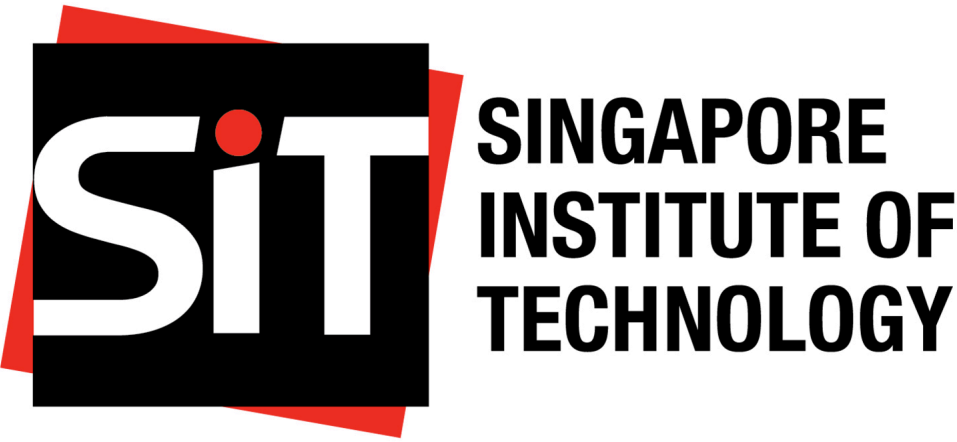


Visualizing Billion-Dollar Disasters in the USA (1980–2024)

Team Oldlace

Oh Jia Wei Darien, Peter Febrianto Afandy, Quek Joo Wee, Desmond Loy Yong Kiat,
Rene Low Yi Xuan, Phileo Teo Weihan (SIT-UoG Computing Science)



INTRODUCTION

<some intro and info on disaster relief fund being drained...>
To highlight the need for enhanced disaster preparedness in the USA, Dottle and Kaufman¹ presented a combined plot visualizing the total estimated costs by disaster type and the frequency of such events from 1980 to 2023. The plot demonstrated the increased frequency of various types of disasters over the years, likely driven by factors such as climate change, along with their escalating financial impact and costs. Coupled with the depletion of the country’s Disaster Relief Fund (DRF), this elucidates the dire need for proactive preparations and mitigations to address the growing threat of such disasters effectively.

PREVIOUS VISUALIZATION

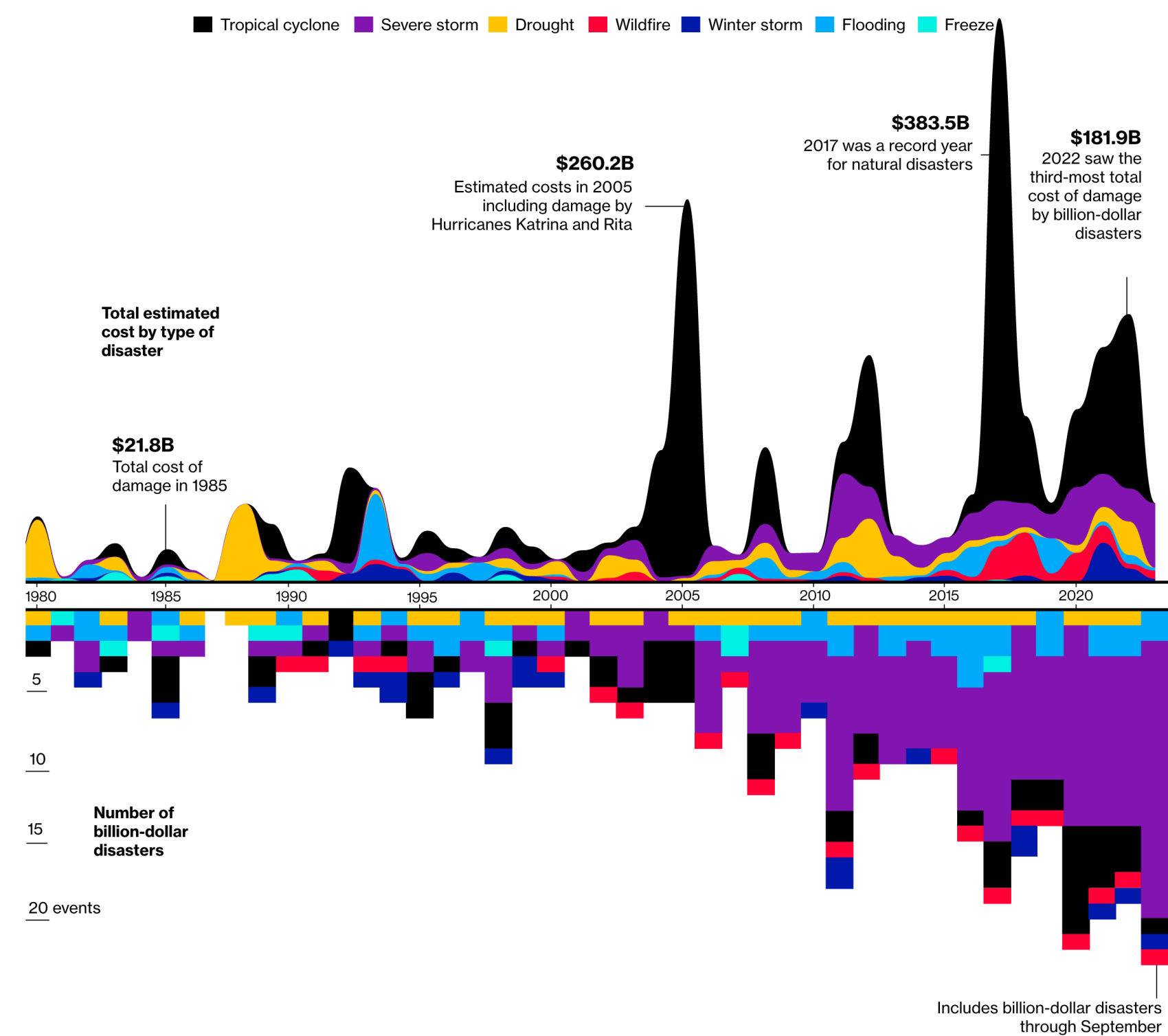


Figure 1: Frequency and Estimated Costs of Billion-Dollar Disasters in the USA by year, published by Bloomberg.

STRENGTHS

- The graph includes a *dual-axis* representation of the frequency and costs of billion-dollar disasters, providing a comprehensive overview of the data with the use of stacked areas and bars.

¹Dottle, R., & Kaufman, L. (2023). Climate Disasters Drain US Emergency Fund, Adding to Government Shutdown Risk. Retrieved from <https://www.bloomberg.com/graphics/2023-fema-disaster-relief-fund-extreme-weather-climate-aid/>

- It includes *annotated descriptions* on certain data points, enhancing the interpretability of the visualisation.
- The timeline shows *clear trends* over the decades, highlighting the increasing frequency and costs of natural disasters.

SUGGESTED IMPROVEMENTS

- Split the visualisation into two separate plots* to better highlight the trends in frequency and costs of billion-dollar disasters.
- Enhance the color palette* to improve readability and distinguish between different disaster types.
- Group disaster types* together to provide a clearer overview of the data.

IMPLEMENTATION

Data

- Frequency and estimated cost for each disaster type is obtained from the National Centers for Environmental Information (NCEI).²
- Consolidated data with NCEI USA to obtain more detailed information on each disaster specific to the United States.[[^]ncei_usa]
- Combined individual disaster types into broader disaster categories for better visualisation and capturing of trends.
- Combined data from each disaster category into 5-year intervals for better visualisation of trends.

[[^]ncei_usa] : <https://www.ncei.noaa.gov/access/billions/state-summary/US>

Software

We used the Quarto publication framework and the R programming language, along with the following third-party packages:

- tidyverse* for data transformation, including *ggplot2* for visualization based on the grammar of graphics
- knitr* for dynamic document generation
- scales* for data transformation and visualization
- patchwork* for combining multiple plots
- dplyr* for data manipulation

FURTHER SUGGESTIONS FOR INTERACTIVITY

Since the visualization is intended for a poster, we could include features such as *hover-over tooltips* to display detailed information, *interactive legends* where users could click to highlight specific disaster types and *zoom and pan* to allow users to closely examine selected areas of the visualisation. This enhances user engagement and provides a more interactive experience.

IMPROVED VISUALIZATION

²<https://www.ncei.noaa.gov/access/billions/time-series>

Frequency and Estimated Costs of Billion-Dollar Disasters in the USA (1980-2024)

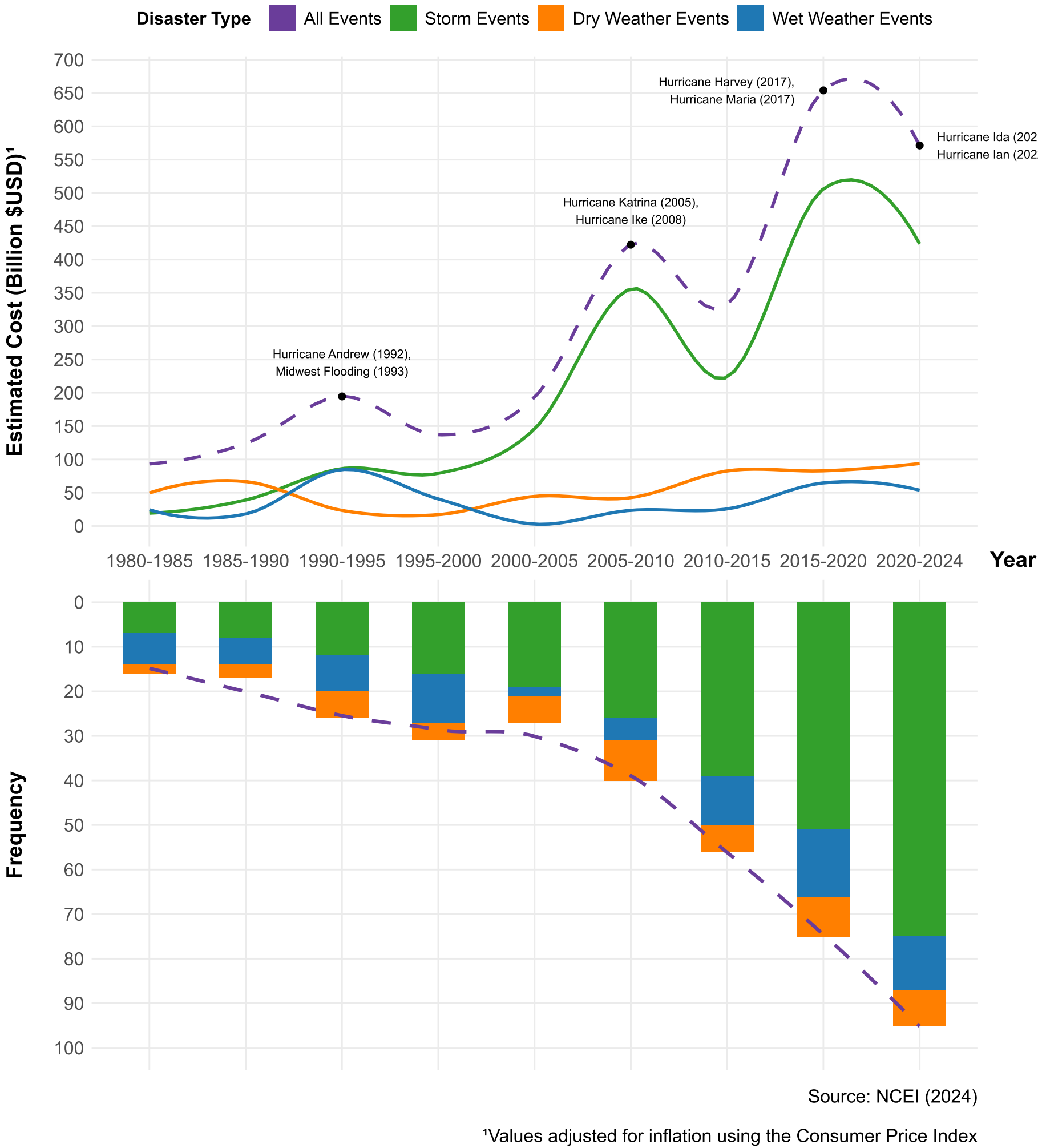


Figure 2: Revised Visualisation of Frequency and Estimated Costs of Billion-Dollar Disasters in the USA by year.

CONCLUSION

The revised visualization of billion-dollar disasters in the USA improves clarity and accessibility by separating frequency and cost data, enhancing the color palette, and grouping disaster types. These improvements highlight the increasing impact of the disasters alongside with the escalating costs over the years. By providing a more detailed and visually appealing representation of the data, the revised visualization conveys the urgency for enhanced disaster preparedness.