



Natural Hazard Mitigation Saves Interim Report

Overall Findings

Natural hazard mitigation saves \$6 on average for every \$1 spent on federal mitigation grants, according to an analysis by the National Institute of Building Sciences. An earlier (2005) study by NIBS found a benefit-cost ratio (BCR) of 4:1.

The new study also estimates what society could save if buildings were to be constructed to exceed the minimum requirements of the 2015 International codes. The study further differentiates the BCRs of building resiliently for a range of different hazard types. These BCRs are averages and will differ among specific mitigation efforts. Additionally, BCR may be only a part—even a small part—of a well-thought-out mitigation decision.

Some mitigation benefits such as the reduction in domestic violence, the conservation of heirlooms and photos, and the preservation of community and culture can be extremely difficult to quantify, and as such, were omitted from the analyses. Therefore, the results of this study are considered to be quite conservative.

Flood Mitigation Results

The bottom-line is that above-code design and public-sector mitigation grant projects for riverine floods save more than they cost. The losses avoided by federally-funded riverine flood mitigation projects far exceeds the money spent (with a 7x return on investment). Both above-code design and public-sector mitigation for riverine floods result in increased occupant safety, reduced business interruption, and beneficial economic impacts for the community.

The new BCR estimate for public-sector riverine flood mitigation grant projects is higher than the 2005 study because the present study has modeled the impacts of mitigation projects at finer scales and using improved tools than those utilized in the previous study.

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

Wind Mitigation Results

Mitigating for wind hazards—in the form of building improvements, tornado safe rooms, and other methods analyzed in this study—offers a 5:1 BCR.

BCR estimates have risen from 4:1 (in the 2005 Mitigation Saves study) to 5:1 in the new study, largely because this new study assessed the country’s major investment in tornado safe rooms in the intervening 13 years. Safe rooms offer significant savings when constructed in medium or high hazard areas and are utilized by schools, communities, hospitals, and in the home.

Analysis of the Insurance Institute for Building and Home Safety’s (IBHS’s) FORTIFIED standard reveals that above-code design of single family residential homes significantly reduces property losses and insurance fees if the insurance is priced in direct proportion to risk.

Strengthening the building envelop in high hazard areas offers substantial benefit to high value and critical facilities, where benefits can far exceed the property losses characterized by this study. In addition to cost-savings, many lives have been saved by using FEMA’s safe room and coastal construction technical guidance.

Earthquake Mitigation Results

Above-code design and public-sector mitigation for earthquakes save more than they cost in high-hazard parts of the U.S. by a factor of 4x for exceeding code requirements and 3x for public-sector investments.

Above-code design means constructing new buildings to be stronger and stiffer than current minimum requirements. Above-code technical guidance can be found on FEMA.gov on behalf of the National Earthquake Hazards Reduction Program.

The small, additional cost required to build stronger, stiffer buildings can pay for itself just in the reduction of earthquake-generated property damage alone. It is even more cost-effective when one includes the savings in occupant safety, building functionality, and interconnections to the larger economy.

Federally-funded earthquake mitigation grants are also cost-effective when one looks beyond monetary savings, especially when considering improved resilience for the community. The new BCR for public-sector mitigation is higher than the 2005 study because it better accounts for the benefits of continuity of service to the community by reducing damage to fire stations, hospitals, and other public facilities.

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Natural Hazard Mitigation Saves: 2017 Interim Report
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Fire at the Wildland-Urban Interface Mitigation Results

There are nearly 100,000 fires every year at the Wildland-Urban Interface (WUI). These fires burn about 7 million acres or 3 percent of the 220 million WUI acres each year. 40 percent of the nation (about 120 million people) lives at the WUI, and thousands of homes are lost each year despite major firefighting efforts that cost almost \$5 billion per year.

Yet, there is a simple solution—comply with the WUI building code. Building or retrofitting a house to comply with the code is pretty simple:

- Add fire-resistant windows, doors and cladding,
- Add a non-combustible roof and keep it clear of pine needles and other flammables,
- Remove woodpiles and other fuels from near your house, and
- Cut back vegetation for one or two dozen yards around the house.

The one-time cost of these measures is typically less than 5 percent of the cost of a home and its contents.

Resources

- A free copy of the NIBS interim report is available at <https://www.nibs.org/page/mitigationsaves>.
- More information about the study is available on the FEMA website at <https://www.fema.gov/natural-hazard-mitigation-saves-2017-interim-report>.
- FEMA Mitigation Saves resources can be found at <https://www.fema.gov/media-library/assets/documents/156979>.
- Stay updated on future developments by subscribing to the FEMA Newsletter: https://service.govdelivery.com/accounts/USDHSFEMA/subscriber/new?topic_id=USDHSFEMA_33 or NIBS' newsletter at <https://www.nibs.org/?buildingsciences>.
- Read about what FEMA is doing with Building Codes for a more resilient future: <https://www.fema.gov/building-codes>.