# The Impact of Climate Change on the U.S. Insurance Industry and Means of Prevention


## Abstract

This research paper examines climate change's effects on the U.S. insurance sector from 1980 to 2023. The paper suggested that to alleviate the effects of climate change, insurers and insurance regulators must improve openness and accountability in their climate risk management and encourage firms to handle climate risks effectively. Furthermore, they must elucidate the appropriate management of climate risk and instruct examiners on circumventing blue-lining, which complicates families' access to affordable insurance and other financial services, thus hindering their capacity to recuperate from the impacts of climate change. Finally, they should select an appropriate external financial services provider, to assess the insurer's operational practices, financial reporting, internal controls, and the general condition of the industry to detect potential risks. then, the service provider devises strategies centered on high-risk insurance categories, ensuring enough field testing to mitigate the risks associated with climate change.



***Keywords:*** *Climate Change, U.S insurance industry, Risk Mitigation, Impact, Insurers and insurance regulators, Financial Services, U.S. economic resilience.*


## 1. Introduction:

The Earth's climate is changing at an unprecedented rate, chiefly due to human activity. A scientific consensus exists that unchecked carbon emissions will cause global warming of at least

several degrees Celsius by 2100, leading to significant local, regional, and global threats to human society and natural ecosystems. Global climate change has already produced diverse effects across all regions of the planet and numerous economic sectors. Various areas and sectors critical to society, such as human health, agriculture, food security, water supply, transportation, energy, biodiversity, ecosystems, insurance, and property sectors, are already experiencing the effects of climate change (Clark et al., 2016). According to the World Climate Research Program (WCRP, 2021), the impact of climate change will become increasingly disruptive in the coming decades. There is substantial confidence that the frequency and intensity of excessive heat and heavy precipitation events are escalating in the majority of continental regions globally. These findings align with anticipated physical reactions to a warmer climate. Rising global temperatures are likely to lead to an increase in the frequency and severity of extreme high-temperature occurrences in the future. There is strong confidence that extreme precipitation events will likely continue to rise in frequency and intensity across the majority of the globe. (O'Neill et al., 2020). Over the past seven years, climate change has progressively affected the financial services sector, particularly insurance, leading the industry to a critical juncture. The assets, profitability, and business models of insurers are susceptible to the present and future effects of climate change on risk assessment and pricing. Fundamentally, insurers' "business as usual" facilitates, via investments, loans, and underwriting of carbon-intensive operations, the climate change effects that adversely affect their companies, consumers, and the communities they serve (Cho, 2022). Certain insurers are reacting by terminating coverage for new clients and/or increasing premiums in high-risk areas. Others are only now seeing the potential financial dangers associated with climate change. Some insurers now acknowledge that their industry can contribute to mitigating the most severe consequences of climate change (Irfan, 2021). The National Centers for Environmental Information (2023) indicated that immediate action is necessary to mitigate the climate change consequences and impact in the United States. In 2022, there were 18 disasters due to climate change, while in 2021, there were 20, each incurring damages beyond one billion dollars, culminating in nearly $165 billion in economic devastation.

Ongoing severe and devastating weather phenomena have led to an increase in climate-related insurance claims. Florida, Louisiana, and other states have enacted improvements in property insurance. Initiate storm retrofitting, guarantee homeowners receive enough warnings, elucidate premium increases, and implement a reinsurance assistance scheme to mitigate insurance costs

(Aon, 2023). The United States is the most vulnerable nation to severe weather-induced property damage; experts anticipate that 75% of global insured losses originate from the natural catastrophes of 2022. Natural disasters documented the aggregate global economic losses in 2021. Projected damages amounted to $343 billion, while insured losses exceeded $130 billion. Despite a minor incident in 2022, the total losses decreased to $313 billion, while the insured losses reached $132 billion, maintaining a trend of increasing losses over several years. This trend highlights the growing impact of climate change and the need for enhanced disaster preparedness and resilience measures. As the frequency and severity of such events continue to rise, both individuals and governments must prioritize strategies to mitigate risks and adapt to the changing environment (Kawamori, Lubber, and Reichert, 2023).

## 2. The Implications of Climate Change in The United States:

Since the 1980s, big reinsurance firms have meticulously monitored the development of climate change worldwide. In 2004, the insurance sector particularly witnessed a significant alert as many storms escalated the total damages compensated for insured property to 49 billion USD. In 2005, these expenditures escalated to a total of 80 billion USD, as reported by Sturm and Oh (2010). In recent years, reinsurance experts tried to explain the mechanism between costs and risks and how the insurance sector spreads the costs of risks. According to Kivisaari (2005), the primary function of the insurance sector is to mitigate the financial risks of policyholders against unforeseen losses by distributing risks across individuals and corporations. However, climate change is anticipated to complicate the execution of this work further. While it may mitigate certain local risks, climate change is expected to generate new financial security requirements due to events such as storms and floods. Utilizing reinsurance services is a method for insurance firms to mitigate their own risk. The risks of an insurance firm are disseminated across a broader economic landscape when these organizations insure their operations, typically via a substantial, worldwide reinsurance entity. This enhances the capacity to finance a catastrophe's expenses in a confined region. Consequently, reinsurance firms can mitigate their risk by issuing diverse bonds to acquire.

However, environmental issues with global repercussions, like climate change, constrain the opportunities for regional risk dissemination. Another concern raised by the reinsurance firms and experts during the past 5 years is whether climate change impedes anticipation of the costs and will cause major high costs for the U.S. insurance industry. In this respect, Mills (2009)

indicated that climate change will provide challenges for the insurance sector in formulating appropriate insurance terms and pricing. Historical data is increasingly becoming obsolete when forecasting weather-related incidents. Therefore, insurance firms must increasingly employ a variety of simulations to obtain information about future catastrophes, as the unpredictability of local climatic projections complicates the evaluation of danger levels. Likewise, Höppe (2006) mentioned that weather-related losses from non-life insurance have been particularly problematic for insurance companies; over the last fifty years, the occurrence of major catastrophes has quadrupled, and the monetary costs have risen even faster than that. It should be noted that the majority of the cost increase to date has been attributed to increases in the value and amount of insured property. In addition, housing centers and other buildings have been concentrated in areas that are prone to more risk. Furthermore, Carter (2007) indicated that the costs of damage related to weather totaled 130 USD billion, of which 44 USD billion were insured property, and that confirms that extreme climate change will not only increase financial costs but also intensify in severity. In this respect, Sturm and Oh (2010) have also argued about the rising cost due to climate change and how that affects the U.S. insurance industry by providing an example of the USA's second-largest provider of home insurance, considering Allstate is a real example of the effects of rising costs on insurance companies. In 2004, due to storm damage in Florida, the company lost two billion USD, a sum corresponding to all profits made by the company in that state since the 90s. Since the company believes that climate change will aggravate the situation in the future, it stopped signing new insurance policies in the area. The next year, Allstate lost another 4.7 billion in compensation for storm damage. This led the company to cancel around 200,000 insurance policies in Florida. In addition, Allstate left the less risk-prone market areas, raised its insurance premiums all over the USA, and terminated existing policies. Although the spread of buildings to flood-risk areas and the intensification of climate change are important elements for the entire US insurance industry, the profitability of a single company is always influenced by several company-specific details.

### 2.1 The U.S. Insurance Industry and Climate Change:

Global warming and its consequent climatic change provide a considerable problem for the American insurance sector; it is imperative to evaluate and, where feasible, alleviate the effects of global warming on insurance. The National Association of Insurance Commissioners (NAIC)

asserts that climate change will pose multiple challenges to the American insurance sector. These concerns encompass issues faced by property and liability insurers, life and medical insurers, and policyholders. The insurance industry plays a distinctive role in the convergence of the causes and effects of climate change. Insurers provide coverage for carbon-intensive companies, residential properties, automobiles, and pollution-emitting aircraft, which are significant contributors to anthropogenic greenhouse gas emissions. Consistent with their historical function, insurers can develop innovative solutions for climate change by addressing and alleviating both the causes and consequences of disasters (Schellhas et al, 2024). By looking at climate change risks in a variety of ways, insurers can show leadership in the industry and come up with new products that encourage people to change their behavior. They can also push for changes to regulations that lower risks and help make and enforce progressive building codes and land use planning guidelines. Such initiatives may produce enduring advantages for the insurer, as it experiences reduced and more controllable disaster losses stemming from these modifications. (Ross et al., 2007). Climate change may affect property and liability insurers the most. However, life insurers also struggle. According to Mills (2005), life insurers provide retirement and premature death insurance to American families, and since life insurers have long-term assets and contracts, today's decisions may affect future solvency. Therefore, they must fulfill all obligations and manage investments and policies responsibly to satisfy policyholders. Life insurers and policyholders may suffer if they don't prepare for climate change, so they should monitor increases in the frequency and severity of weather-related occurrences and try to identify how much of a catastrophic event may be linked to climate change. They should also monitor scientific advances in forecasting, storm tracking, and communications; federal, state, and local disaster mitigation and management; and public awareness and attitudes, which may reduce catastrophic event fatalities. As people become more aware of the impact of harsh weather and climate change, they will be more likely to follow obligatory and voluntary evacuation orders and take other life-saving measures. Even with climate change, more of the American people understand disasters and improved technology to reduce disaster deaths, so life insurers must include all these elements when predicting climate change-related mortality changes. Like other companies, life insurers should also prepare for the impact of climate change on their investments, particularly when they anticipate managing long-term financial risk. Wagner (2008) discovered that climate change will impact people's health in unexpected ways.

Many things could happen, and some of these will make health problems worse, like asthma, so regulators will need to learn more about them and figure out how they will affect public health and the health insurance business. Wagner also introduced examples of such possible events, such as hurricanes and other floods that put people in the path of rivers. As a real example, think about the floods from Hurricane Katrina. As people ran away from their homes, they came into contact with many germs and dangerous chemicals, so a lot of people got sick, and some had long-term mental health problems. Another real example is the health problems that come with heat waves. In 2003, the heat wave in Europe killed a lot of people and made it very hard for countries to deal with the direct health effects; some countries didn't have enough trained medical staff to deal with the large number of people who got sick during the heat wave because of their summer vacation schedules. The real-life examples from the US and Europe that Wagner (2008) used to back up Mill's (2005) study showed that climate change can also make vector-borne diseases, food poisoning, water quality, aeroallergens, and the health of natural systems worse. This can cost people money and is sometimes covered by insurance. More airborne allergens, higher temperatures, higher humidity, more wildfires, and more dust and particulate pollution may make upper respiratory diseases like rhinitis, conjunctivitis, sinusitis, asthma, and heart disease a lot worse. Many studies argued about the impact of climate change on the U.S. insurance industry. However, only a few studies focused on the impact of climate change on policyholders. In this respect, Westfall (2006) argued that policyholders eventually bear a significant amount of the consequences of climate change on insurers; global warming is expected to result in decreased availability of personal and commercial property insurance coverage; regional coverage unavailability has not transpired in almost a century, during which major insurers exhibited disinterest in insuring properties in the emerging great plains and western regions of the United States. Inhabitants in those areas reacted by establishing and endorsing cooperative insurance companies to safeguard property. Currently, the emphasis is on pursuing a government resolution rather than utilizing mutual insurers. The high likelihood of losses surpassing premiums in coastal areas may restrict insurers' short-term rate hikes.

The point of view of Westfall (2006) came to agree with Wagner (2008) and Mills (2005). However, the recent observations in the southeastern and northeastern United States indicate that evolving expectations for long-term risk profiles have complicated insurers' ability to price their policies actuarially soundly. Similarly, policyholders encounter ambiguity regarding the actual

danger and, consequently, the expense of constructing in a specific place. Acquiring a mortgage necessitates property insurance to safeguard the lender's interests. Likewise, for coastal regions, western woodlands, and other ecologically sensitive areas to prosper economically, individuals must comprehend and mitigate the hazards associated with global warming. Before insurance coverage becomes prohibitively expensive or inaccessible, consumers, politicians, realtors, builders, and other relevant stakeholders will insist that regulators and insurers enhance their engagement in comprehending shifts in fundamental risks and effectively conveying that understanding to policyholders and the public. Governments and regulators ought to collaborate with the U.S. insurance sector to inform these entities about the heightened risks linked to climate change and the factors that influence insurance costs. Take into account that insurers have long recognized that sustained stability or a decrease in insurance prices can only be attained by mitigating the level of risk. However, to control insurance prices, policyholders must actively participate in this endeavor, necessitating insurers to persist in promoting this approach.

**2.2 Means of Prevention:**

Climate change threatens insurers' ability to assist U.S. individuals and businesses in many ways. According to the National Centers for Environmental Information (2024), during the last year 2023, climate change damages were around 92.9 billion dollars. Several U.S. insurance companies have responded to climate-related financial issues by withdrawing from vulnerable regions, raising prices, and substantially limiting coverage, these signify substantial market indications concerning the scale and scope of the economic effects of climate change. Feinman (2020) confirmed that the insurance protection gap can significantly impact residents and the worth of their assets. Thus, these developments may have far-reaching implications for the financial system. Sometimes, consumers assume financial responsibility in areas where insurance coverage is either insufficient or absent. However, suppose individuals cannot afford the costs of natural disasters and fail to uphold mortgage or loan payments. In that case, that risk is transferred to lenders, creating systemic risk, endangering financial stability and, consequently, the general health of the U.S. economy.

***Table (1)***
***Climate Change impact on the United States from 1980 to 2023 (CPI-Adjusted)***

| Time Period | Billion-Dollar Disasters | Events/Year | Cost | Percent of Total Cost | Cost/Year | Deaths | Deaths/Year |
|---|---|---|---|---|---|---|---|
| 1980s (1980-1989) | 33 | 3.3 | $213.6B | 8.0% | $21.4B | 2,994 | 299 |
| 1990s (1990-1999) | 57 | 5.7 | $326.8B | 12.3% | $32.7B | 3,075 | 308 |
| 2000s (2000-2009) | 67 | 6.7 | $604.2B | 22.7% | $60.4B | 3,102 | 310 |
| 2010s (2010-2019) | 131 | 13.1 | $967.5B | 36.4% | $96.8B | 5,227 | 523 |
| Last 5 Years (2019-2023) | 102 | 20.4 | $603.1B | 22.7% | $120.6B | 1,996 | 399 |
| Last 3 Years (2021-2023) | 66 | 22.0 | $431.5B | 16.2% | $143.8B | 1,690 | 563 |
| Last Year (2023) | 28 | 28.0 | $92.9B | 3.5% | $92.9B | 492 | 492 |
| **All Years (1980-2023)** | **376** | **8.5** | **$2,661.1B** | **100.0%** | **$60.5B** | **16,350** | **372** |

***Source: National Centers for Environmental Information (2023-2024)***

Table 1 above presents a comprehensive summary of the billion-dollar impact of climate change on the United States from 1980 to 2023. In 2023, the United States encountered 28 distinct weather and climatic disasters, each incurring costs of at least one billion dollars. The year 2023 ranks first for the highest incidence of billion-dollar catastrophes in a calendar year, accounting for 3.5% of the total cost and resulting in 492 fatalities. Conversely, the Insurance Information Institute (III) reported that insured property losses in 2023 approached 78.8 billion USD, with projections suggesting that the ratios of insured property losses will increase during the next three years. Many researchers and specialist research centers, including Maynard (2008), Dlugolecki (2008), Phelan et al. (2020), and the Center for American Progress (CAP) 2024, have argued about the impact of climate change and how insurers can help with adaptation and risk mitigation. These studies have identified four potential solutions that insurers should consider. ***The first solution*** is for insurers to enhance transparency and accountability in their management of climate risks. Insurance companies, along with the reinsurers who take on shared risks, collect a lot of information about the economic losses suffered by consumers and businesses, as well as other data relevant to the policies they write. The impact of detrimental climate occurrences is evident in this data and influences corporate decisions about the types of insurance coverage offered and their pricing. With access to this data, policymakers will be better able to figure out how climate-related losses might affect insurers' ability to serve clients and how stable insurers and the financial institutions that depend on them staying open will be.

***The second solution*** to mitigate climate change impact refers to insurance regulators in the United States, as they should promote the management of climate risks by enterprises. In this

respect, insurance regulators around the United States ought to provide directives to assist insurers in incorporating climate risk management strategies. Furthermore, authorities must verify that these insurance companies possess credible transition plans and that their internal strategies are congruent with these plans. ***The third solution*** also has to do with insurance regulators. State insurance regulators should tell companies how to handle climate risk properly and teach examiners how to avoid blue-lining which makes it harder for families to get affordable insurance and other financial services and gets in the way of their ability to recover from disasters and extreme weather. The financial intelligence office is mandated to oversee the accessibility of inexpensive non-health insurance products for traditionally underserved communities, consumers, minorities, and individuals with low to moderate incomes. ***The fourth solution*** has to do with choosing the right external financial services provider. These service providers look at how the insurer works, how they report their finances, their internal controls, and the overall state of the industry to find any possible risks. After that, they make plans that focus on high-risk insurance types, making sure that there is enough testing in the field to lower the possible risks of climate change. According to the Center for American Progress (CAP) reports (2021), financial services, including auditing and accounting are essential instruments for conveying trustworthy climate information to insurers. Insurers can undertake crucial measures, fully within their jurisdiction, to utilize these tools in combating the climate change impact: (1) To account for the financial impact of climate change and the shift to a low-carbon economy, current accounting, and related transparency rules must be strictly enforced. (2) Implement modifications to disclosure, ensuring the exchange of established best practices on crucial climate-related data among markets and industries. A staff accounting bulletin and other rules and guidelines can accomplish this. (3) Make the most of the audit to establish a strong link between company financial reporting and climate-related risks to examine how the current U.S. accounting standards increase systemic climate change risks.

**Conclusion:**

This paper aims to discuss the impact of climate change on the insurance sector in the United States over the period from 1980 to 2023, by confirming that the primary role of the insurance sector is to mitigate the financial risks faced by policyholders due to unforeseen losses by distributing risks among individuals and corporations. Nevertheless, climate change is expected to exacerbate the implementation of this task. Although it may alleviate specific local hazards, climate change is anticipated to create new financial security demands arising from occurrences such as storms and floods. The paper showed essential methods for insurers to improve openness and accountability in the management of climate change risks. Insurance firms, in conjunction with reinsurers that assume shared risks, gather extensive information regarding the economic losses incurred by individuals and businesses, along with other pertinent data related to the policies they underwrite. The influence of adverse climate events is apparent in this data and affects corporate decisions on the types of insurance coverage provided and their pricing. Access to this data will enable policymakers to assess the impact of climate-related losses on insurers' capacity to serve clients and the stability of insurers and the financial institutions reliant on their operations. The second method to alleviate the effects of climate change pertains to insurance regulators in the United States, who should advocate for the management of climate risks by businesses. In this regard, insurance regulators across the United States should issue guidelines to aid insurers in integrating climate risk management techniques. Moreover, regulators must ensure that these insurance businesses have realistic transition plans and that their internal objectives align with these plans. The third method pertains to insurance regulators. State insurance regulators ought to instruct companies on the appropriate management of climate risk and educate examiners on circumventing the "blue lining," which impedes families' access to affordable insurance and financial services, thereby hindering their recovery from disasters and extreme weather events. The financial intelligence office is tasked with ensuring the availability of affordable non-health insurance products for historically marginalized populations, consumers, minorities, and persons with low to moderate incomes. The fourth answer pertains to selecting the appropriate external financial services provider. These services assess the insurer's operations, financial reporting, internal controls, and the general industry condition to identify potential hazards. Subsequently, they devise strategies centered on high-risk insurance categories, ensuring enough field testing to mitigate potential climate change hazards.

**Disclaimer (Artificial intelligence)**

Option 1:

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

Option 2:

Author(s) hereby declare that generative AI technologies such as Large Language Models, etc. have been used during the writing or editing of manuscripts. This explanation will include the name, version, model, and source of the generative AI technology and as well as all input prompts provided to the generative AI technology

Details of the AI usage are given below:

1.

2.

3.

## References:


- Carter, T. R. (2007), Assessing the adaptive capacity of the Finnish environment and society under a changing climate: FINADAPT. Summary for policymakers. Suomen ympäristökeskus, Helsinki. Suomen ympäristö 1/2007. PP 11-18.
- Clark, P., Shakun, J., Marcott, S., et al., (2016), Consequences of twenty-first-century policy for multi-millennial climate and sea-level change. Nature Clim Change 6, 360–369. DOI: https://doi.org/10.1038/nclimate2923.
- Dlugolecki, Andrew. (2008), Climate change and the insurance sector." The Geneva Papers on Risk and Insurance-Issues and Practice, 33 (2008): PP71-90.
- Feinman, Jay M. (2020), What is a Protection GAP? Connecticut Insurance Law Journal, Vol.1, PP 83-113.
- Herweijer C, Ranger N, Ward RE. (2009), Adaptation to climate change: threats and opportunities for the insurance industry. The Geneva Papers on Risk and Insurance-Issues and Practice. 2009 Jul 1;34:PP 36-80.
- Höppe. Peter, Pielke, Roger, (2006), Workshop on Climate Change and Disaster Losses Understanding and Attributing Trends and Projections, e U.S. National Science Foundation under a grant to the University of Colorado titled “Science Policy Assessment and Research on Climate” (SPARC). PP123-126.
- Irfan, Umair, (2021), The $5 trillion insurance industry faces a reckoning. Blame climate change. Online posting. Accessed 5 July 2023. Vox. https://www.vox.com/22686124/climate-change- in insurance-flood-wildfire-hurricane-risk
- Kawamori, Kentaro, Lubber, Mindy, and Reichert, Tom, (2023). Changing Climate for the Insurance Sector: Research and Insights, ESG Investing Lead, EU- headquartered Insurance Group, PP6-55.

- Kivisaari, E. (2005), Vakuutusala, aktuaari ja ilmastonmuutos. 27 s. (viitattu 2.7.2010).
- Maynard, Trevor, (2008), Climate Change: Impacts on Insurers and How They Can Help with Adaptation and Mitigation, The Geneva Papers, The International Association for the Study of Insurance Economics, 33, PP 140–146.
- Mills, Evan (2009), A Global Review of Insurance Industry Responses to Climate Change. The Geneva Papers Vol. 34: PP323–359.
- Mills, Evan; Richard Roth and Eugene Lecomte, (2005) "Availability and Affordability of Insurance Under Climate Change, December 2005, PP 26-28.
- O'Neill, B., Carter, T., Ebi, K., et al., (2020), Achievements and needs for the climate change scenario framework. Nature Climate Change Vol.10, PP 1074-1084.
- Phelan, Liam, Cameron Holley, Clifford Shearing, and Louise Du Toit (2020) Insurance and climate change. In Routledge International Handbook of Green Criminology, PP. 449-462.
- Ross, Christina, Evan, Mills and Sean, B. Hecht (2007) "Limiting Liability in the Greenhouse: Insurance Risk-Management Strategies in the Context of Global Climate-Change." Stanford Environmental Law Journal, Vol. 26A, PP. 316- 200.
- Schellhas, Christoph, McClellan, Angela, and Giehler, Lena, (2024), How Climate Change Affects Insurance: A 2050 perspective, 2024, PwC Sustainable Finance, PP 8-25.
- Sturm, T, Oh, E. 2010. Natural disasters as the end of the insurance industry? Scalar competitive strategies, Alternative Risk Transfers, and the economic crisis. Geoforum. Vol.41, Issue 1, PP154–163.
- Wagner, Tim, (2008), The Potential Impact of Climate Change on Insurance Regulation, National Association of Insurance Commissioners reports 2008, PP 9-10.
- Westfall, Christopher, (2006), "Insurers Balance Supply and Demand (Surge)." KPMG Insurance Insider, March 17, 2006.
- World Climate Research Program (WCRP), 2021: Paleoclimate Modeling Intercomparison Project (PMIP) URL: https://www.wcrp-climate.org/modelling-wgcm-mip-catalogue/cmip6-endorsed-mips-article/1064-modelling-cmip6-pmip


## Online References:

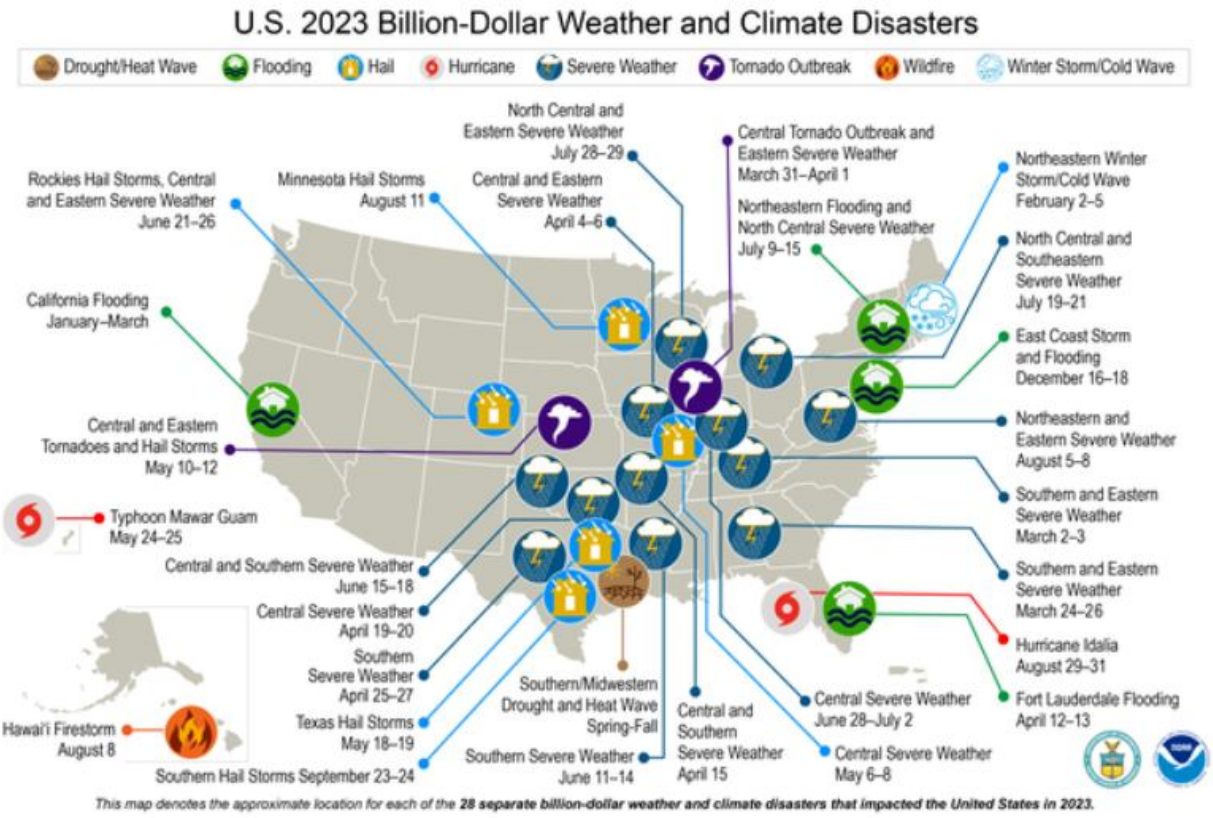

- **National Association of Insurance Commissioners:** https://content.naic.org/sites/default/files/legacy/documents/cipr_potential_impact_climate_change.pdf
- **Aon (2023): Weather, Climate, and Catastrophe Insight 2023: Online resource. Accessed 5 July 2023.** https: getmedi a/f34ec133-3175-406c-9e0b-25cea768c5cf/20230125- weather-climate-catastrophe-insight.pdf
- **Cho, Renee (2022): Online posting. Accessed 5 July 2023. State of the Plane V Columbia Climate School.** https://news.climate.columbia.edu/2022/11/03/with-climate-impacts-growing-insurance-companies-face-big-challenges/
- **Climate Guide.Fi**: https://www.climateguide.fi/articles/the-insurance-industry-is-susceptible-to-the-impacts-of-climate-change#ref_Kiv05
- **NOAA Climate.gov:**

https://www.climate.gov/news-features/blogs/beyond-data/2023-historic-year-us-billion-dollar-weather-and-climate-disasters

- **World Bank: Climate Change Knowledge Portal:** https://climateknowledgeportal.worldbank.org/overview#:~:text=Climate%20change%20is%20the%20significant,change%20from%20natural%20weather%20variability.
- **Center for American Progress (CAP):**
  - https://www.americanprogress.org/
  - https://www.americanprogress.org/article/role-accounting-auditing-addressing-climate-change/
- **Insurance Information Institute:** https://www.iii.org/insurance-basics/life-insurance/shopping-for-insurance-1

**Appendices:**

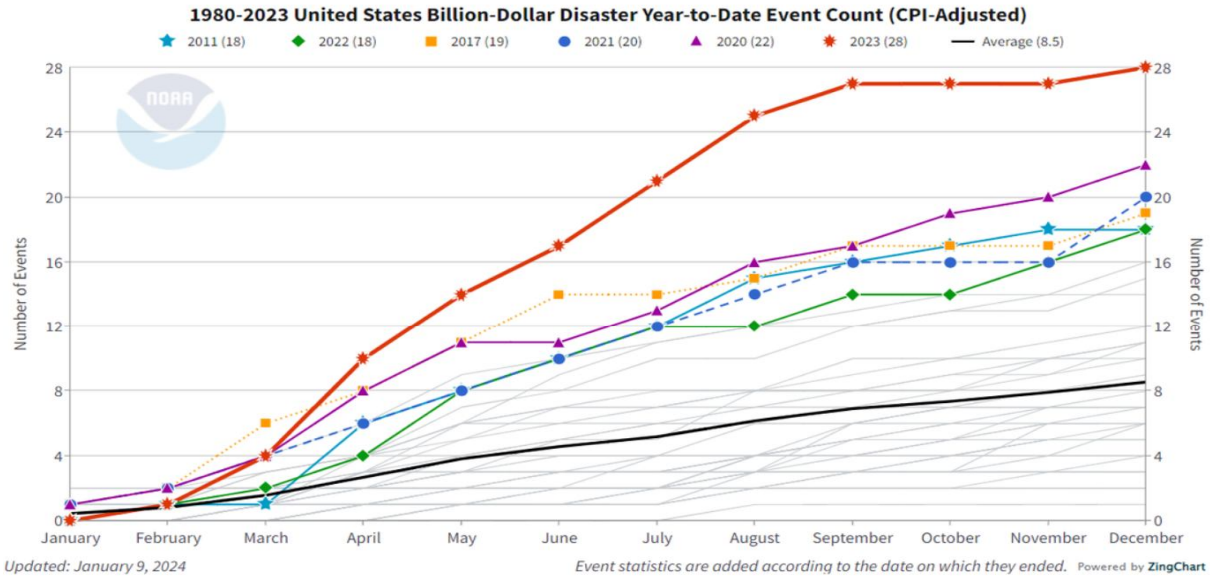
## Appendix A: U.S. 2023 Billion-Dollar Weather and Climate Disasters



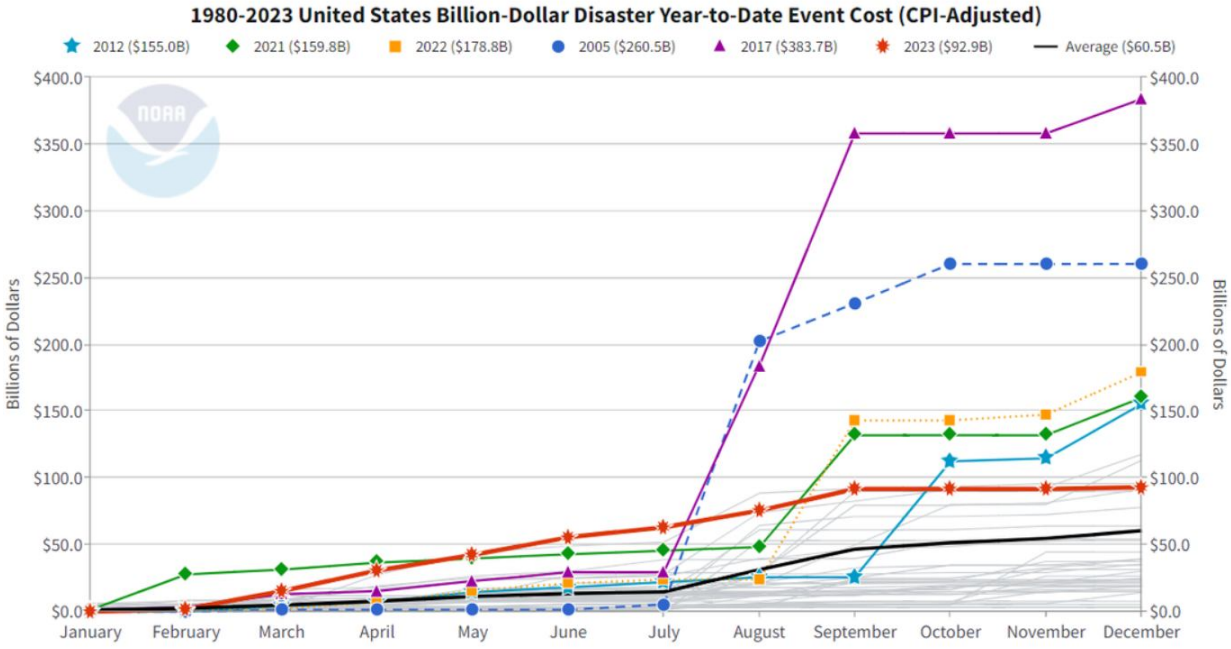

In 2023, the United States experienced 28 separate weather or climate disasters that each resulted in at least $1 billion in damages. NOAA map by NCEI.

**Sources:** National Oceanic and Atmospheric Administration **(**NOAA) Climate.gov, https://www.climate.gov/news-features/blogs/beyond-data/2023-historic-year-us-billion-dollar-weather-and-climate-disasters

## Appendix B: 1980-2023 United States Billion-Dollar Disaster Year to Date Event Count (CPI-Adjusted)



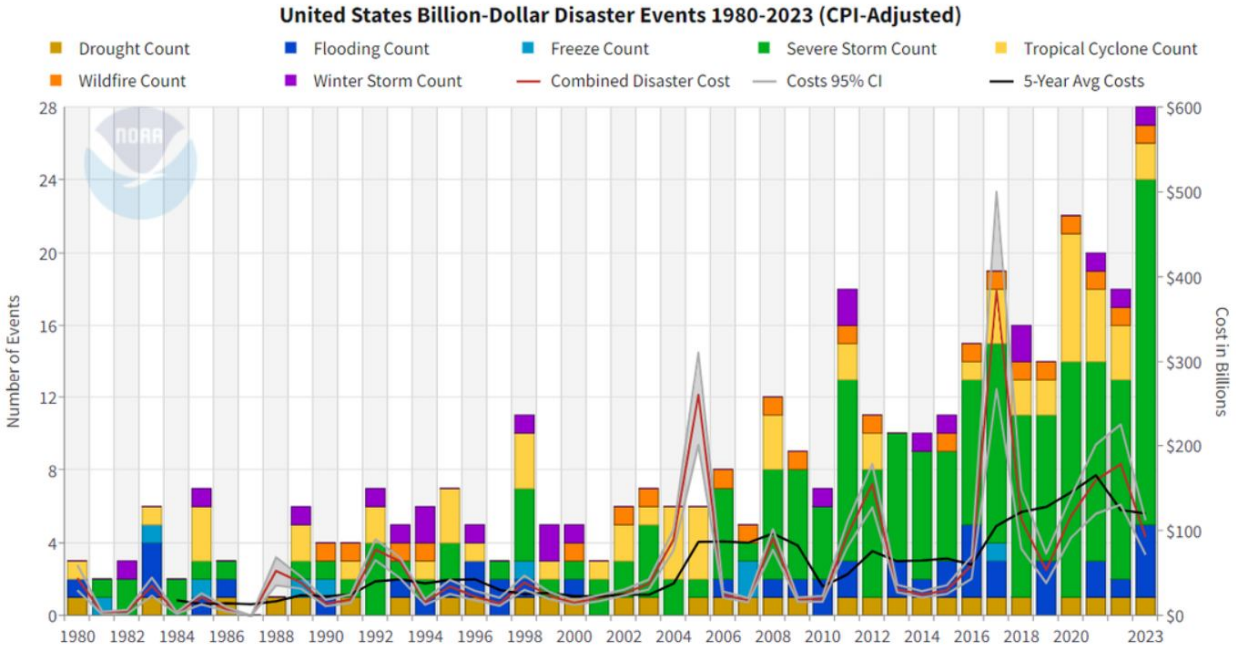

Month-by-month accumulation of billion-dollar disasters for each year on record. The colored lines represent the top 6 years for most billion-dollar disasters. All other years are colored light gray. NOAA image by NCEI.




Month-by-month accumulation of estimated costs of each year's billion-dollar disasters, with colored lines showing 2023 (red) and the previous top-10 costliest years. Other years are light gray. 2023 finished the year in tenth place for annual costs. NOAA image by NCEI.

**Sources:** National Oceanic and Atmospheric Administration **(**NOAA) Climate.gov, https://www.climate.gov/news-features/blogs/beyond-data/2023-historic-year-us-billion-dollar-weather-and-climate-disasters

## Appendix C: United States Billion-Dollar Disaster Events 1980-2023 (CPI-Adjusted)




The history of billion-dollar disasters in the United States each year from 1980 to 2023, showing event type (colors), frequency (left-hand vertical axis), and cost (right-hand vertical axis.) The number and cost of weather and climate disasters is rising due to a combination of population growth and development along with the influence of human-caused climate change on some type of extreme events that lead to billion-dollar disasters. NOAA NCEI.

**Sources:** National Oceanic and Atmospheric Administration **(**NOAA) Climate.gov, https://www.climate.gov/news-features/blogs/beyond-data/2023-historic-year-us-billion-dollar-weather-and-climate-disasters