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Big Data Project Findings

For my analysis, I aimed to determine if any potential wildfire hotspots would appear in the near future. In order to do this, datasets were obtained from the NIFC (National Interagency Fire Center) in order to determine how wildfire frequency and damage have changed in each state in the past decade.

It was found that wildfire frequency across the United State has been increasing in the past decade. The west coast states have had consistently had the highest fire counts, and have been consistently increasing; ~2500 wildfires occurred in California in 2015, and > 10,000 fires per year have been reported in the state since 2020. Although fire and fire damage was generally localized to mostly the west coast in the past, fire frequency has been gradually increasing in states east of it in the continental US; in 2021, midwestern states have had fire counts similar to those found in West Coast states in 2014 and 2015.

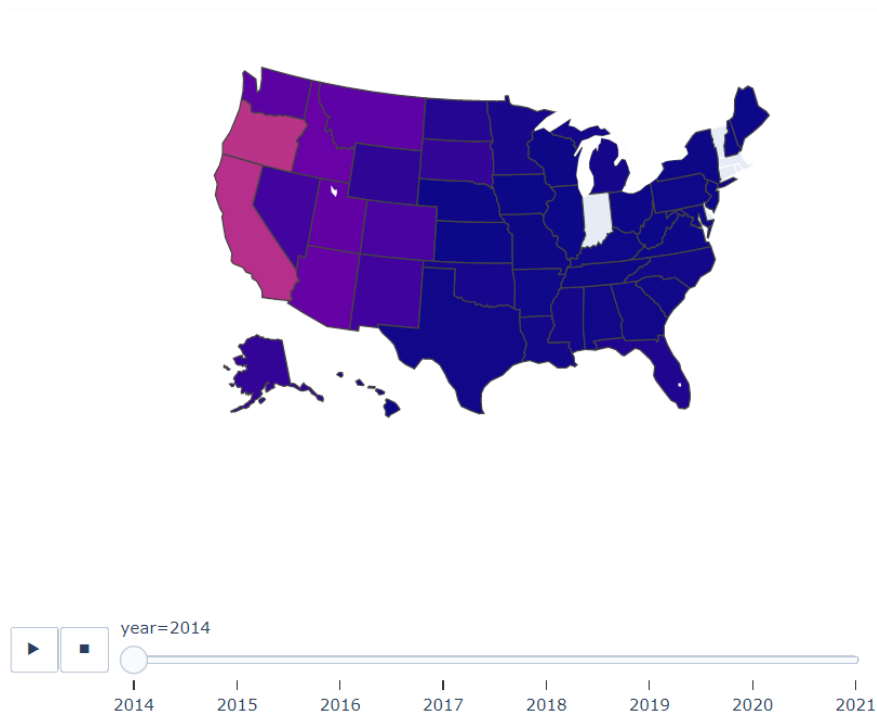


Figure 1. Fire Frequency Per State Across the United States in 2014.

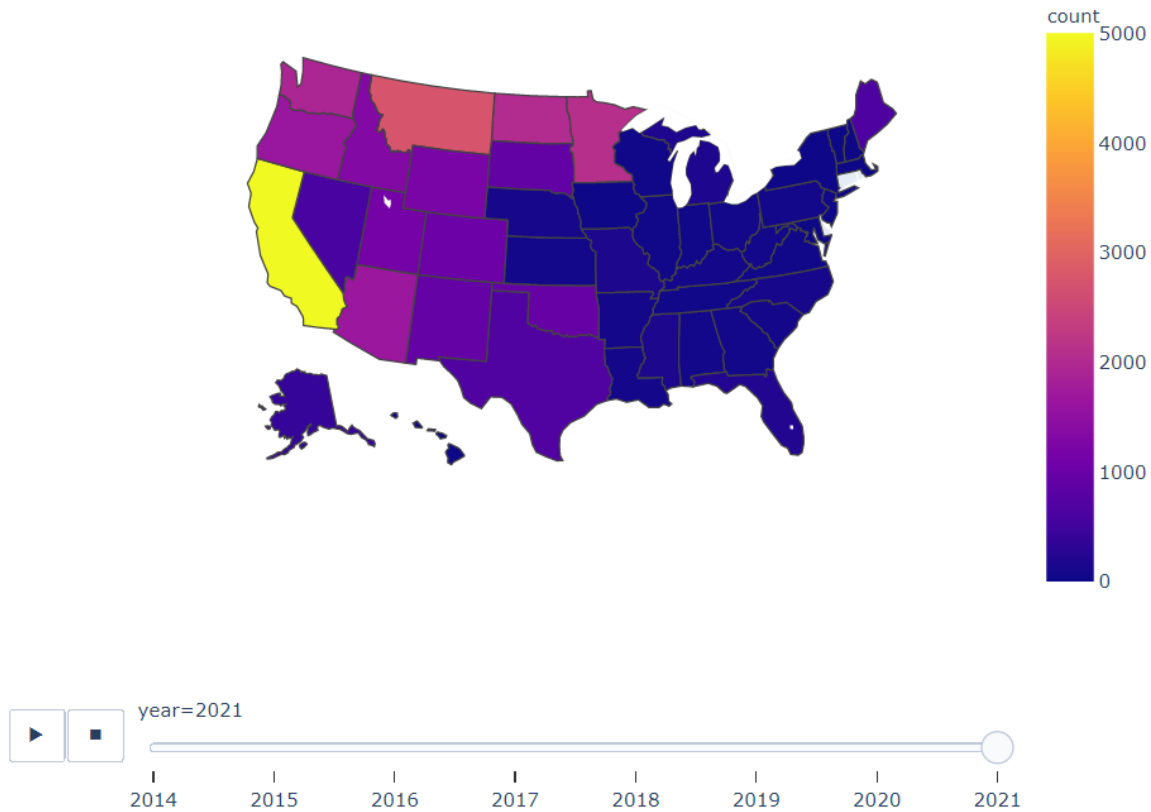


Figure 2. Fire Frequency Per State Across the United States in 2021.

It was also found that the number of recorded fires did not necessarily correlate with the area affected for each state. While the degree of fire coverage has remained relatively consistent, the distribution of burned area across the United States has changed over the years. In the early 2000s, the majority of wildfire area was almost entirely localized to Alaska and the West coast; by 2021, the majority of the US had seen more than minimal fire coverage.

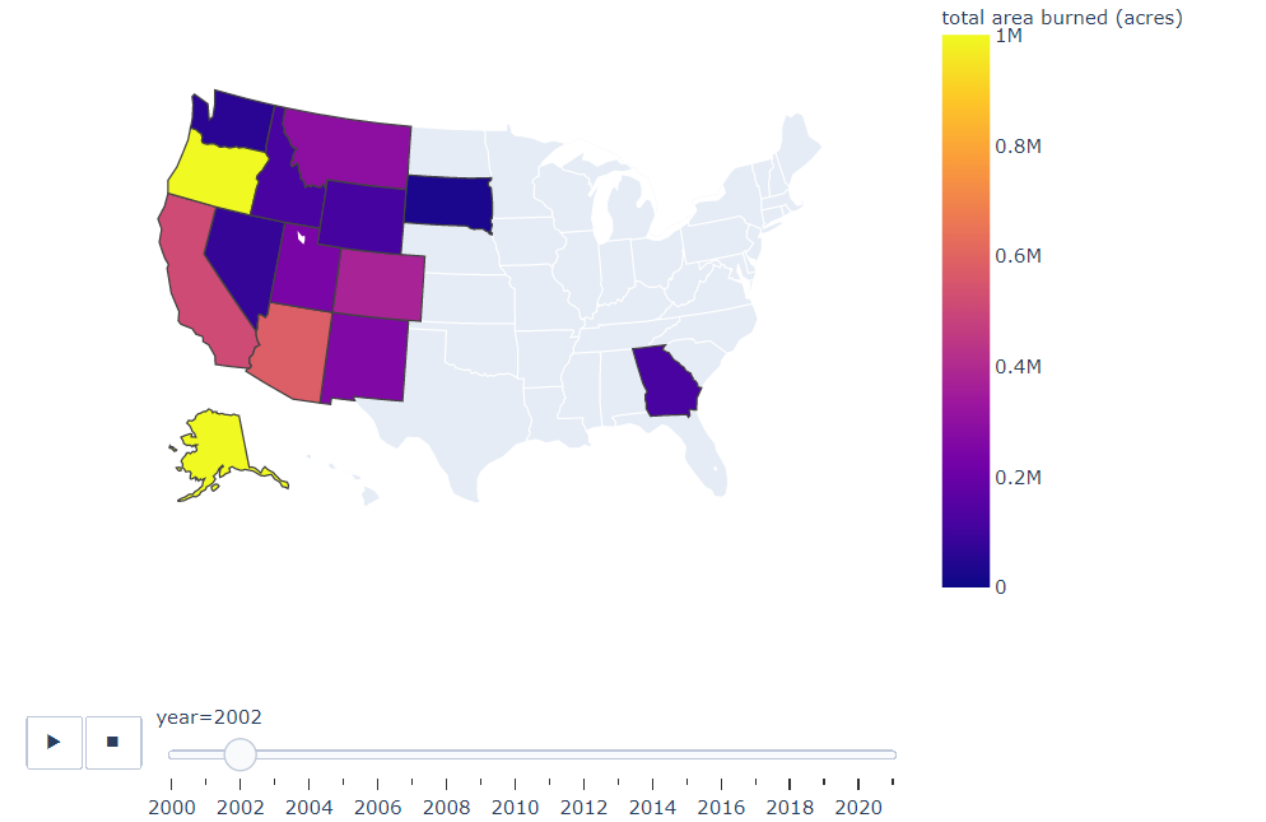


Figure 3. Distribution of Reported Acres Burned Across the United States in 2002. Note that uncolored states had minimal or no reported acres burned.

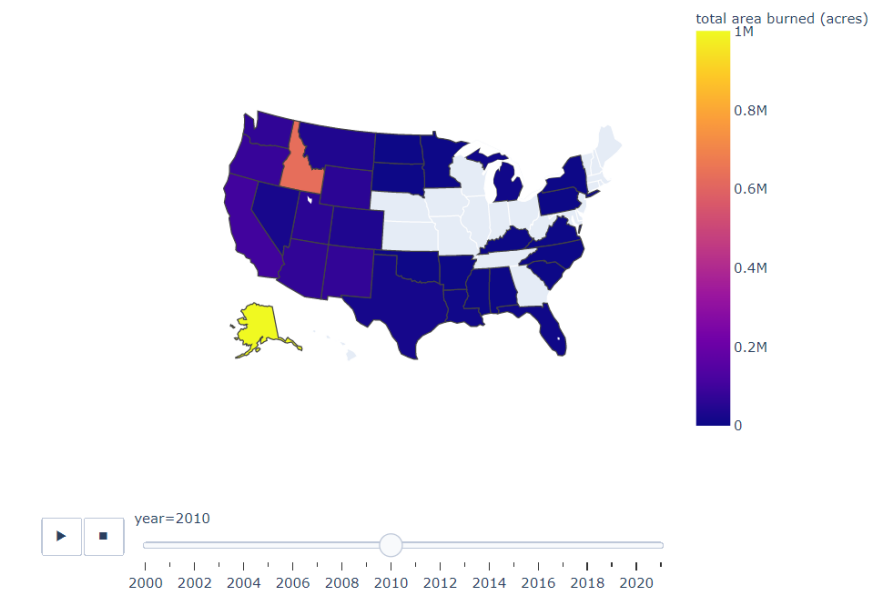


Figure 4. Distribution of Reported Acres Burned Across the United States in 2010.

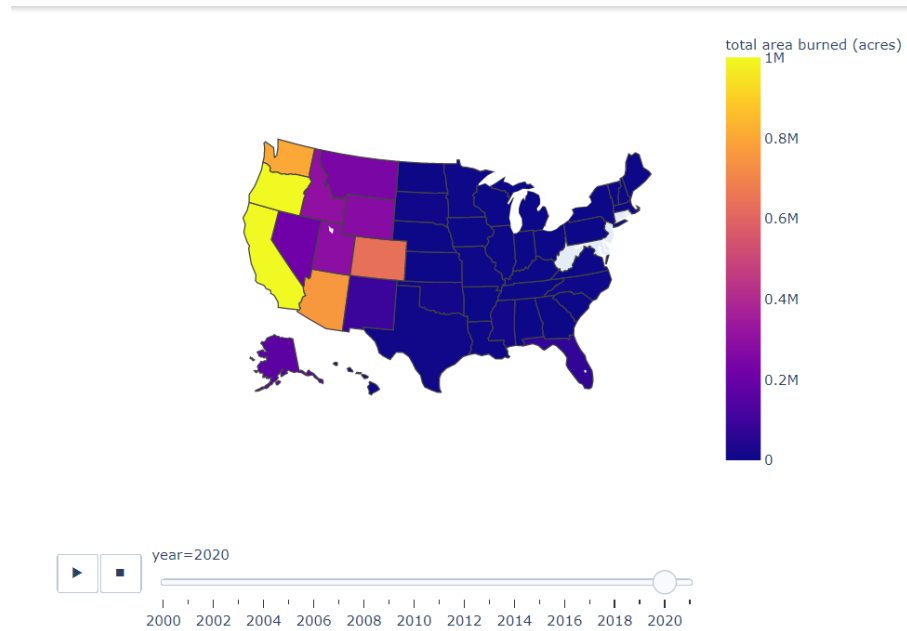


Figure 5. Distribution of Reported Acres Burned Across the United States in 2020.

To gain more information about how wildfires have proportionally affected each state, an analysis of wildfire damage in each state was conducted. Taking into account the area of each state, wildfire damage was calculated as the area of land burned by wildfire over the area of the state.

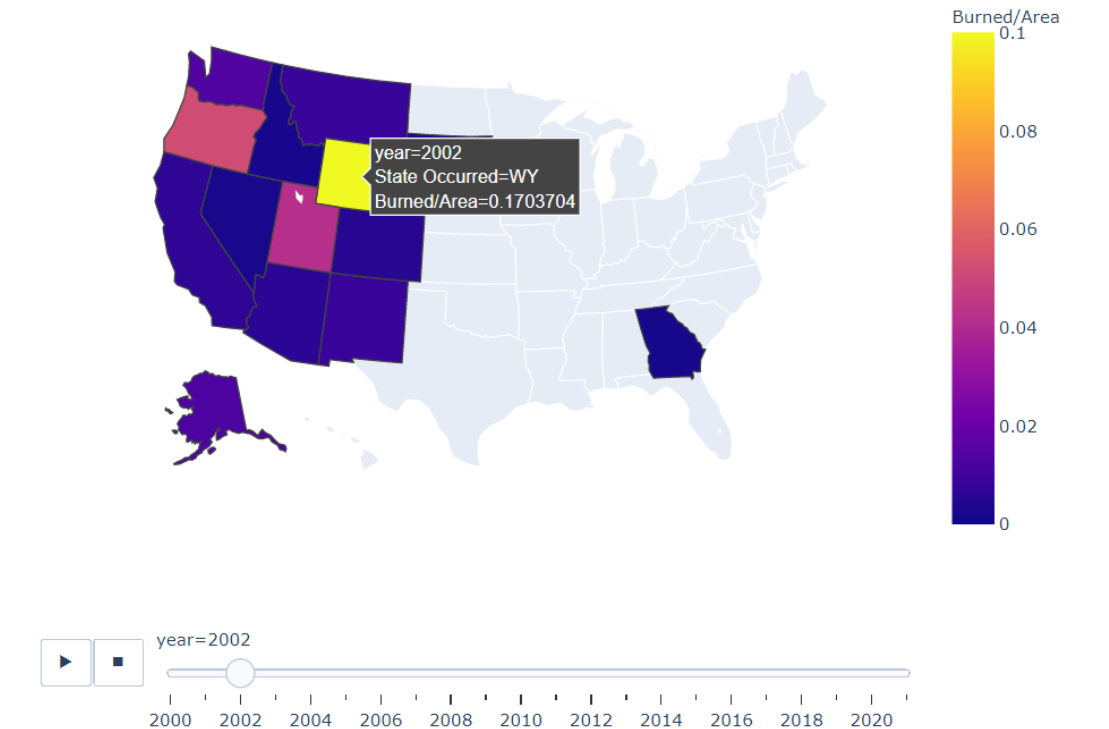


Figure 6. Distribution of Wildfire Damage across the United States in 2002.

When comparing figure 6 to figure 3, there are noticeable differences in the distribution and prominence of certain states; although Alaska had a significant quantity of acres burned, it was small in proportion to the size of the state. Instead, Wyoming saw damage roughly equal to ~17% of the state's area.

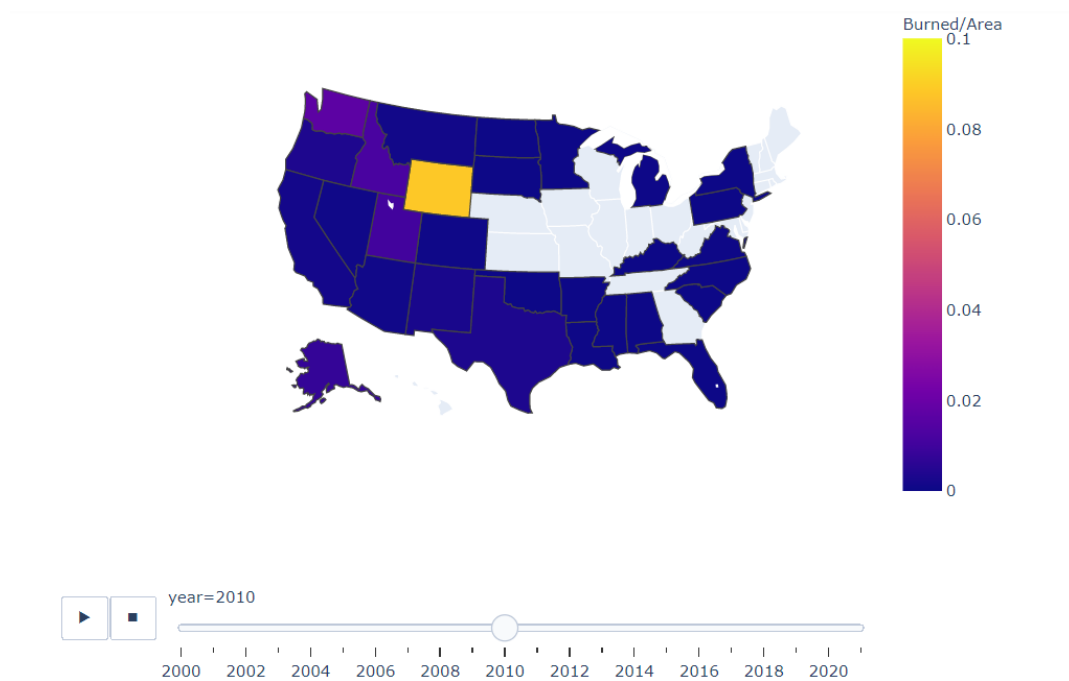


Figure 7. Distribution of Wildfire Damage Across the United States in 2010.

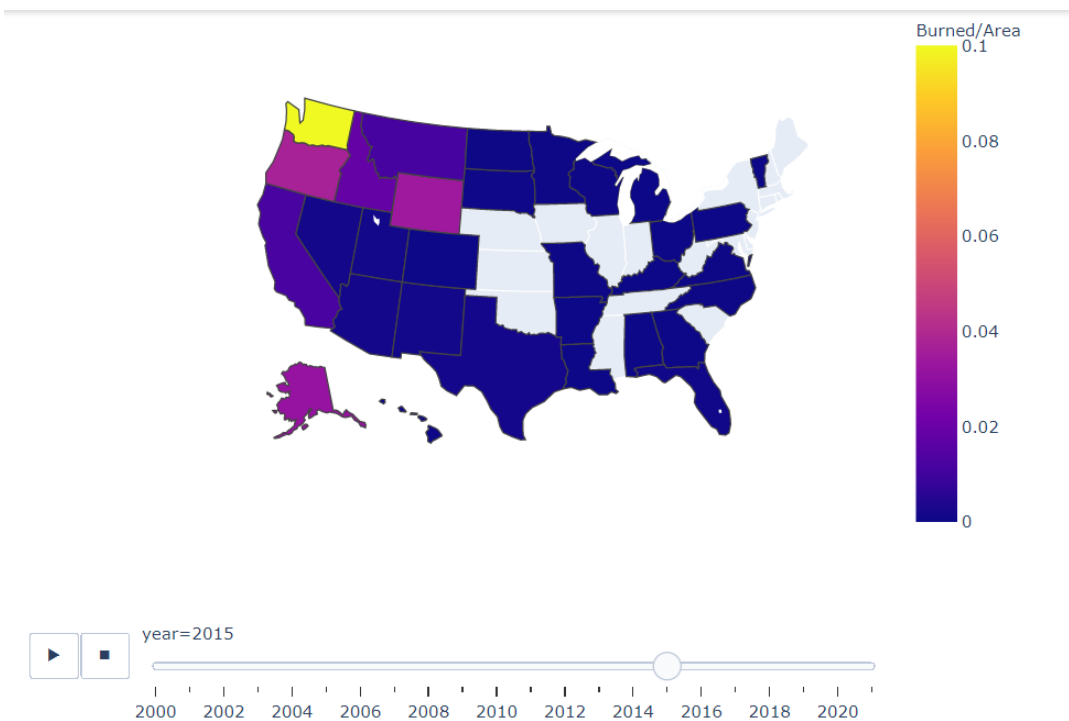


Figure 8. Distribution of Wildfire Damage Across the United States in 2015.

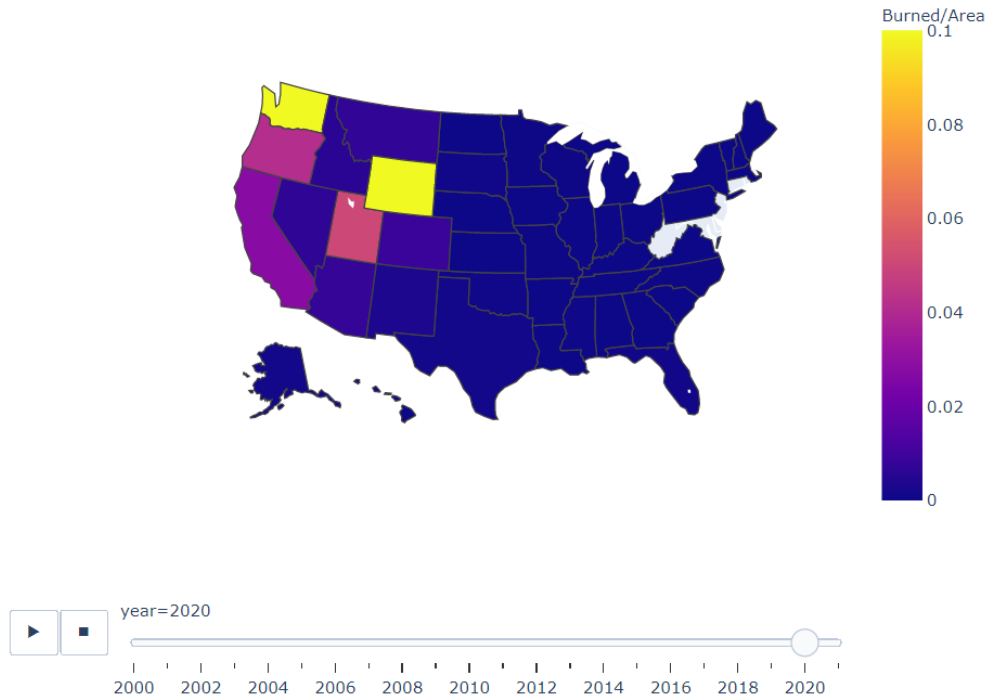


Figure 9. Distribution of Wildfire Damage Across the United States in 2020.

Figures 7-9 indicate a steady increase in wildfire damage on the West Coast and the notable high damage present in Wyoming since 2002. It should be noted that the higher fire frequency in the midwest has not necessarily led to a higher fire damage, but some differences could be due to separate datasets used for the visualizations.

Throughout the past decade, the west coast has had a relatively high fire frequency, quantity of acres burned, and more recently, fire damage; due to this, it is predicted that states such as Washington, Oregon and California will continue to remain hot spots in the near future. Similar prediction could be made for Wyoming, which has slowly been increasing in fire frequency and consistently has some of the highest fire damage in the country. Although the midwest has seen increased fire frequency, the low damage present in the region makes hot spots less likely to occur. Outside of predicted hot spots, the United States has generally seen an increase in wildfire activity.

