

# THE NEED TO REBUILD SMARTER

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**U.S. CONGRESS JOINT ECONOMIC COMMITTEE**  
U.S. Senator Martin Heinrich, Ranking Member



## The Need to Rebuild Smarter

Rebuilding after hurricanes, wildfires, and other natural disasters demands an immediate and comprehensive response from the federal government. This process also offers an opportunity to think long term about how our nation can better prepare to mitigate natural disasters and address risks that will only escalate with climate change.

The destruction we have witnessed this summer and fall makes clear that merely rebuilding without taking actions to ensure that infrastructure, homes, and businesses are made less vulnerable to the next storm or natural disaster will only lead to higher costs down the road. As Congress moves forward with additional hurricane relief, it can require that relief funds go to the construction of resilient infrastructure and also can prioritize mitigation efforts. Limiting the impacts of future natural disasters requires collaboration between different levels of government, active involvement of the private sector, and sustaining the urgency in mitigation work that is present during relief efforts.

We know that disaster planning pays off. Each dollar spent by the Federal Emergency Management Agency (FEMA) on disaster preparedness provides almost \$4 in future benefits.<sup>1</sup> Mitigation can take many forms—higher roads, stronger bridges, and better building codes. Through its mitigation work, FEMA has reduced future losses from earthquakes, wind, and flooding. Mitigation reduces damage, limits loss of life, and results in less economic loss.

Many approaches deliver positive results. For example, following Hurricane Sandy, federal disaster funds were used to purchase almost 400 flooded homes in New Jersey's tidal areas. The homes were demolished and the land preserved as open space and a buffer against future storms.<sup>2</sup> In Dallas, the U.S. Army Corps of Engineers, the city of Dallas, and the U.S. Fish and Wildlife Service teamed to reduce flood risks by designing a "chain of wetlands" that included relocating trees to promote better water flows.<sup>3</sup> Communities have used FEMA mitigation grants to access backup power sources, enabling critical emergency response services to continue during storms and outages.<sup>4</sup>

## More frequent and costly disasters

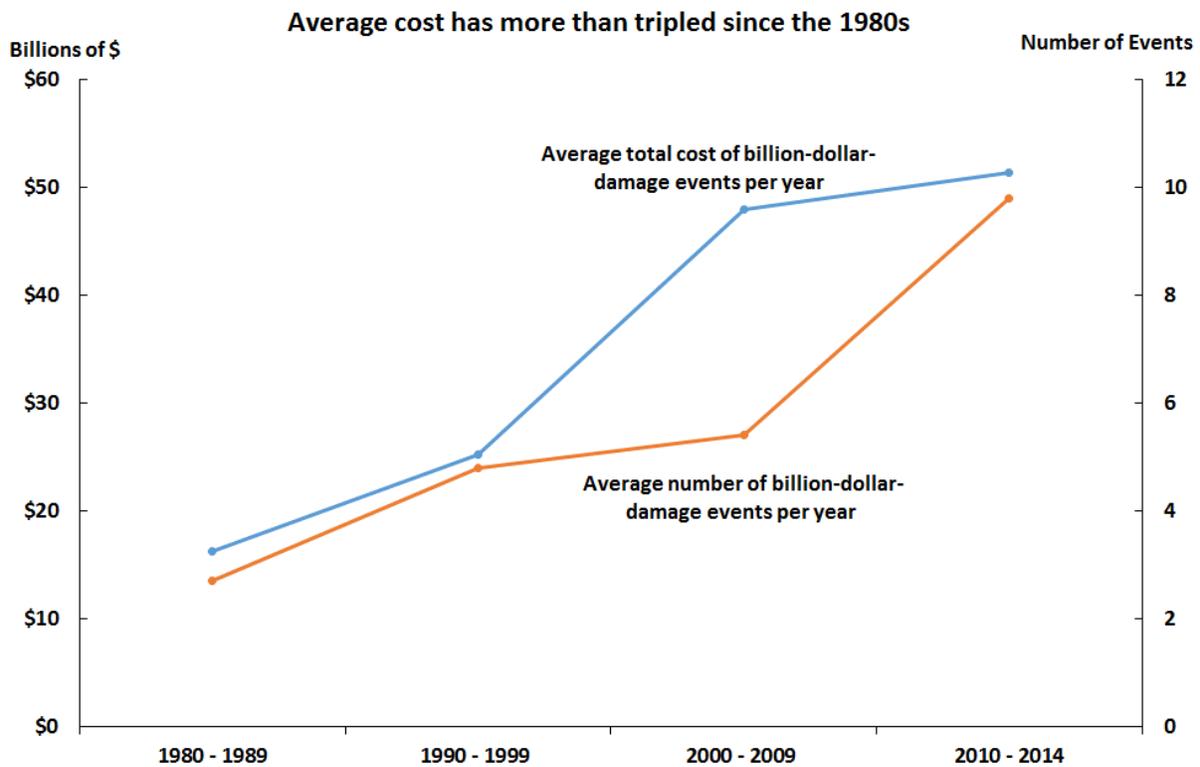
Natural disasters are becoming more frequent, intense, and costly.<sup>5</sup> The annual inflation-adjusted disaster relief appropriated by Congress increased from a median of \$6.2 billion for 2000 to 2006 to a median \$9.1 billion for 2007 to 2013 – an increase of 46 percent.<sup>6</sup> This trend is likely to accelerate with climate change.

Not including recent hurricanes Harvey, Irma, and Maria and the wildfires in California, severe weather events since 1980 have caused more than \$1.2 trillion in damage, with almost half of that damage resulting from hurricanes.<sup>7</sup> Preliminary estimates indicate that the combined costs of Harvey and Irma could exceed those of Katrina, which reached \$160 billion.<sup>8</sup> Initial estimates

indicate Maria could cost between \$45 and \$90 billion and Governor Ricardo Rosselló said the island had been “essentially devastated” by the hurricane.<sup>9</sup>

Moreover, the frequency of major hurricanes in the Atlantic is escalating, with one-quarter of all Category 5 landfalls on record in the Atlantic since 1851 occurring this year.<sup>10</sup> The frequency of storms that rapidly intensify just before landfall, posing particular challenges for those preparing to respond to their impact, is also expected to increase with climate change’s impact on warmer ocean waters.<sup>11</sup> In a study of Caribbean hurricanes, for every 1 percent increase in wind speeds of storms making landfall, the economic damages grew by a factor of up to 3 percent.<sup>12</sup>

## Natural Disasters Growing in Frequency and Cost



Source: National Oceanic and Atmospheric Administration

The Congressional Budget Office estimates that the costs from hurricane damages will grow faster than our overall economy over the next several decades, comprising an increasing share of GDP. While communities must contend with the 45 percent of these increased hurricane damages that are due to climate change, the 55 percent resulting from development of coastal areas remains more within our control.<sup>13</sup>

Complicating matters for policymakers are current methods for assessing flood risks that look to past floods, though history will not show real future flooding risks when the climate is

changing.<sup>14</sup> When a once-in-500-year flood hits three times in three years, as has happened in the Houston area, policymakers must consider whether they are using the correct yardstick for flood risks.<sup>15</sup>

## Building in high-risk areas continues

While climate change is pushing sea levels and water temperatures higher, contributing to an increasing intensity of storms, development near the water continues to accelerate. Between 2001 and 2010, the population in areas vulnerable to hurricanes grew 22 percent faster than the overall population.<sup>16</sup> By 2010, more than 123 million Americans lived in coastal counties and that number is projected to reach 133 million by 2020.<sup>17</sup>

Houston is a prime example of a community where unchecked development increased flood risk. The city's recent experience also reminds us that local governments make many of the decisions that determine a city or state's resilience to extreme weather events. Houston is the only major city in the country without zoning. This helped to fuel the rapid growth and development that catapulted Houston to its current status as the nation's fourth largest city.<sup>18</sup> It also meant that developers built homes in flood plains. Wetlands, which help absorb excess rain and runoff, were paved over. Population growth outpaced storm water infrastructure.<sup>19</sup> Between 1992 and 2010, 30 percent of freshwater wetlands in Harris County disappeared.<sup>20</sup> When it rained, the water had nowhere to go and flooding occurred in areas well outside flood zones, highlighting the need to rethink how and where we build.

### Federal response to disasters

Major hurricanes like Harvey, Irma, and Maria do significant damage to roads, bridges, water systems, telecommunications infrastructure, power sources, buildings, and homes. They uproot people's lives and often require years of rebuilding. Congress plays a major role in the rebuilding process, with the vast majority of the money it allocates going to rebuilding public infrastructure. Only about 10 percent goes to private homeowners.<sup>21</sup>

Congress provided \$110 billion following Katrina in 2005 and \$54 billion after Sandy hit in October 2012. This relief covered 75 percent of the damage caused by Katrina and 77 percent of the damage done by Sandy.<sup>22</sup> It initially approved \$15 billion in September to support clean up and rebuilding after Harvey.<sup>23</sup> Another \$36.5 billion in disaster relief for the hurricanes and recent wildfires was approved by the Senate on October 24<sup>th</sup>, after previously passing the House. More relief is expected later this fall.<sup>24</sup>

## Federal Spending on Hurricanes 2005 - 2015 (billions of dollars)

Hurricane	Year	Total Federal Spending	Total Economic Damage	Federal Spending as % of Damage
Dennis	2005	\$0.3	\$3.5	9%
Katrina	2005	\$110.2	\$147.4	75%
Rita	2005	\$8.7	\$22.4	39%
Wilma	2005	\$6.2	\$22.4	28%
Dolly	2008	\$0.3	\$1.1	27%
Gustav	2008	\$4.0	\$6.7	60%
Ike	2008	\$12.3	\$33.7	36%
Irene	2011	\$4.3	\$15.5	28%
Isaac	2012	\$1.3	\$3.2	41%
Sandy	2012	\$53.9	\$69.9	77%

Source: Congressional Budget Office, using economic damage data from the National Oceanic and Atmospheric Administration. Dollar amounts in 2015 dollars, in billions. Includes all hurricanes with damage of \$1 billion or greater.

About three-quarters of federal funding to address hurricane damage goes through the Federal Emergency Management Agency (FEMA), the Department of Housing and Urban Development and the Army Corps of Engineers. FEMA accounted for about 45 percent of federal spending on hurricanes between 2000 and 2015.<sup>25</sup> Only about six percent of FEMA's spending goes toward its Hazard Mitigation Grant program, which is designed to reduce the impact and costs of future disasters.

Following Harvey, Senators Van Hollen, Schatz and Booker introduced the Flood Risk Management Act to ensure that federal infrastructure projects are built to withstand flooding damage. The legislation would codify standards set by the Obama administration in 2015, but overturned by President Trump just weeks before hurricanes Harvey and Irma hit the United States. The legislation starts from the premise that investing in resilient infrastructure will save lives and reduce repair costs down the road.<sup>26</sup>

### Changes at the state level

States have also learned from past disasters. Following Hurricane Andrew in 1992, which damaged or destroyed 125,000 homes in south Florida, the state strengthened building codes.<sup>27</sup> Since 2001, new structures in Florida must be built to withstand winds of 111 miles per hour (mph), and in Miami and other parts of south Florida, the code is more stringent. In these areas, buildings must be able to withstand winds of at least 130 mph and critical infrastructure buildings must be able to withstand 156 mph winds.<sup>28</sup> The new code also requires shatterproof windows and bars construction of "stick" frame houses in south Florida.<sup>29</sup>

However, the changes weren't adopted throughout Florida, nor were they embraced in other states vulnerable to hurricanes, including South Carolina, Alabama, and Mississippi.<sup>30</sup> Furthermore, many states along the Gulf and the Atlantic seaboard do not have a statewide building code, fail to enforce the code on the books, or have weakened wind provisions in the face of growing disasters.<sup>31</sup>

## Strengthening building standards

While the federal government cannot determine zoning rules in cities across the country, when it responds to major disasters, it can – and has – stipulated that the relief funds are used to make the regions more resilient to future extreme weather events. Following Sandy, infrastructure had to be rebuilt a least a foot higher than the expected flood level.<sup>32</sup>

In allocating money to rebuilding after Sandy, “resiliency” became an important word. For example, Congress directed the National Park Service to spend \$360 million to “increase the resiliency and capacity of coastal habitat and infrastructure to withstand storms and reduce the amount of damage caused by such storms.” Similarly, HUD launched the National Disaster Resilience Competition, which used CDBG funds for up to \$1 billion in resilience proposals in counties affected by Sandy or other natural disasters.<sup>33</sup>

Subsequently, the Obama administration passed a rule that gave agencies three options in federally funded infrastructure construction: building two feet above the 100-year flood level, building to the 500-year flood elevation, or using climate science in the process.<sup>34</sup> The new standard sought to avoid wasting taxpayer money on building infrastructure that faced a high likelihood of flood damage. President Trump eliminated the rule just before Hurricane Harvey hit Texas.

## Providing new tools to prepare for and limit impacts from future disasters

The federal government should support targeted initiatives that strengthen resiliency and help high-risk regions which have faced repeated natural disasters prepare for future weather-related events. Senate Democrats' Blueprint to Rebuild America's Infrastructure calls for \$25 billion in investments that will go toward a new Resilient Communities Revolving Loan Fund, a critical infrastructure resiliency competition, and to support the National Oceans and Coastal Security Fund that strengthens coastal infrastructure and encourages smart coastal development.<sup>35</sup> Directing the national laboratories to provide technical assistance to Federal, state, and local governments and the private sector to help them plan more resilient, efficient, and clean energy systems is another way to ensure that the nation rebuilds smarter after disasters. Investments in resiliency will help communities prepare for future disasters and reduce the economic costs and loss of life.

## Updating FEMA flood maps

Other actions are needed to prepare for future storms, including updating FEMA flood maps to more accurately reflect flood risk and to account for the anticipated effects of climate change.<sup>36</sup> FEMA's flood maps determine whether homeowners need to purchase flood insurance, but the maps are out of date and rely on past floods rather than expected future flood levels. About two-thirds of the homes damaged during Hurricane Harvey were outside the 100-year floodplain.<sup>37</sup> A new study shows that this wasn't just a rare miss: from 1999 to 2009, 75 percent of flood damage in Houston's southeast suburbs took place outside FEMA's 100-year flood zone.<sup>38</sup> In 2012, Congress authorized \$400 million in annual funding for updating flood maps, but funding has not reached this level.

## Increasing FEMA resources for disaster mitigation

A greater share of FEMA's resources should be directed to mitigation. FEMA's Pre-Disaster Mitigation Grant program (PDM) provides funding to help states, communities, and tribes design and carry out plans to protect homes and businesses from extreme weather events.<sup>39</sup> While mitigation efforts return \$4 for each dollar invested, few resources have been put behind this program. From 2005 to 2014, the federal government spent more than \$277 billion on disaster assistance, but invested not even \$600 million on PDM to reduce the risks and costs of natural disasters.<sup>40</sup>

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<sup>2</sup> "[3 Years Long, 3 Years Strong: New Jersey's Successful Approach to Purchasing Homes along Sandy's Flooded Path.](#)" Federal Emergency Management Agency, Mitigation Best Practices.

<sup>3</sup> "[Chains of Wetlands Project Reduces Flood Risks in City of Dallas.](#)" Federal Emergency Management Agency, Mitigation Best Practices.

<sup>4</sup> "[Hazard Mitigation Grant Ensures Bayfield County will be Prepared for Power Outages.](#)" Federal Emergency Management Agency, Mitigation Best Practices.

<sup>5</sup> "[Billion-Dollar Weather and Climate Disaster: Time Series.](#)" National Oceanic and Atmospheric Administration National Centers for Environmental Information.

<sup>6</sup> Government Accountability Office. "[Climate Change: Better Management of Exposure to Potential Future Losses Is Needed for Federal Flood and Crop Insurance.](#)" October, 2014.

<sup>7</sup> "[Billion-Dollar Weather and Climate Disaster: Summary Stats.](#)" National Oceanic and Atmospheric Administration National Centers for Environmental Information.

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