


Addressing Current and Future Risks in Real Estate

Congressional Briefing on
Building Climate Resilience in the Real Estate Sector
March 6, 2018



National Institute of
BUILDING SCIENCES

*An Authoritative Source of Innovative Solutions
for the Built Environment*

Ryan M. Colker, J.D.
Vice President
National Institute of Building Sciences
1090 Vermont Ave., NW #700
Washington, DC 20005
202-289-7800 x133
rcolker@nibs.org
 @rmcolker

Public Law 93-383, Sect. 809

Congress directed the Institute to “exercise its functions and responsibilities in four general areas.....”

- **Develop and maintain** performance criteria for maintenance of life, safety, health, and public welfare for the built environment
- **Evaluate and prequalify** building technology and products
- **Conduct** related and needed investigations
- **Assemble, store, and disseminate** technical data and related information



National Institute of
BUILDING SCIENCES

Institute in Action



The Growing Impacts of Natural Disasters

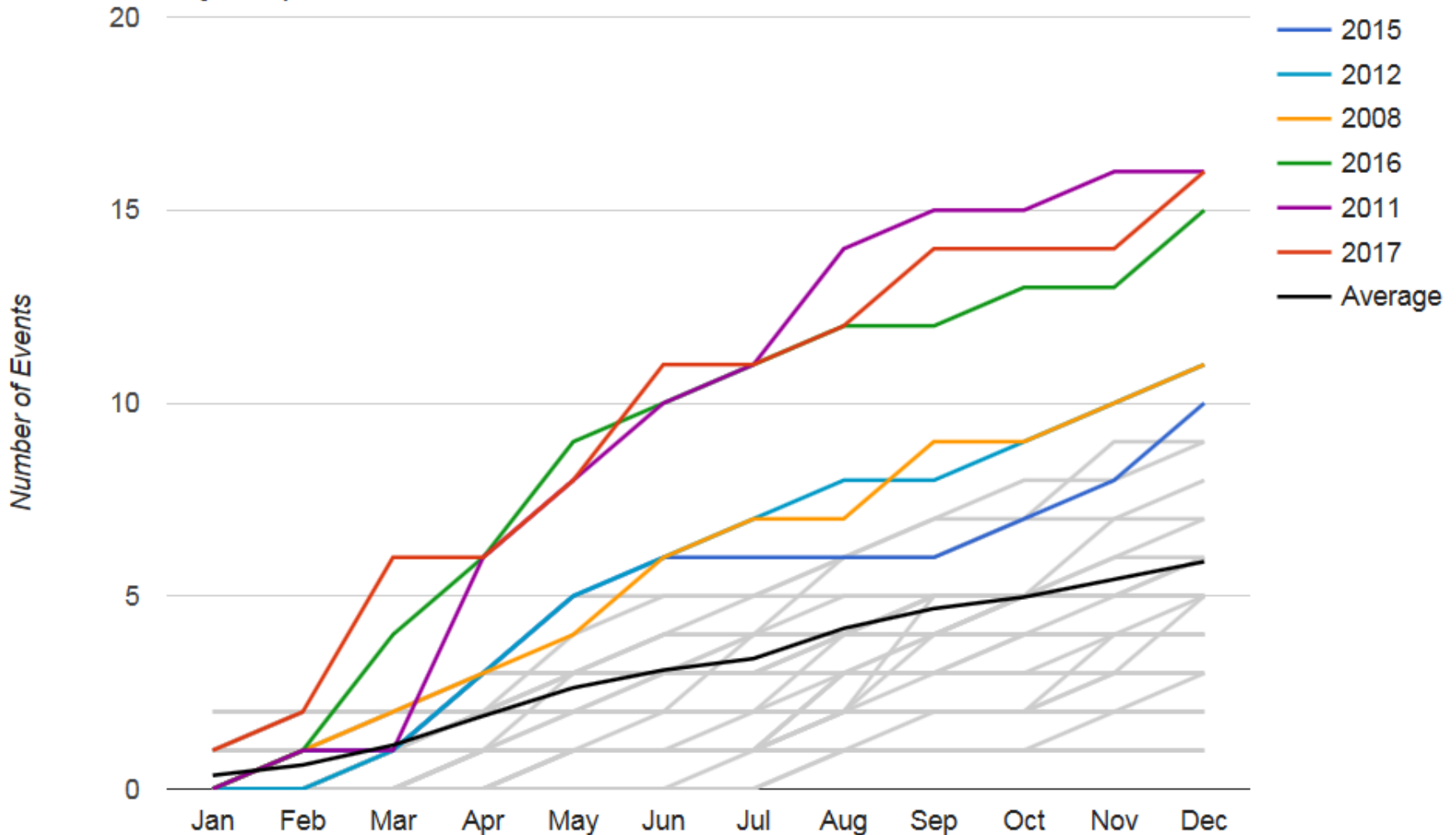
U.S. 2017 Billion-Dollar Weather and Climate Disasters



This map denotes the approximate location for each of the 16 billion-dollar weather and climate disasters that impacted the United States during 2017.

Frequency of Natural Disasters

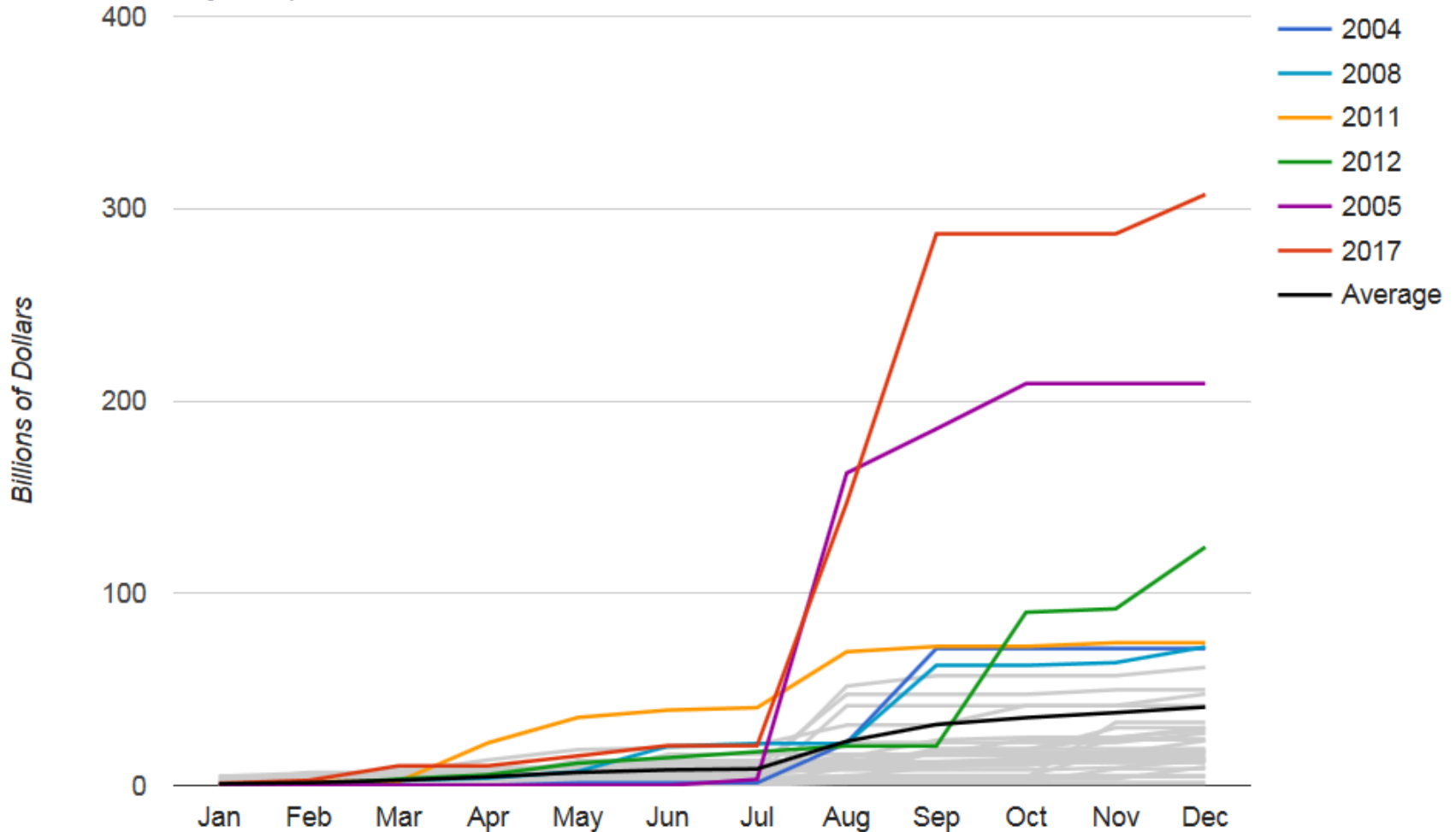
1980-2017 Year-to-Date United States Billion-Dollar Disaster Event Frequency (CPI-Adjusted)



Event statistics are added according to the date on which they ended.

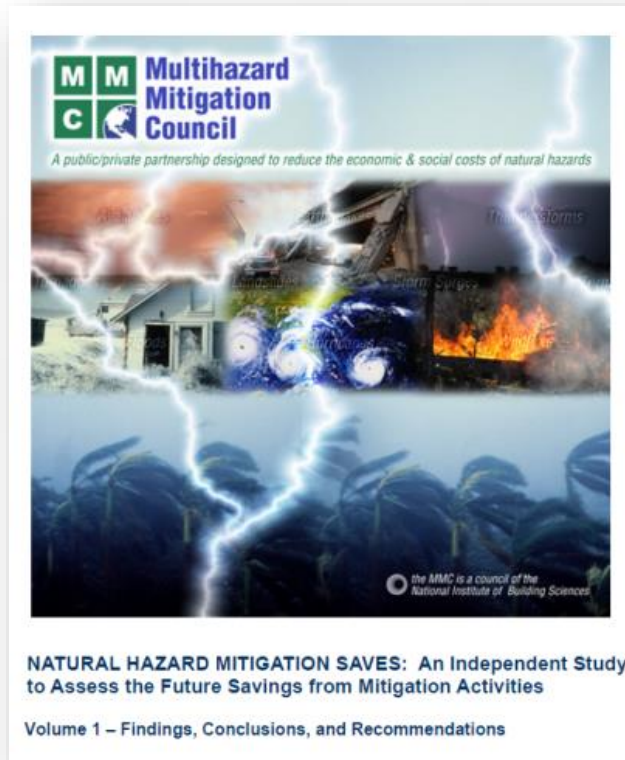
Cost of Natural Disasters

1980-2017 Year-to-Date United States Billion-Dollar Disaster Event Cost (CPI-Adjusted)



Event statistics are added according to the date on which they ended.

Natural Hazard Mitigation Saves: An Independent Study to Assess the Future Savings from Mitigation Activities (2005)



“Money spent on reducing the risk of natural hazards is a sound investment. On average, a dollar spent by FEMA on hazard mitigation provides the nation about \$4 in future benefits.”

A Valuable Contribution . . . But Questions Remained



Private Sector Initiatives

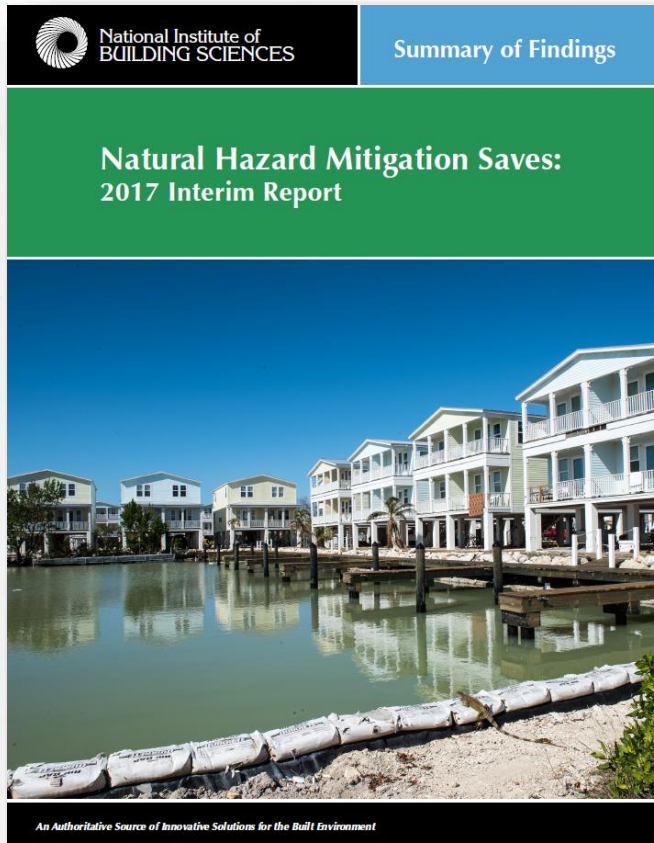
1999
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Building Codes



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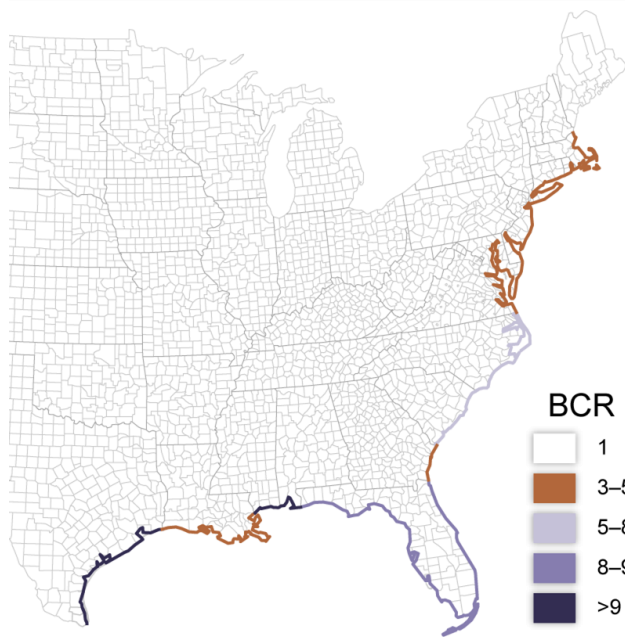


Hazard Mitigation Saves: 2017 Interim Report Findings

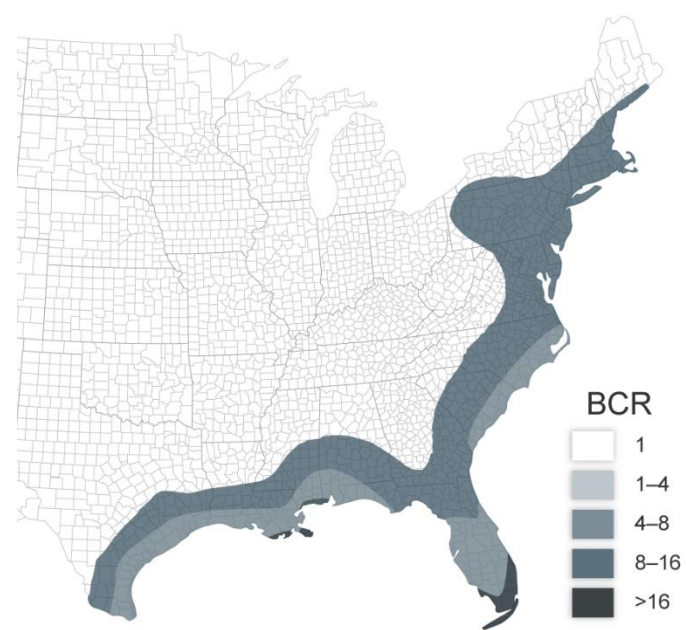
- **Federal grants:** The impacts of 23 years of federal mitigation grants provided by the Federal Emergency Management Agency (FEMA), Economic Development Administration (EDA) and Department of Housing and Urban Development (HUD), resulting in a national benefit of \$6 for every \$1 invested.
- **Exceed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

Benefit Cost Ratios by Hazard and Mitigation Measure

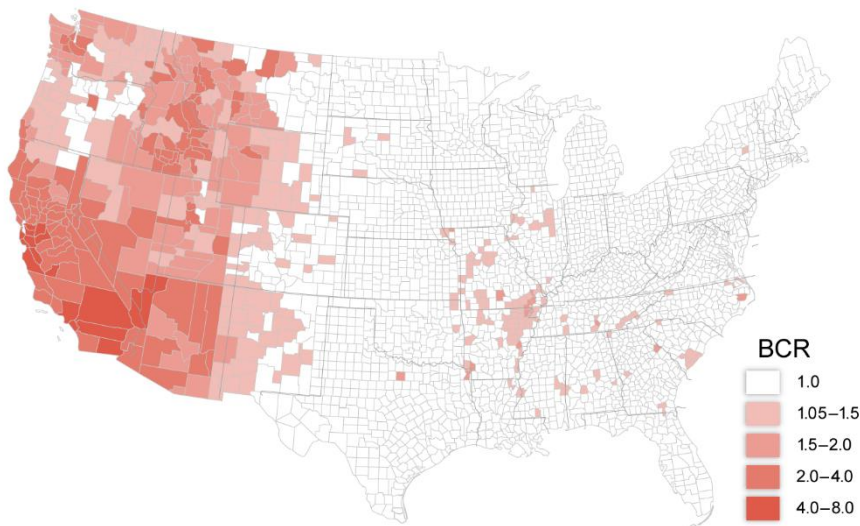
National Benefit-Cost Ratio Per Peril <i>*BCR numbers in this study have been rounded</i>		Federally Funded	Beyond Code Requirements
Overall Hazard Benefit-Cost Ratio		6:1	4:1
 Riverine Flood		7:1	5:1
 Hurricane Surge		Too few grants	7:1
 Wind		5:1	5:1
 Earthquake		3:1	4:1
 Wildland-Urban Interface Fire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



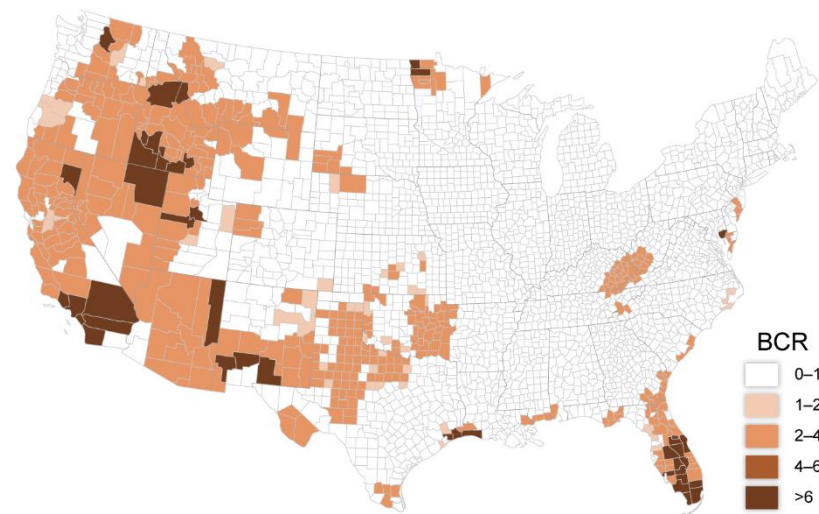
BCR for Coastal Flooding Mitigation



BCR for Hurricane Wind Mitigation



BCR for Earthquake Mitigation



BCR for Wildfire Mitigation

Some Benefits Cannot Be Estimated, so BCRs May Be Low



Elisa.rolle

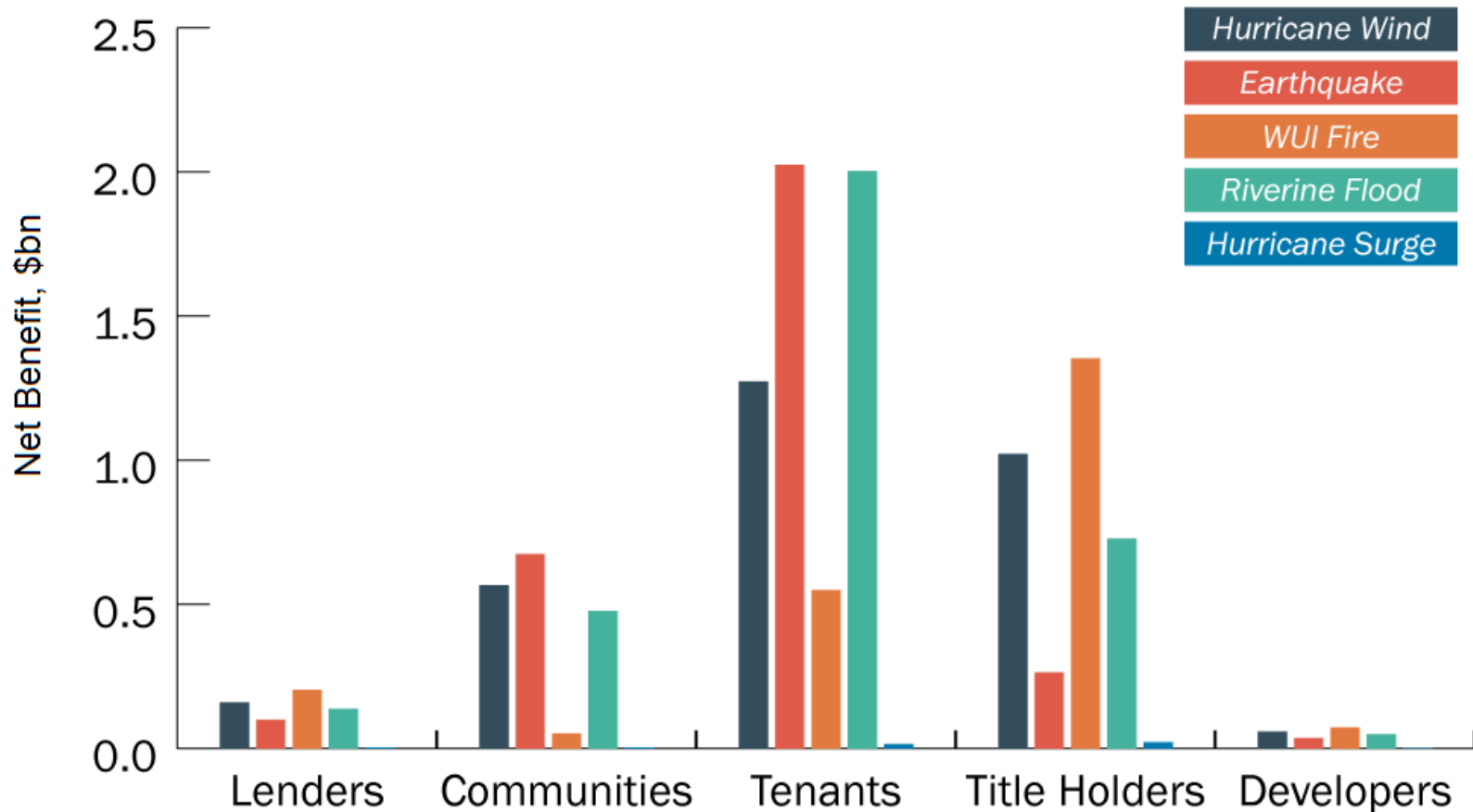


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Changes in future risks also not generally included. . .

All Stakeholders Benefit from Exceeding Select 2015 I-Code Provisions

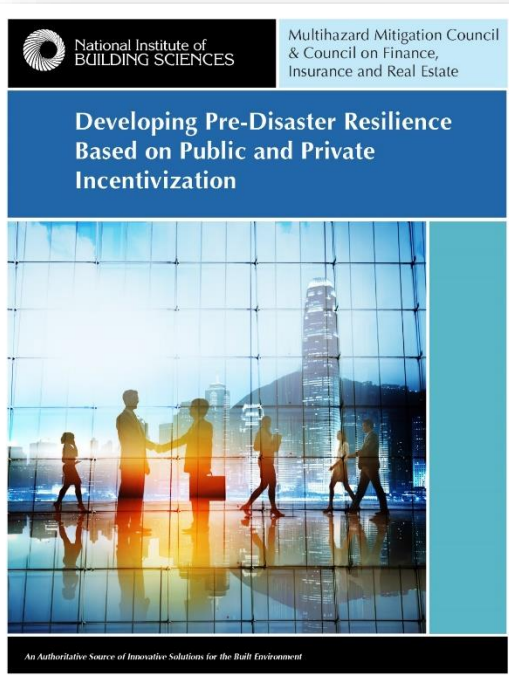




Additional Mitigation Measures to Study

- Adoption of Current Building Codes (In Progress)
- Retrofit of Existing Facilities (In Progress)
- Business Continuity Planning (Proposed)
- Utility and Transportation Lifeline Mitigation (In Progress)
- Public-Sector Direct Mitigation Efforts (Proposed)

Pre-Disaster Resilience Based on Public and Private Incentivization



The most cost-effective manner to achieve resilience is through a holistic and integrated set of public, private and hybrid incentivization programs including mortgages, insurance, finance, tax incentives and credits, and grants

The Importance of Community-Level Resilience Illustrated



Galveston Texas, Post-Ike



NYC, Post-Sandy

Designing for Life-Cycle Risks

National Institute of BUILDING SCIENCES

Moving Forward:
Findings and Recommendations from the Consultative Council

An Authoritative Source of Innovative Solutions for the Built Environment **2014**

National Institute of BUILDING SCIENCES

Recommendations for the 45th President

The U.S. Congress established the National Institute of Building Sciences in 1974 to serve as an authoritative source of information on building science and technology. In the beginning years, the Institute tackled many building-related problems, such as removing lead paint and asbestos; addressing mold and rot; and providing access for people with disabilities. More than four decades later, this non-profit, non-governmental organization still brings the public and private sectors together to find solutions to make buildings better, safer, more economical places to live, work, play and learn.

From seismic safety to building information modeling, members of the Institute's Councils and Committees—among them some of the most renowned experts in their respective fields—continue to address building-related issues. With those concerns in mind, the Institute offers the following recommendations to the Trump Administration:

- Make Buildings More Resilient to Natural Disasters**
Natural disasters can devastate communities. Hurricane Katrina, Super Storm Sandy, the Norridge (California) Earthquake, flooding along the Mississippi, California wildfires, the Joplin (Missouri) tornado: they all bring to mind death and destruction. Yet, in 2005, the Institute's Multihazard Mitigation Council did a study that found investing in buildings before a disaster occurs can reduce or even prevent future losses. In fact, based on a study of Federal Emergency Management Agency (FEMA) funding, every \$1 invested in mitigation resulted in \$4 in future savings.¹ Considering how much money the U.S. government spends on disaster cleanup after an event, investing in prevention makes a lot of sense. Even though mitigation saves money in the long run, the challenge is getting federal and state governments to make that investment now. Even after a disaster occurs, funding for mitigation is low, especially when compared to post-disaster recovery funding. That is one of the reasons the Institute began developing a new strategy, called incentivization, to encourage investment in mitigation. The goal of incentivization is to bring private stakeholders, such as insurers, investors and others, together with federal agencies, including the Department of Housing and Urban Development, Justice, the Small Business Administration, Department of Veterans Affairs, Department of Agriculture, Department of the Treasury and Department of Homeland Security, to align existing programs aimed at homeowners and businesses. When their mortgage payment, tax rate or insurance premiums are lower as a result, property owners have a clear incentive to invest in making their buildings more resilient. The outcome is safer buildings, stronger communities, lower risk for insurers and financiers and a stronger, more stable tax base.
- Fund Pre- and Post-Disaster Mitigation.** The federal government should invest more in mitigation programs prior to disasters to help reduce federal exposure for recovery after an event. The proposed deduction for FEMA Public Assistance Program is one promising approach.
- Support Cost-Effective Resilience through a Holistic Incentivization Approach.** Federal agencies should work with the private sector to implement an approach that uses incentives to encourage homeowners and businesses to invest in resilience.
- Protect Federal Investments**
The nation needs functioning infrastructure to be able to deliver goods and services efficiently and support communities in serving and protecting its citizens. The American Society of Civil Engineers has rated the nation's infrastructure at a D+.² The time has come for the federal government to stop deferring maintenance and invest in the nation's

¹ Public Law 99-50, 51 USC 17612-2
² Multihazard Mitigation Council, National Hazard Mitigation Survey: An Independent Study to Assess the Future Savings from Mitigation Activities, Volume 2: Findings, Conclusions, and Recommendations, Technical Institute of Building Sciences, 2005. <http://www.nibs.org/multihazardreport.html>

An Authoritative Source of Innovative Solutions for the Built Environment **www.nibs.org**

Adapting Infrastructure and Civil Engineering Practice to a Changing Climate

Committee on Adaptation to a Changing Climate

Edited by J. Rolf Olsen, Ph.D.

ASCE

United States Government Accountability Office
GAO
Report to the Honorable Matthew Cartwright, House of Representatives

November 2016
CLIMATE CHANGE

Improved Federal Coordination Could Facilitate Use of Forward-Looking Climate Information in Design Standards, Building Codes, and Certifications

WORKSHOP REPORT

Nonstationary Weather Patterns and Extreme Events

Informing Design and Planning for Long-Lived Infrastructure

ESTCP Project RC-201591

NOVEMBER 2017

Robert H. Meas Ben Nichols Alison Dugdale Cherise Jones Jill Brannerberger Mark Hightower Frank Rutherford National Laboratory	Ami Koppal General Services Administration Stephanie Lawless Jeffrey Marquis Molly, Inc. Fred Lipschutz U.S. Global Change Research Program
Kurt Pfaffen U.S. Department of Defense Strategic Environmental Research and Development Program	Rubin O'Connell Naval Facilities Engineering Command and Development Program
Thaddeus Ryan U.S. Department of Defense	Raf Duan U.S. Army Corps of Engineers
Monica Quevedo Paula Shaw Kermit Stucker U.S. Air Force	Don Walker University of Maryland, College Park
Jim Ingalls National Aeronautics and Space Administration	Chris Weaver U.S. Environmental Protection Agency
Amethystina Sama Lodini, Inc.	Marvin Stevens National Oceanic and Atmospheric Administration Richard Wright American Society of Civil Engineers

Distribution Statement A
This document has been cleared for public release



Industry Statement on Resilience

- We **research** materials, design techniques, construction procedures, and other methods to improve the standard of practice.
- We **educate** our profession through continuous learning. Through coordinated and continuous learning, design, construction and operations professionals can provide their clients with proven best practices and utilize the latest systems and materials to create more resilient communities.
- We **advocate** at all levels of government for effective land use policies, modern building codes, and smarter investment in the construction and maintenance of our nation's buildings and infrastructure.
- We **respond** alongside professional emergency managers when disasters do occur. Industry experts routinely work in partnership with government officials to survey damage, coordinate recovery efforts, and help communities rebuild better and stronger than before.
- We **plan** for the future, proactively envisioning and pursuing a more sustainable built environment.

Industry Statement on Resilience

Representing nearly 1.7 million professionals, America's design and construction industry is one of the largest sectors of this nation's economy, generating over \$1 trillion in GDP. We are responsible for the design, construction, and operation of the buildings, homes, transportation systems, landscapes, and public spaces that enrich our lives and sustain America's global leadership.

We recognize that natural and manmade hazards pose an increasing threat to the safety of the public and the vitality of our nation. Aging infrastructure and disasters result in unacceptable losses of life and property, straining our nation's ability to respond in a timely and efficient manner. We further recognize that contemporary planning, building materials, and design, construction and operational techniques can make our communities more resilient to these threats.

Drawing upon the work of the National Research Council, we define resilience as the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events.

As the leaders of this industry, we are committed to significantly improving the resilience of our nation's buildings, infrastructure, public spaces, and communities.

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- We **advocate** at all levels of government for effective land use policies, modern building codes, and smarter investment in the construction and maintenance of our nation's buildings and infrastructure.
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- We **plan** for the future, proactively envisioning and pursuing a more sustainable built environment.

The promotion of resilience will improve the economic competitiveness of the United States. Disasters are expensive to respond to, but much of the destruction can be prevented with cost-effective mitigation features and advanced planning. Our practices must continue to change, and we commit ourselves to the creation of new practices in order to break the cycle of destruction and rebuilding. Together, our organizations are committed to build a more resilient future.

CULTIVATORS
led the effort to establish and implement the Statement with their industry peers



FOUNDERS
united to define the goals and objectives of a resilient built environment



AMPLIFIERS
joined the founding signatories in committing to the advancement of Statement goals



Recommendations

- Invest in mitigation to reduce future federal obligations
- Encourage state and local governments to adopt and enforce the latest building codes
 - Coordinated interagency code program
 - Prerequisite for certain federal funding
- Support research into incorporating climate risk into design and construction guidance
- Encourage innovative federal programs (and remove barriers) to enhance private-sector investment in mitigation
- All federal investments should recognize current and future risks to assure assets are protected