Wildfires, Climate Change and Population Dynamics in U.S.

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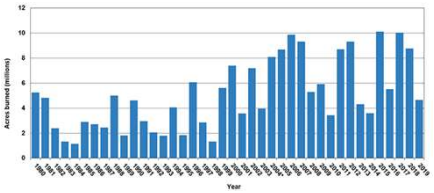
INTRODUCTION

Wildfires are unplanned and unwanted fires, including lightning-caused fires, unauthorized human-caused fires, and escaped prescribed fire projects.

For the United States as a whole, the total number of acres burned by wildfires has been ticking up in recent decades (see figure 1). From 2000 to 2018, wildfires burned more than twice as much land area per year than those from 1985 to 1999.



In 2019 there were 50,477 wildfires and 4.7 million acres burned (see figure 2). About 4.5 million U.S. homes were identified at high or extreme risk of wildfire, with more than 2 million in California alone.

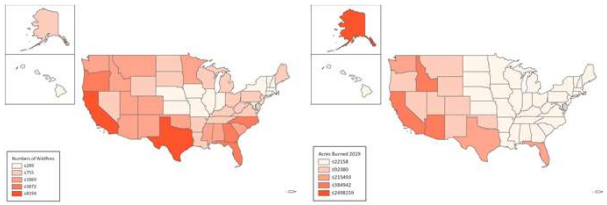


Figure 2: a) Numbers of Wildfires 2019, b) Acres Burned 2019

GOALS

1. Climate change has increased the vulnerability of many U.S. forests. Of particular concern is the potential for increased fire frequency and intensity as the result of warmer temperatures and severer drought.

2. Climate change is not the only thing. Human-caused ignitions are indeed responsible for over 97 percent of the wildfires, as they increasingly encroach on the forest.

This poster will include maps to visually compare their spatial patterns and then explore the relationship between wildfires, climate change and population dynamics in U.S.

RESULTS

1. Climate Change

In summer 2019, above-average temperatures spanned from the West Coast to the Southwest and into the Deep South, as well as from the Gulf Coast to New England.

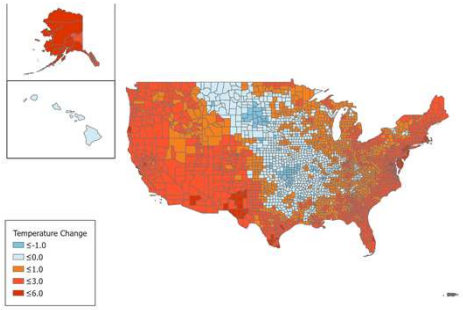
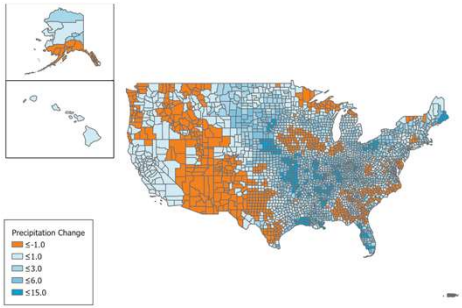


Figure 3 : Temperature Change June-August by County 1901-2019



Below-average precipitation stretched from California to Texas and across Iowa and upper Michigan.

Figure 4 : Precipitation Change June-August by County 1901-2019

The combination of warmer temperature and Reduced precipitation contribute to drought conditions (figure 5) as exceptional drought clustered in western and southwest U.S.

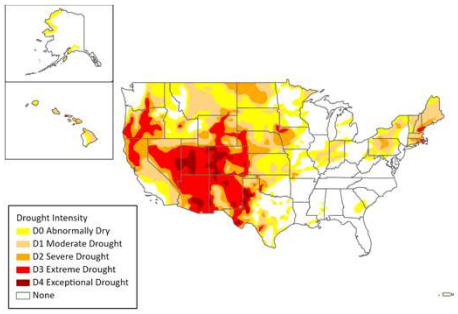


Figure 5: U.S. Drought Monitor 2019

2. Population Change

From 2010 to 2018, the total United States population increased by 6%. Of 3,142 counties shown (figure 6), 1,489 experienced growth, while 1,653 saw a decline.

Across the nation, there is clearly an uneven pattern of population change. Rockets of growth are mostly observed in fire prone regions, associated with hot and dry climate.

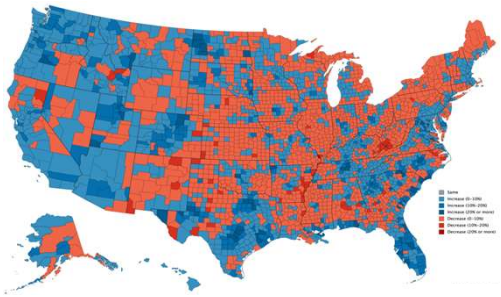


Figure 6: Percent of Population Change by County 2010-2018

CONCLUSIONS

As shown on the figure 1-6, areas of high severity of wildfire events, drought conditions and positive population growth are largely overlapped.

It is reasonable to speculate that people are now moving to warmer places where rising temperature evaporates most moisture from the ground. Then increasing human activities, such as accidental ignitions, further exacerbate the vulnerability of forests under dry climate.

REFERENCES

1. U.S. Census Bureau (USCB)
2. The National Interagency Fire Center (NIFC)
3. United States Environmental Protection Agency (EPA)
4. National Centers for Environmental Information (NOAA)