities

Below are some examples of communities that have been awarded FEMA HMA grants to construct GI to mitigate flooding hazards.

- Lawrence, MA received over \$1 million from the FEMA HMGP to relocate twenty-two residents out of an urban area that had repeatedly flooded for decades from the nearby Spicket River. Since the project's completion in 2003, flood damages have decreased. The FEMA funded project laid the foundation for the creation of the Spicket Greenway, a walkable area that includes multiple parks and trails.
- The City of Fall River, MA received \$4.6 million from the FEMA HMGP to address flooding issues that posed significant public health risks through sewer separation and GI, including tree-box filters and bioswales. The total project cost was \$6.2 million and was completed in 2020.



- Brattleboro, VT was awarded a FEMA PDM grant for \$500,000 in 2015 to complete the engineering design and feasibility study of a project for floodplain restoration within the Whetstone Brook watershed and to construct a wetland adjacent to the floodplain.

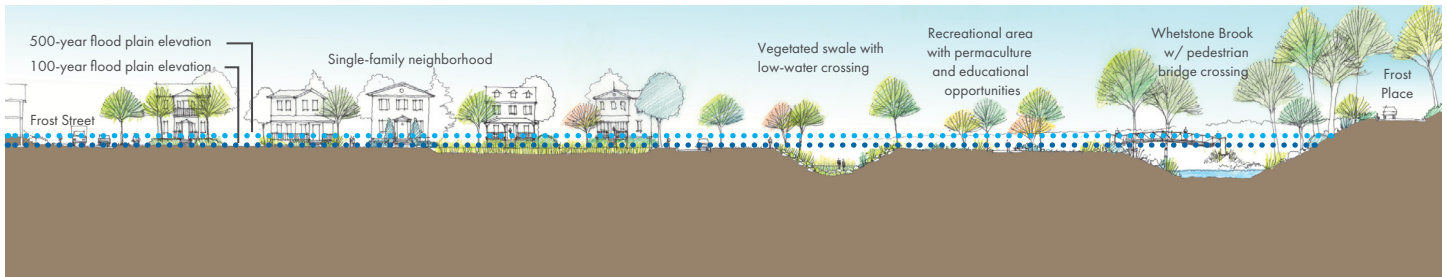


Figure 4. Proposed green infrastructure Project Illustration: Brattleboro, VT. Image source: Design for Resilience in Brattleboro's Lower Whetstone Brook Corridor, January 2017

#### For additional guidance, please refer to these resources:

BCA Helpline FEMA's BCA Helpline is available to provide assistance using the BCA Toolkit. Questions to the BCA Helpline can be directed to [bchelp@fema.dhs.gov](mailto:bchelp@fema.dhs.gov) or by calling toll free at 1-855-540-6744.

[BRIC & FMA Grant Programs Web Page](#) This MEMA web page provides the latest information and resources related to the BRIC and FMA Grant Programs, including how to take the first steps in applying by completing the statement of interest form.

[Enhancing Sustainable Communities with Green Infrastructure](#) EPA's Office of Sustainable Communities offers this comprehensive guide to help communities manage stormwater while also achieving other environmental, public health, social, and economic benefits.

[EPA Green Infrastructure Modeling Toolkit](#) The resources in this toolkit incorporate green or a combination of green and gray infrastructure practices to help communities manage their water resources in a more sustainable way, increasing resilience to future changes.

[EPA Region 1 Stormwater Optimization Tool Opti-tool](#) is a spreadsheet-based tool for evaluating the cost of various stormwater treatment options including green infrastructure, low-impact development, and more traditional stormwater management controls.

[Federal Funding Opportunities for Flood Resilience: A Guide for Small Cities](#) The American Flood Coalition created this guide to highlight the various federal funding sources that can be utilized to protect your community against flooding hazards.

[FEMA HMA Helpline](#) Send an email to FEMA's HMA Helpline to ask general questions about the program or for guidance relating to project eligibility and the grant application process.

[FEMA's Building Community Resilience with Nature-Based Solutions: A Guide for Local Communities](#) This guide identifies key staff and resources, discusses potential co-benefits, and lists federal funding opportunities to support GI projects including EPA, FEMA, HUD, and NOAA.

[FEMA's "Mitigation Minute" e-newsletter](#) provides funding and guidance updates.

[Green Infrastructure Wizard](#) This is an interactive web application that connects communities to EPA Green Infrastructure tools and resources.

[MEMA's Local Hazard Mitigation Planning website](#) Provides resources for Massachusetts communities.

**Watershed Management Optimization Support Tool (WMOST)** This tool helps communities screen water management options by accounting for water and pollutant loads at a watershed scale, identifying water-related goals and constraints, evaluating integrated management practices, and optimizing costs while finding solutions.

**Author's note: FEMA funding programs are frequently updated and program details can change annually. Use the resources noted above to keep up to date.**