



For Riverine Flood Mitigation, Federal Grants Provide \$7 Benefit for Each \$1 Invested

Introduction

Natural hazards present significant risks to many communities across the United States. Fortunately, there are measures governments, building owners, developers, tenants and others can take to reduce the impacts of such events. These measures—commonly called mitigation—can result in significant savings in terms of safety, prevent property loss and disruption of day-to-day life.

The National Institute of Building Sciences Multihazard Mitigation Council (MMC) undertook a study in 2017 to update and expand upon the findings of its *2005 Mitigation Saves* study on the value of mitigation. In the 2017 Interim Study, the project team analyzed two areas of mitigation programs:

- **Federal grants:** The impacts of 23 years of federal grants made by the Federal Emergency Management Agency (FEMA), Economic Development Administration (EDA) and the Department of Housing and Urban Development (HUD), resulting in a national benefit of \$6 for every \$1 invested.
- **Beyond code requirements:** Designing new structures to exceed select provisions of the *2015 International Building Code (IBC)* and *International Residential Code (IRC)* and the adoption of the *2015 International Wildland-Urban Interface Code (IWUIC)*. This resulted in a national benefit of \$4 for every \$1 invested.

Results of Federal Grants for Flood Mitigation

The public-sector mitigation strategy examined for flood resistance is the acquisition or demolition of flood-prone buildings, especially single-family dwellings, manufactured homes, and 2- to 4-family dwellings. While the benefit-cost ratio (BCR) varies across projects, public-sector mitigation spending for the acquisition of buildings exposed to riverine flooding appears to be cost-effective. The average BCR across the sample projects is approximately 7:1. The implication is that past federally funded riverine flood mitigation is cost-effective (at the cost-of-borrowing discount rate). Given that the total cost of all riverine flood-mitigation grants was \$11.5 billion, a BCR of 7:1 implies that federally funded flood mitigation will ultimately save the United States \$82 billion. Table 1 provides BCRs for each natural hazard the project team examined. Figure 1 shows the benefits specifically attributable to federal flood mitigation grants. The national-level BCRs aggregate study findings across natural hazards and across state and local BCRs.

National Benefit-Cost Ratio Per Peril <small>*BCR numbers in this study have been rounded</small>		Federally Funded	Beyond Code Requirements
Overall Hazard Benefit-Cost Ratio		6:1	4:1
 Riverine Flood		7:1	5:1
 Hurricane Surge		Too few grants	7:1
 Wind		5:1	5:1
 Earthquake		3:1	4:1
 Wildland-Urban Interface Fire		3:1	4:1

Table 1. Benefit-Cost Ratio by Hazard and Mitigation Measure.

Benefit: \$82 billion

- 65% – Property: \$53.0
- 12% – Additional living expenses & sheltering: \$10.0
- 11% – Insurance: \$9.0
- 6% – Casualties & PTSD: \$5.0
- 6% – Indirect business interruption: \$5.0

billions 2016 USD

Cost: \$11.5 billion

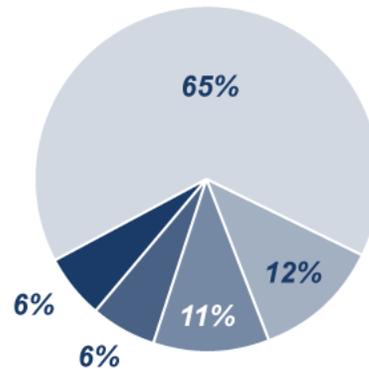


Figure 1. Contribution to benefit from federally funded riverine flood grants.