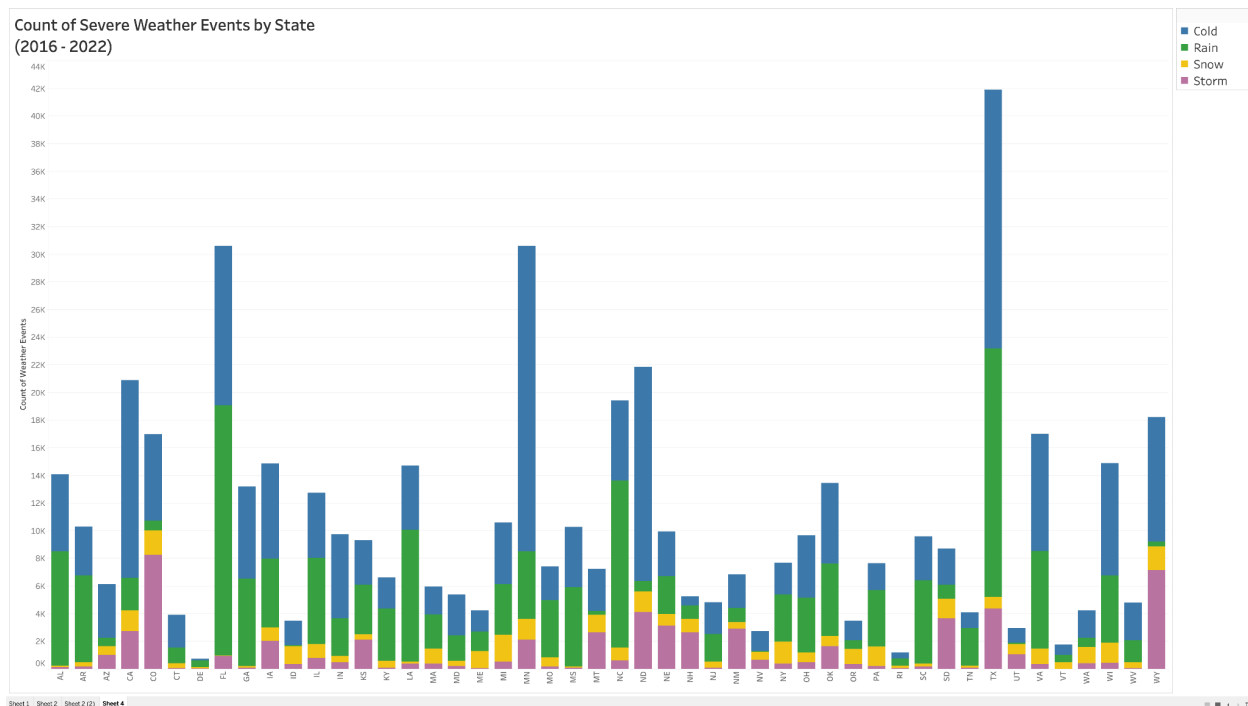# Exploratory Visualization

Timothy Majidzadeh, James Venter

Summer 2024: W209 Section

Hypothesis 1: No part of the United States is truly insulated from the harmful effects of climate change. Harmful effects are already present and widespread across the entire US.

What's informative about this view: This view shows the total number of Severe Weather events for each state between the years 2016 and 2022. We see the type of event broken out by color across "cold", "rain", "snow", and "storm". Texas stands out as having the highest number of events, greatly exceeding that of smaller states such as Rhode Island, Delaware, and Vermont.

What could be improved about this view: It became clear through this view that our dataset excluded several major categories of weather events that are especially relevant when assessing the impact of climate change. These include wildfires, floods, and tropical storms. Adding this additional level of data would greatly improve our ability to evaluate the first hypothesis.

In addition, the stacked bar chart is not as engaging and immediately interpretable as other options. We aren't able to quickly understand how states relate to each other in size and geographic position, which will likely be relevant to this analysis.
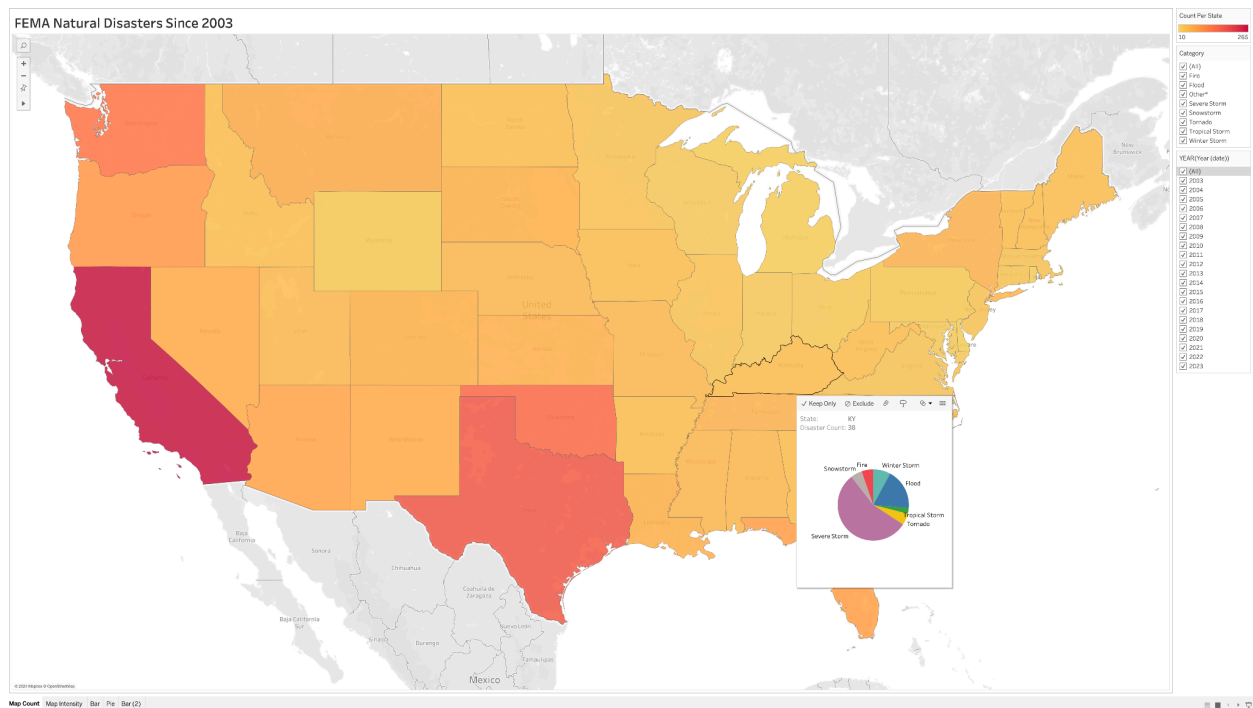
What's informative about this view: This view uses data from the Federal Emergency Management Agency (FEMA). It captures all weather related disasters declared by FEMA since 2003. It is a more comprehensive set of climate disasters, which include fire, flood, tropical storms, and tornados.

We also see the data represented on a map which allows us to see the relative size and location of states. Shading gives a sense for how many disasters have occurred in each state over the given time period. Using the tooltip function we're able to see how the mix of disaster types varies across states (e.g. California's disasters are made up of a high proportion of wildfires, while Florida has a high proportion of tropical storms). We also see that California and Texas have the highest count of disasters as indicated by the darker shades or orange.

What could be improved about this view: In this view large western states tend to have darker colors and smaller eastern states lighter colors. This is primarily due to the fact that large states tend to have more overall disasters purely because they cover a greater area. Choosing a metric other than raw count may provide greater insight.
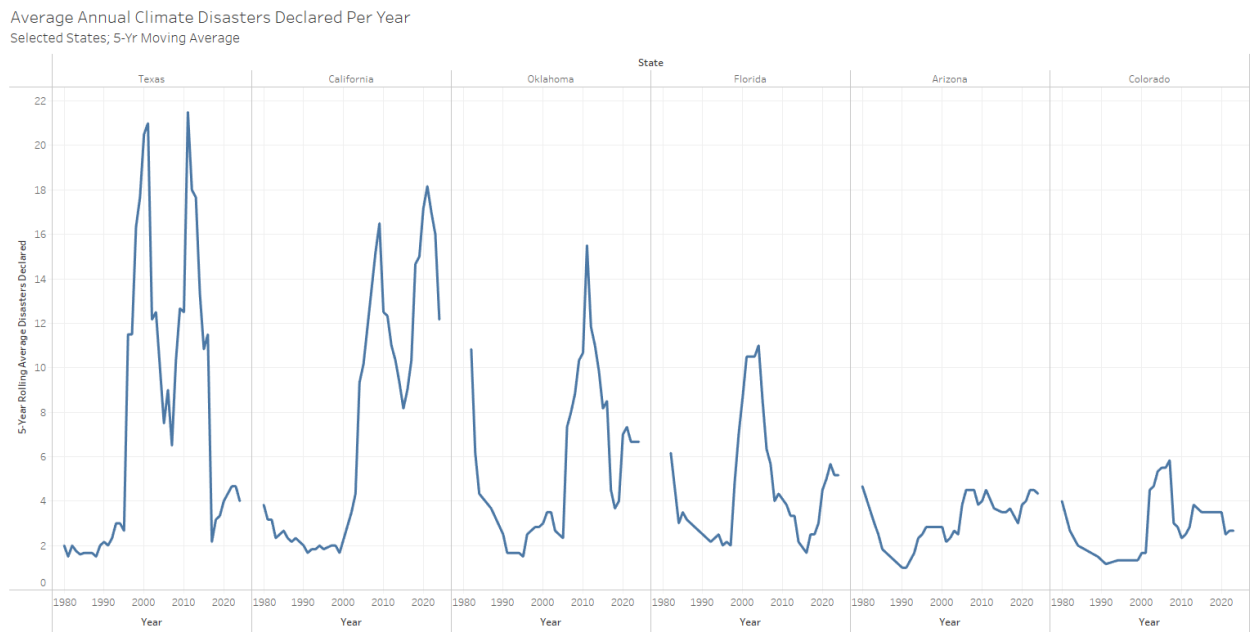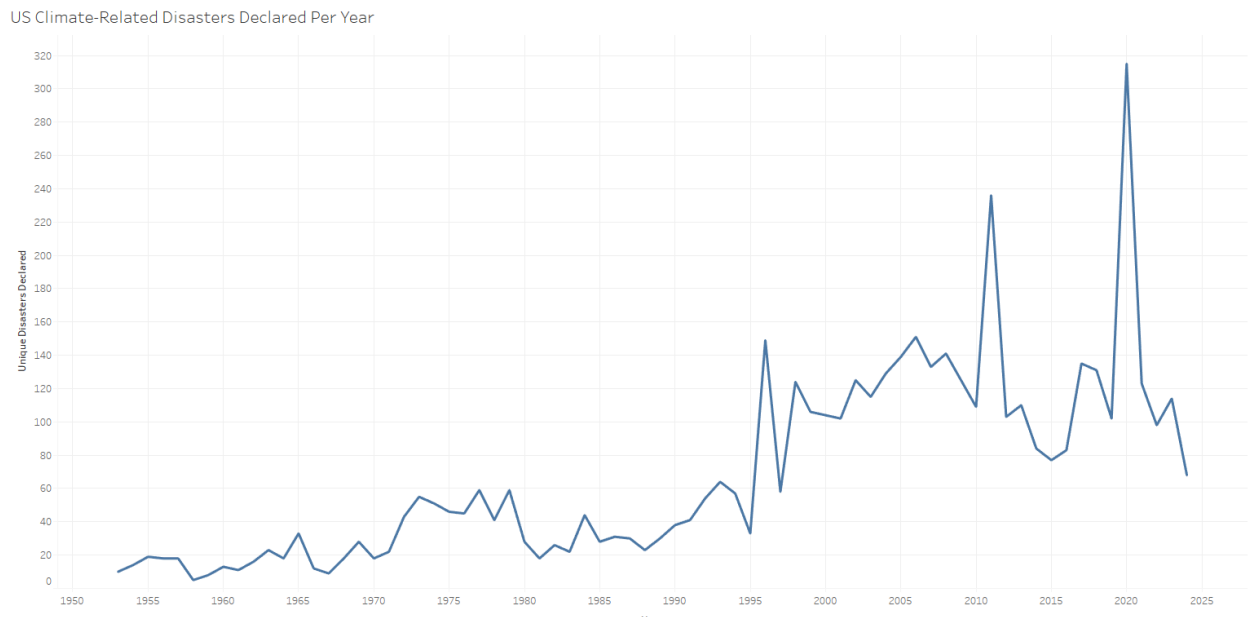
FEMA Natural Disasters Since 2003
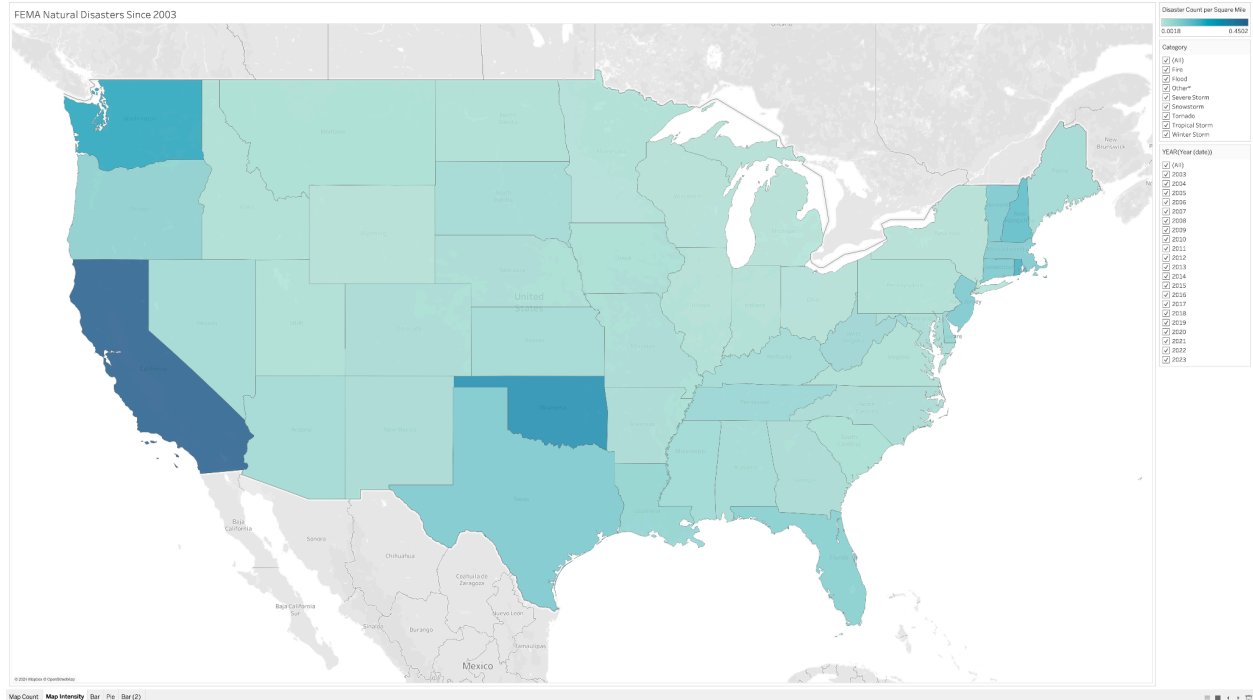
What's informative about this view: In this view we have used a derived variable, "intensity" which captures natural disasters per square mile for each state. In this view we can see that California not only has the highest count of natural disasters as noted above, but also the highest intensity. We also see that several Northeastern states, including New Hampshire and Rhode Island, have a high intensity despite having a small number of disasters.

What could be improved about this view: In this view it is difficult to see trends over time. Incorporating some type of animated view over time could help us gain a better understanding for how trends across the country are changing with time.

Conclusion: The data is mixed for our hypothesis. We clearly see that there have been a large number of weather related disasters over the last 20 years in every state. Effects have not been evenly distributed across states though. States in the West (California and Washington) and states in the center of the country (Oklahoma and Texas) appear to have experienced more disaster intensity than other regions, such as the upper midwest and great lakes region.

Hypothesis 2: Natural disasters have become increasingly more common across the US in the last 50 years.

US Climate-Related Disasters Declared Per Year

Average Annual Climate Disasters Declared Per Year
Selected States; 5-Yr Moving Average

Hypothesis 3: Costs from climate related natural disasters have increased over the last 40 years.

Total Annual Cost of Billion Dollar Natural Disasters Since 1980

Total Annual Cost of Billion Dollar Natural Disasters Since 1980
with 3 Year Moving Average