BRIC System-Based Mitigation

This Program Support Material (PSM) provides information about system-based mitigation, a reimagined approach to hazard mitigation. Vulnerability to natural hazards is complex and influenced by many factors, so system-based mitigation encourages projects that address the interconnectedness and provide benefits to the whole community. The Building Resilient Infrastructure and Communities (BRIC) program supports the use of system-based mitigation approaches in projects by prioritizing equity, addressing future conditions due to climate change, enhancing hazard mitigation planning and building code implementation and enforcement, supporting nature-based solutions, and leveraging partnerships.

Background

Communities across the country face a new set of risks due to the increasing impacts of climate change,[1] aging and strained infrastructure, population growth, demographic changes, and land use and development patterns. The increasing connectivity of systems that sustain our communities can lead to cascading failure when climate change and natural hazards impact or destroy integrated infrastructure network operability.

Mitigation of standalone projects—such as enlarging a culvert for flooding or building a retention pond—only incrementally address resiliency. A system-based mitigation approach can help communities design more holistic projects to comprehensively tackle climate change and disaster damage affecting the whole community.

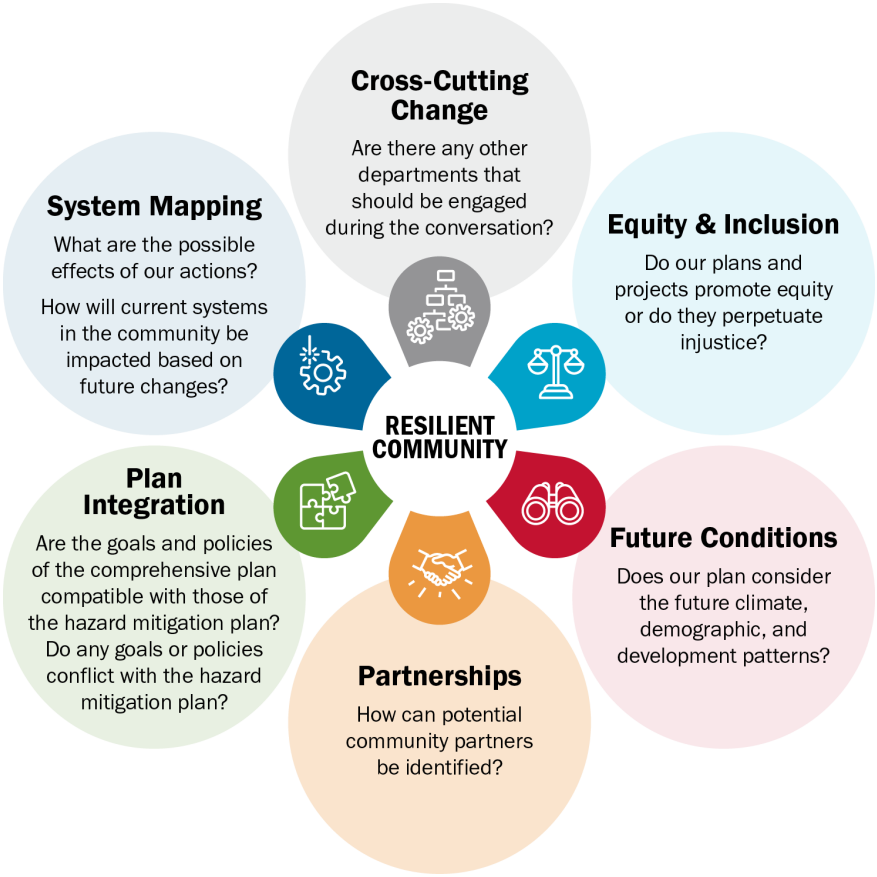
A system-based mitigation approach aims to address the interdependence of community systems. These can include transportation and utilities, key services such as life safety and communications networks, local institutions that support educational and economic progress, value chains, and other critical components of community resilience.

System-based mitigation is a proactive approach to combat the climate crisis. The approach generates greater investment returns because it integrates future conditions and moves away from incremental measures. These measures help protect a diverse group of stakeholders and their community systems.

[1] Climate change is defined as "Changes in average weather conditions that persist over multiple decades or longer. Climate change encompasses both increases and decreases in temperature, as well as shifts in precipitation, changing risk of certain types of severe weather events, and changes to other features of the climate system" (U.S. Global Research Program. 2018. *Fourth National Climate Assessment*. Revised March 2021. https://nca2018.globalchange.gov/).

Components of System-Based Mitigation

This system-based mitigation approach has significant strategic support from outside FEMA as well as within FEMA's own strategic planning framework. Embracing the goals of EO 14008, *Executive Order on Tackling the Climate Crisis at Home and Abroad* and *HMA's Strategic Framework FY22–23* goals C and D (C: We Build Capacity and D: We Foster Connection), system-based mitigation approaches improve resilience to hazards holistically rather than on an individual disaster or topical basis. Building out this approach will also help FEMA implement our FY2022–2026 Strategic Plan, specifically Goal 2 (Lead Whole of Community in Climate Resilience) and the sustainable outcomes for Goal 3 (Promote and Sustain a Ready FEMA and Prepared Nation). The components of a system-based mitigation approach, which help distinguish it from other mitigation approaches, are discussed below. Subapplicants can use this information to aid in building partnerships, project scoping, planning, design, and implementation.



- **Equity and inclusion**: Goal 1 of FEMA's 2022–2026 Strategic Plan is to instill equity as a foundation of emergency management. In the context of mitigation, this includes examining how the community system promotes equity or perpetuates injustice and, in turn, exploring how proposed system-based mitigation solutions would impact the outcomes of all segments of the population.

  One consideration for an outcome is to develop projects or actions that reduce disproportionate impacts on disadvantaged populations. A way to ensure more equitable outcomes is to enact more inclusive engagement practices that empower a diverse array of voices to influence change while cultivating decision-making processes that uphold the needs of marginalized groups.

- **Future conditions**: The system-based mitigation approach considers future conditions, including how climate change and shifts in population and development will impact individual nodes in the community system as well as the system overall.

  Changes in weather patterns, temperature, and sea levels can bring more extreme storms, droughts, wildfires, and other natural disasters to a community. In addition, how a community uses and develops the land, for instance zoning and population demographic changes, can put more people, businesses, and homes in harm's

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way. Consideration of future conditions must address how development changes will affect the community's resilience to hazards.

These future changes can bring greater risk to the people who live and work in a community and should be considered throughout all mitigation efforts. Project identification and development could benefit from applying adaptive design and risk management principles to account for uncertainty in future conditions.

For example, designing a foundation to allow for future increases in the height of a flood wall to address uncertainty in water surfaces avoids additional construction costs over time. Additionally, nature-based solutions can provide examples of how to address future conditions by reducing negative impacts to the environment, integrating more sustainable practices, or restoring balance to environmental systems that can reduce risk for human populations and infrastructure.

- **System mapping:** A system-based mitigation approach considers the configuration of a community's systems and analyzes how changes in one part might impact the overall risk to the system, referred to as system mapping. This involves defining the components of the system, identifying and visualizing how each of the components interact with each other and the overall system, and determining how a proposed solution would impact the system.

  Additionally, system-based mitigation identifies the root causes of risk and addresses vulnerabilities using a holistic framework of change to ensure that the system itself does not perpetuate risk.

Phased Projects

Phased projects provide a unique opportunity for communities to engage in a system-based mitigation approach. These are complex mitigation projects in which FEMA provides funding to applicants to develop all the technical and environmental information, including design, engineering studies, and permitting, before issuing a full construction approval. Phased projects allow funds to be reserved through the same grant cycle and allow monies to flow and effective mitigation projects to be developed and evaluated without a community assuming the risk of not being funded. By understanding the full scope, or phases of the entire project, a community can holistically plan for and develop a pipeline of funding. For more information on phased projects, see the *BRIC and FMA Phased Projects* PSM.

- **Cross-cutting change:** Systems are inherently complex and a system-based mitigation approach should result in cross-cutting impacts. Cross-cutting change focuses on identifying issues, examining causes and effects, and acknowledging the connections and potential changes across jurisdictions prior to project implementation.

  This component embraces the Hazard Mitigation Assistance (HMA) Goal D1, "Use innovation research and data to drive improved mitigation practices and investments," by analyzing risks for mitigation decisions. Innovation can encompass elements of mitigation activities that promote technological changes, establish coordination among partners, or consolidate systems.

  Cross-cutting impacts may include coordination among jurisdictions across a region, adjustments to policies or programs that apply to all residents of a municipality, or projects that benefit a large proportion of the

population. However, implementing a small change may cause a much-larger shift in the overall system, so solutions themselves need not be sophisticated or large.

- **Plan Integrations**: Coordination and integration across all plans for a jurisdiction is one way of embracing a system-based mitigation approach. Integrating plans, such as the Hazard Mitigation Plan, the Climate Adaptation Plan, the Capital Improvements Plan, the Comprehensive Economic Development Strategy, the Stormwater Management Plan, the Comprehensive (or Master) Plan, and the Future Land-Use Plan, helps to align project or policy strategies across community sectors.

  This process also helps to inform all sectors of the local government of the priorities for future mitigation and resiliency and ensures that all relevant governmental sectors have a common or shared resiliency vision for development. Integrating plans also reduces the volume of materials that must be consulted when recovering from or planning for the next disaster.

  Partnerships: BRIC also encourages a system-based mitigation approach by supporting the creation of partnerships for projects. Often, a system-based mitigation approach requires a framework to work across jurisdictions. For example, several counties or states may find that working at the watershed level can create rich opportunities for mitigation action that addresses the multiple systems that contribute to and are impacted by climate change. However, this approach requires extensive collaboration among various interest groups and communities to identify common system risks and shared benefits, such as coordination of resources and shared financial responsibility.

Multi-jurisdictional Projects

Multi-jurisdictional subapplications are eligible for funds within the BRIC program. The Cleveland and Northern Ohio Regional Stormwater Management and Flood Control Program is an example in which the Northeast Ohio Regional Sewer District successfully built a partnership across 62 communities. This undertaking illustrates how fostering a system-based mitigation approach can build a network of partnerships for a single project. The network of communities worked together to track stormwater project implementation and facilitate better cooperation across the Region to collaborate on resilience measures. This project is included in the *Hazard Mitigation Assistance Mitigation Action Portfolio*, which showcases an array of eligible hazard mitigation activities that may benefit stakeholders under one of the HMA programs.

How BRIC Encourages a System-Based Mitigation Approach

The BRIC Notice of Funding Opportunity (NOFO) outlines a given year's program funding priorities, many of which encourage the implementation of a system-based mitigation approach. For example, the priority to focus funding on implementing stronger building codes at the state and local level is a low-cost, high-impact system-based mitigation solution that can help break the cycles of disaster damage and reconstruction.

Applicants and subapplicants can review the annual BRIC NOFO for opportunities to connect program priorities with technical and qualitative criteria and are encouraged to apply system-based mitigation approaches for potential

projects. The technical and qualitative criteria are used to evaluate projects submitted to the national competition, which can incentivize applicants and subapplicants to explore and implement a system-based mitigation approach.

Applicants and subapplicants are encouraged to document how a project can use a systems-based approach to fully explain the strengths and interconnections of the proposed projects in the qualitative criteria. While the incorporation of a system-based mitigation approach is not required, projects that use this approach may achieve more points on other criteria, resulting in a more competitive application. For information about scoring criteria, please review the BRIC NOFO.

Under the BRIC state and territory allocation for capability- and capacity-building activities, hazard mitigation planning is another example of how the BRIC program provides flexibility and supports a holistic view of risk management and resilience. By regulation, states, federally recognized tribal governments, and local governments are required to update their hazard plans every 5 years. The hazard mitigation planning process offers communities an opportunity to scope and plan system-based mitigation projects. Utilizing these funds to integrate the disparate planning documents a community may have is a system-based and holistic approach to hazard mitigation planning that would be supported by BRIC.

Subapplicants that may not have the capacity or the resources to submit a BRIC subapplication can seek holistic support at the earliest stages through the BRIC Non-Financial Direct Technical Assistance. Direct Technical Assistance can provide support for both project or application-specific needs and community-wide resilience needs. FEMA can connect communities with experienced mentors who provide support and lessons learned.

BRIC Mitigation Action Portfolio Projects that Incorporate a System-Based Mitigation Approach

For examples of projects that support a system-based mitigation approach, please see the BRIC *Mitigation Action Portfolio*, the Nature Conservancy's *Promoting Nature-Based Hazard Mitigation through FEMA Mitigation Grants*, and the Georgetown Climate Center's Adaptation Clearinghouse, which showcase several illustrative examples of projects that incorporate components of a system-based mitigation approach. While not all featured projects include all components of system-based mitigation, they offer insights that can guide municipalities in determining more holistic solutions.