

# The Far-Reaching Impact

Current and Future Climate Considerations

## Current Trend

The global climate landscape is in the midst of a paradigm shift marked by a discernible increase in surface temperatures. This phenomenon creates a potential for more frequent droughts and heightened storm intensity. The increased evaporation of water vapor into the atmosphere serves as fuel for the development of storms with greater rainfall. Elevated heat within the atmosphere and warmer ocean surface temperatures can lead to tropical storms with higher wind speeds, and the elevation in sea level increases land exposure to the erosive actions of waves and currents.

Against this backdrop, the phrase “billion-dollar disaster,” serves as a stark reminder of the escalating impact of natural catastrophes.<sup>1</sup> It not only reflects the mounting economic toll but also highlights how climate change and increasing urbanization exacerbate our vulnerability to the forces of nature.

## Implications

The implications of our rapidly changing climate are profound in their impact and scope, reverberating across multiple dimensions of our lives, from the environment to our communities, infrastructure, and economy.

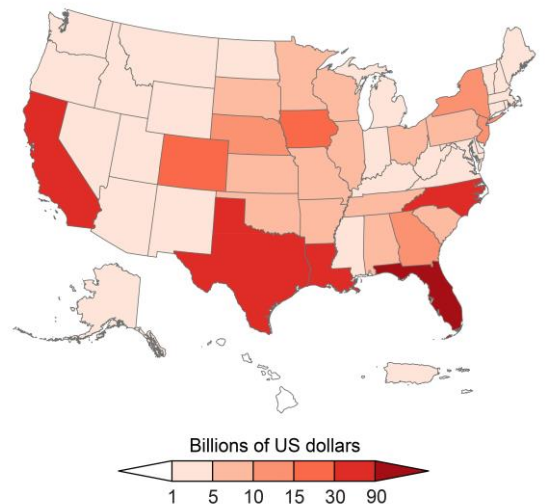
### Disaster Insurance Market Instability

Confronted with the uncertainty of future weather events, government leaders are wrestling with the challenge of revamping disaster insurance markets to ensure homeowners have sufficient coverage. This dilemma coincides with projections of a substantial increase in the demand for

## Key Facts

- The U.S. has sustained 377 disasters since 1980 where overall damages/costs reached \$1 billion.
- With every additional increment of global warming, costly damages accelerate—2 °F of warming is projected to cause more than twice the economic harm induced by 1 °F of warming.
- The 2017-2018 California wildfires resulted in a 31% increase in insurance non-renewals, with 235,250 households affected.

Damages by State from Billion-Dollar Disasters  
(2018–2022)



<sup>1</sup> Graphic: [NOAA National Centers for Environmental Information \(NCEI\) U.S. Billion-Dollar Weather and Climate Disasters](#)

Key Facts: [Billion-Dollar Weather and Climate Disasters \(noaa.gov\)](#); [Climate change impacts are increasing for Americans \(noaa.gov\)](#); [With Climate Impacts Growing, Insurance Companies Face Big Challenges – State of the Planet \(columbia.edu\)](#)

Over the past two decades, several prominent insurers have exited the state of Florida, culminating in 12 closures since 2020. This trend has left only small in-state insurance companies with limited resources. To counteract this trend, California has taken measures to prevent insurance companies from rejecting home renewals in or adjacent to certain areas under emergency declarations for wildfires.<sup>3</sup> This temporary protective prohibition has been extended on an annual basis since its establishment.

## Growing Infrastructure Vulnerability

The power grid is highly vulnerable to climate risk from both acute and chronic impacts, amplified by fragile components and relatively low redundancy. Higher temperatures boost peak demand, lower generation efficiency, increase losses in transmission and distribution, and decrease the lifetime of key equipment. Heat and drought also cause problems for hydroelectric dams and nuclear plants, which struggle to maintain output or maintain proper operational temperatures with less water.

<sup>5</sup> Will climate change cause infrastructure to bend or break? | McKinsey

Small rural water providers that often depend on a single water source or have limited capacity are especially vulnerable.”<sup>6</sup> In addition, climate impacts are expected to increase risk of exposure to water-borne pathogens and water-treatment expenses. Water utilities spend more than \$109 billion each year to provide safe drinking water and wastewater services.<sup>7</sup> Nonetheless, more than 7 million people get sick from diseases spread through water each year, which cost the U.S. healthcare system more than \$3 billion annually.

The impacts of extreme heat will continue to grow across the infrastructure sector. People living in cities are at a higher risk of experiencing the impacts of heat waves because urban areas are already warmer due to the heat island effect. Further, at the city scale, neighborhoods with substandard infrastructure and services, such as fewer green spaces and histories of restricted housing investment, are measurably hotter (as much as 12 °F).<sup>6</sup> This will likely create new demands for heat response and cooling missions in emergency management. In addition, extreme heat is expected to cause wide-ranging transportation impacts through greater damage to roads, delayed trains, and grounded airplanes, which could cause travel and supply chain disruptions that exacerbate or trigger emergencies.

The telecommunications industry already experiences weather related impacts, many of which are expected to rise in frequency and/or severity due to ongoing climate variability and climate change. Increases in temperature and the growing frequency, duration, and intensity of heat waves create an additional burden on keeping equipment cool in exchanges and base stations, resulting in higher failure rates. Increases in storm frequency or intensity elevates the risk of damage to above-ground transmission infrastructure (masts, antennae, switch boxes, aerials, overhead wires, and cables), which are often final access connections to homes and businesses and may negatively impact telecommunications service delivery.

## Sustained Impacts of Economic Vulnerability

Businesses are the foundation of local, regional, and national economies; when businesses are affected by disasters, that disruption produces not only direct business losses, but also indirect losses and economic ripple effects. Damage to and destruction of businesses, coupled with disaster-related closures, result in job losses and supply chain disruptions, impacting incomes and increasing challenges for households, neighborhoods, and communities during the recovery process.

FEMA estimates that close to 40% of business do not reopen following a major disaster,<sup>8</sup> though it is important to note that small businesses are prone to closure within a year of opening regardless of outside factors. Research indicates that the economic effects of natural disasters tend to be localized, with businesses in the affected region generally rebounding as they reconstruct their property and replenish their inventories.

Disasters also incur significant expenses for the government and can strain state, local, tribal, and territorial budgets, leading to the diversion of funds from other programs or increased debt. Further,

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<sup>6</sup> [Fifth National Climate Assessment \(globalchange.gov\)](https://www.globalchange.gov/fifth-national-climate-assessment/)

<sup>7</sup> [Investing in water: Comparing utility finances and economic concerns across U.S. cities | Brookings](https://www.brookings.edu/research/investing-in-water-comparing-utility-finances-and-economic-concerns-across-u.s.-cities/)

<sup>8</sup> [Business-Resiliency-Guidebook-4-10-2020.pdf \(americassbdc.org\)](https://www.americassbdc.org/Business-Resiliency-Guidebook-4-10-2020.pdf)

these consequences are confounded with the lasting impact that disasters can have on investment, tourism, and property values, which drive tax revenues. In 2022, the National Oceanic and Atmospheric Administration (NOAA) reported that billion-dollar disasters caused a cumulative total of \$165 billion in damages in the U.S. and that these events account for 85% of all disaster-related costs.<sup>9</sup> A 2019 estimate from the Congressional Budget Office (CBO) projects that damage from hurricanes and other storms will cost the federal government \$17 billion annually, which includes around \$11 billion in aid to the public sector and \$4 billion in aid for individuals.<sup>10</sup>

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<sup>9</sup> [2022 U.S. billion-dollar weather and climate disasters in historical context \(NOAA Climate.gov\)](https://www.noaa.gov/news/2022-u.s.-billion-dollar-weather-and-climate-disasters-in-historical-context)

<sup>10</sup> [Expected Costs of Damage From Hurricane Winds and Storm-Related Flooding \(cbo.gov\)](https://www.cbo.gov/publications/45282)



# Signals of Change

Climate change will impact how much you need in savings. Here's how

<https://www.washingtonpost.com/business/2023/10/06/climate-change-emergency-fund/>

A Record Number of Billion-Dollar Disasters Show U.S. Isn't Ready for Climate Change

<https://www.scientificamerican.com/article/a-record-number-of-billion-dollar-disasters-show-u-s-isnt-ready-for-climate-change/>

Extreme disasters are overwhelming safety systems not designed for climate-fueled events

<https://www.nbcnews.com/science/science-news/maui-wildfires-disaster-safety-resilience-climate-change-rcna99347>

FEMA announces \$2.5B for enhanced resiliency against climate change-fueled extreme weather

<https://thehill.com/policy/energy-environment/4175121-fema-announces-2-5b-for-enhanced-resiliency-against-climate-change-fueled-extreme-weather/>

How extreme weather events are testing disaster preparedness and resilience

<https://www.washingtonpost.com/washington-post-live/2023/06/28/how-extreme-weather-events-are-testing-disaster-preparedness-resilience/>