We Don't Need More Responders, We Need More Prepared Communities

Poster Showcase

#iaem23

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Introduction

The diverse nature of emergencies and disasters is only eclipsed by the multitude of differences in the communities impacted by emergencies and disasters. While the emergency management community has gone to great lengths over the past 20+ years to create and nurture a professional workforce of responders qualified to answer the call, there are only a finite number of experts capable of responding. To complicate matters, those finite number of expert responders are limited in the size and scope of the support they can provide. Additionally, these responders may not be fully familiar with the cultural, racial, social, or economic dynamics of the community for which they are asked to respond and therefore, less effective at providing what is really needed. This isn't to suggest that the emergency management community should stop building and strengthening its pool of professionals, nor limit efforts to extend the reach of their service and support the needs of all communities. What it does suggest is that the priority and focus on training and capacity development must shift to preparedness and resilience initiatives.

Objectives

The purpose of this study was to:

1. Examine the costs and benefits associated with preparedness and mitigation actions.
2. Identify if recovery from disasters requires resources to be diverted from other important public and private programs.
3. Validate the argument for an increased focus on actively allocating resources and attention to the development and expansion of individual and community preparedness and resilience.

Significance

With an increasing focus on disaster preparedness, mitigation, and resilience we can reduce the risk of loss of life, injury, economic costs, and destruction of natural and cultural resources that result from natural disasters.

Methodology

A comprehensive literature review of published works concerning was conducted. Products included case studies of mitigation measures, articles on valuing the human impact of disasters, data from the Insurance Information Institute, analysis by the National Institute of Building Sciences (NIBS), and reports from the National Oceanographic and Atmospheric Administrations (NOAA).

Costs

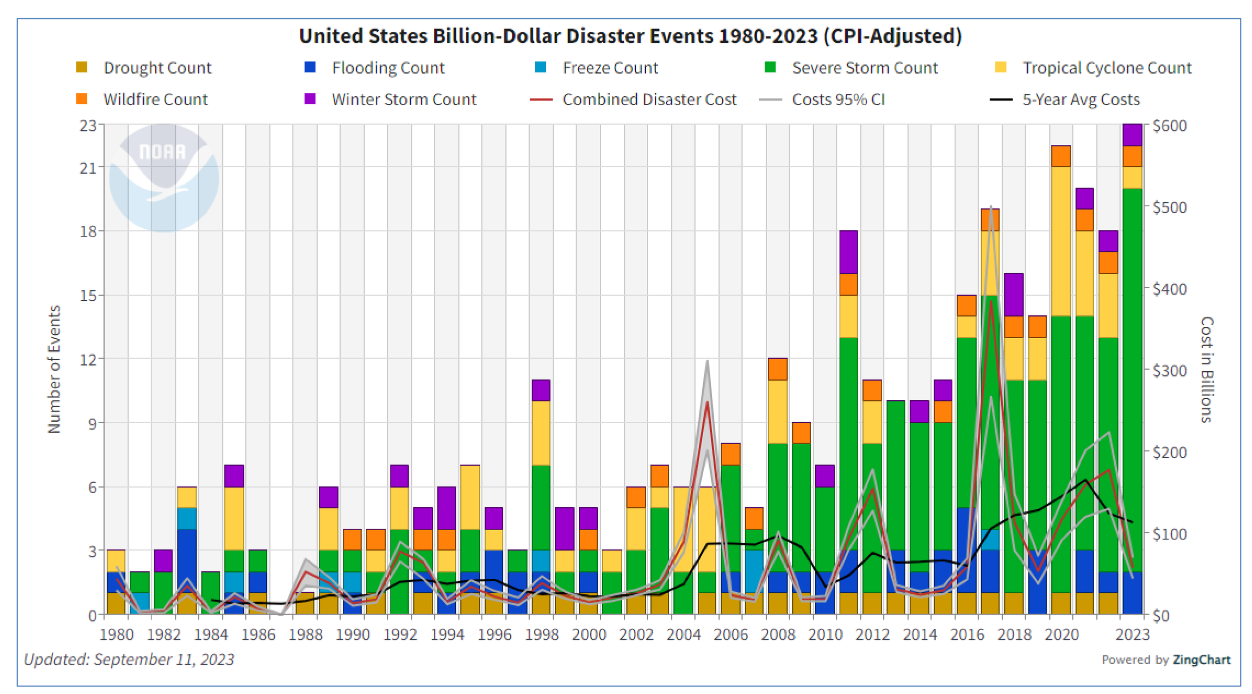

Figure 1: Disaster events by type and cost from 1980-2023. (source: NOAA)

Billion-dollar events to affect the United States from 1980 to 2023 (CPI-Adjusted)*

Disaster Type	Events	Events/ Year	Percent Frequency	Total Costs	Percent of Total Costs	Cost/ Event	Cost/ Year	Deaths	Deaths/ Year
Drought	30	0.7	8.1%	$337.1B	12.9%	$11.2B	$7.7B	4,275	97
Flooding	42	1.0	11.3%	$193.4B	7.4%	$4.6B	$4.4B	733	17
Freeze	9	0.2	2.4%	$36.2B	1.4%	$4.0B	$0.8B	162	4
Severe Storm	185	4.2	49.9%	$442.4B	16.9%	$2.4B	$10.1B	2,094	48
Tropical Cyclone	61	1.4	16.4%	$1,367.6B	52.3%	$22.8B	$31.1B	6,895	157
Wildfire	22	0.5	5.9%	$142.1B	5.4%	$6.5B	$3.2B	550	13
Winter Storm	22	0.5	5.9%	$97.3B	3.7%	$4.4B	$2.2B	1,402	32
All Disasters	**371**	**8.4**	**100.0%**	**$2,616.1B**	**100.0%**	**$7.1B**	**$59.5B**	**16,111**	**366**

Figure 2: Disaster event totals by type from 1980-2023. (source: NOAA)

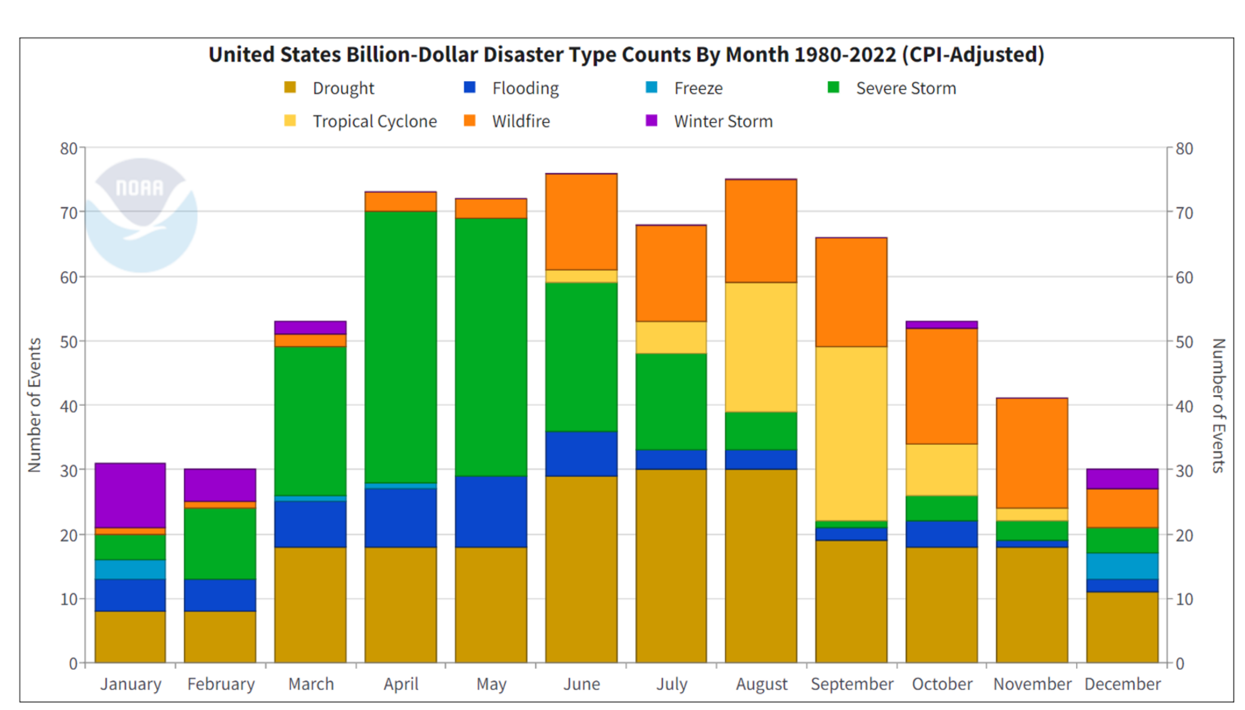

Figure 3: Frequency of disaster event by type and month from 1980-2023. (source NOAA)

Benefits

National Institute of BUILDING SCIENCES	ADOPT CODE	ABOVE CODE	BUILDING RETROFIT	LIFELINE RETROFIT	FEDERAL GRANTS
Overall Benefit-Cost Ratio	11:1	4:1	4:1	4:1	6:1
Cost ($ billion)	$1/year	$4/year	$520	$0.6	$27
Benefit ($ billion)	$13/year	$16/year	$2200	$2.5	$160
Riverine Flood	6:1	5:1	6:1	8:1	7:1
Hurricane Surge	not applicable	7:1	not applicable	not applicable	not applicable
Wind	10:1	5:1	6:1	7:1	5:1
Earthquake	12:1	4:1	13:1	3:1	3:1
Wildland-Urban Interface Fire	not applicable	4:1	2:1	not applicable	3:1

Table 1: Nationwide average benefit-cost ratio by hazard and mitigation measure. (source: NIBS 2019)

Reference	VSL (in Millions USD *)	Countries	Disaster Types
Cropper and Sahin (2009) [12]	0.143 (Low-Income-Country) 4.27 (High-Income-Country)	Not Specified	Not Specified
Porfiriev (2014) [31]	0.19 (International comparison) 0.33 (Welfare method)	Russia	Natural and technological
Hoffmann et al. (2017) [26]	0.61	China	Not Specified
Sadeghi et al. (2015) [32]	0.73–1.4	Iran	Earthquakes
Fuchs and Mcalpin (2005) [34]	0.81	Switzerland	Avalanches
Daniell et al. (2015) [33]	2.2	Australia, calculations applied to case studies in Turkey and Croatia	Earthquakes
Cheng (2018) [36]	2.34	Australia	Heatwave
Leiter et al. (2010) [24]	2.3–4	Austria	Avalanches
Dassanayake et al. (2012) [35]	2.5–9.2	Germany	Floods
Zhai et al. (2003) [28]	3.3–9.2	Japan	Floods
Johansson and Kristrom (2015) [29]	5.2–12.8	USA	Floods and storms
Rheinberger (2011) [23]	6.8–7.5	Switzerland	Snow avalanche and rockfalls
Barbier (2022) [27]	1.25–7.7	Italy	Earthquake
Bockarjova et al. (2012) [22]	9.6	The Netherlands	Floods
Hammitt et al. (2019) [30]	10	China	Not specified
Ozdemir (2011) [25]	15	USA	Tornado

Table 2: Estimated values of statistical life in U.S. Dollars in respective years. (source: Kharb, et al. 2022)

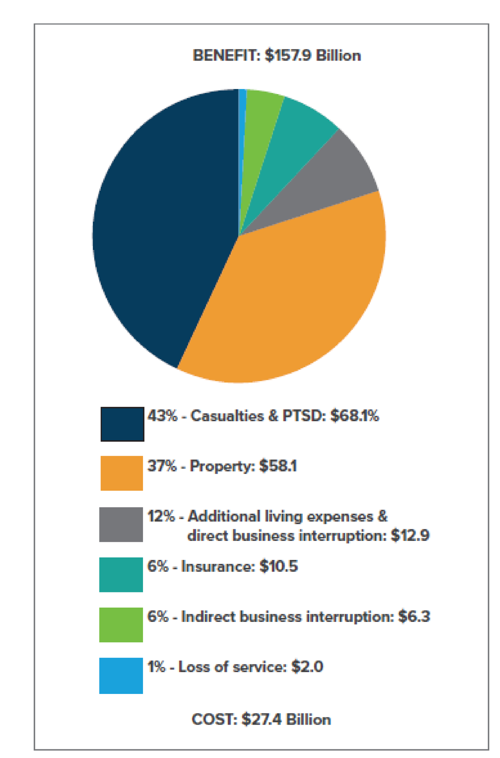

Figure 4: Total costs and benefits of 23 years of federal mitigation grants. (source: NIBS 2019)

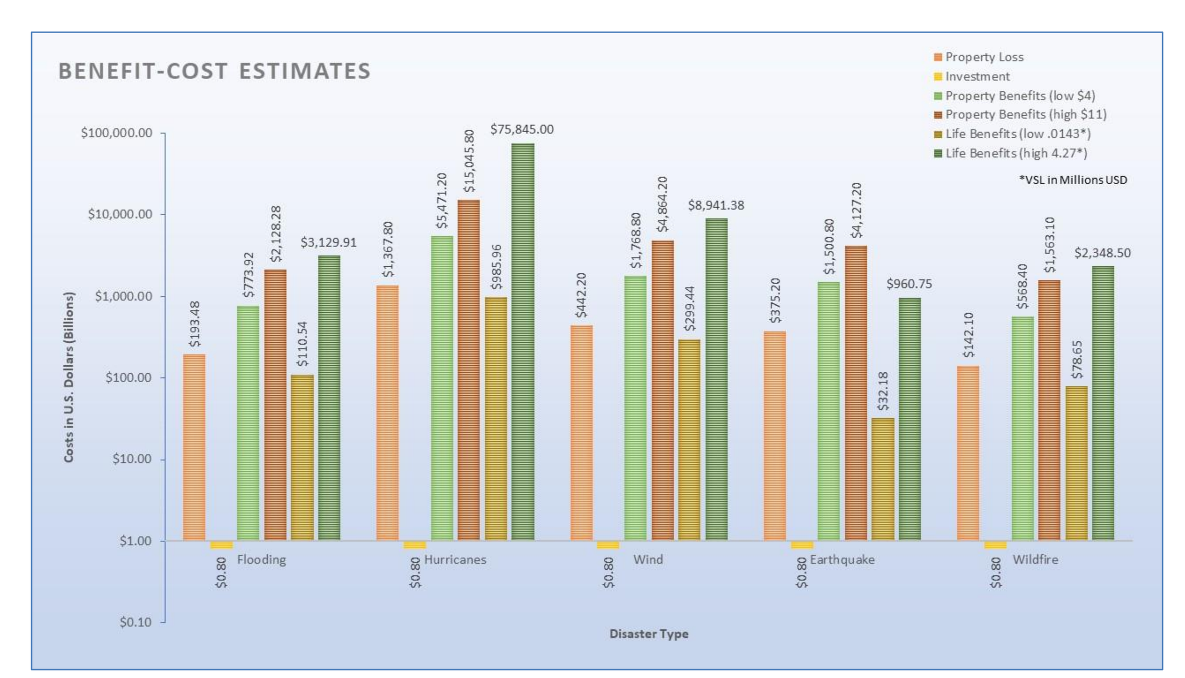

Figure 5: Estimated benefit-cost for disasters in U.S. Dollars. (source: Marble 2023)

Results

- From 1980–2023
  - 371 confirmed weather/climate disaster events in the United States with losses exceeding $1 billion.
  - Events resulted in the deaths of 16,111 people and had significant economic effects on the areas impacted.
  - The 1980–2022 annual average is 8.1 events.
  - The annual average for the most recent 5 years (2018–2022) is 18.0 events.

Much of the literature does not adequately address U.S. preparedness efforts. Preparedness and response are often used in the same sentence, but discussion tends to focus on preparedness to respond versus preparedness to avoid or mitigate. In a review of global efforts, the current funding model is weighted towards emergency response versus a more proactive and risk-centered approach. In the top 20 humanitarian recipient countries between 2005-2017, just 62 cents out of every $100 was spent on disaster prevention and preparedness (OCHA 2017).

Conclusion

- Resilience is perhaps best conceptualized as a process, rather than an outcome. Preparedness saves lives and saves money.
- On average, U.S. natural hazard mitigation saves $4-$11 for each $1 invested and Federal grants provide a $6 benefit for each $1 invested. (NIBS 2019)
- Compared to 50 years ago, more people are in harms way and there is an increased likelihood that a routine natural hazard will become a major catastrophe.
- Low-income individuals in the U.S., and in developing countries, are at greater risk of being affected by disaster and have fewer resources to recover.

Acknowledgements

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