A wildfire is a fire that usually starts by itself in a wild area and spreads rapidly, causing great damage.

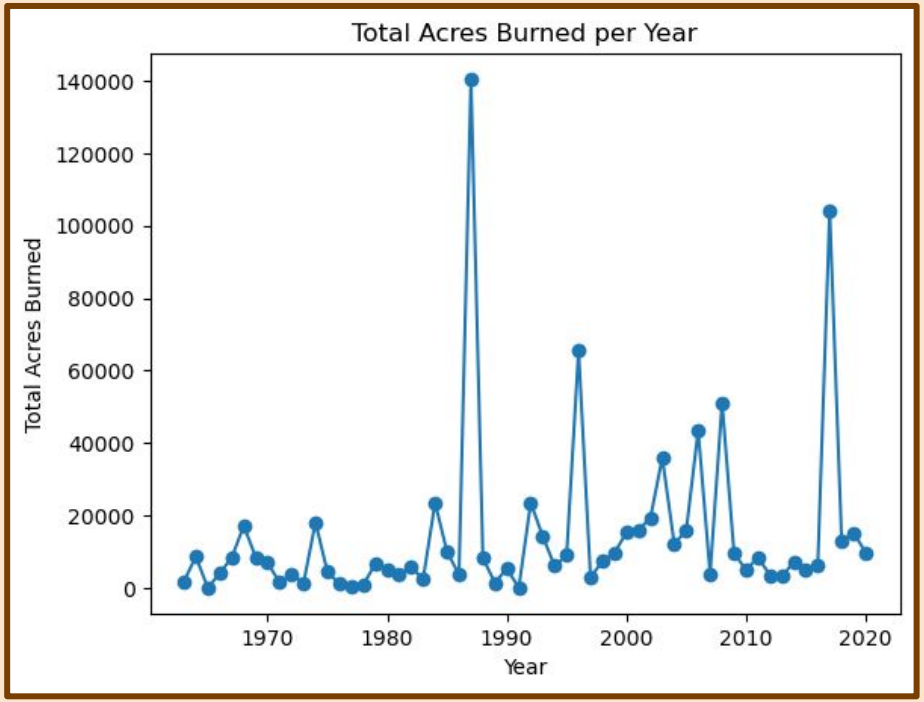
National Centers for Environmental Information reported alarming wildfire statistics for 2022 alone!

- **67000 wildfires burned over 7 million acres**
- **4500 people dead, 15000+ injured**
- **$18 billion USD worth property damage**

- **76,139 properties in Merced have some risk of being affected by wildfire over the next 30 years.**

- **This represents 85% of all properties in Merced County!**

POV - I was curious about the spike in 1987



The National Park Service Wildland Fire Report of 1987

- The 1987 fire season was highlighted by the largest mobilization of personnel and resources to western fires in modern history.
- In 1987 alone, ~72k wildfires reported burning ~2.5 million acres

Contribution of poor air quality to premature deaths

- **Respiratory and Cardiovascular Effects**
  Exacerbates respiratory conditions

- **Exposure to Fine Particulate Matter (PM 2.5)**
  Prolonged exposure to PM 2.5 is associated with increased mortality rates

- **Compromised Immune Function**
  Makes individuals more susceptible to infections

- **Long-Term Health Impact**
  Poor air quality is responsible for development of chronic respiratory conditions

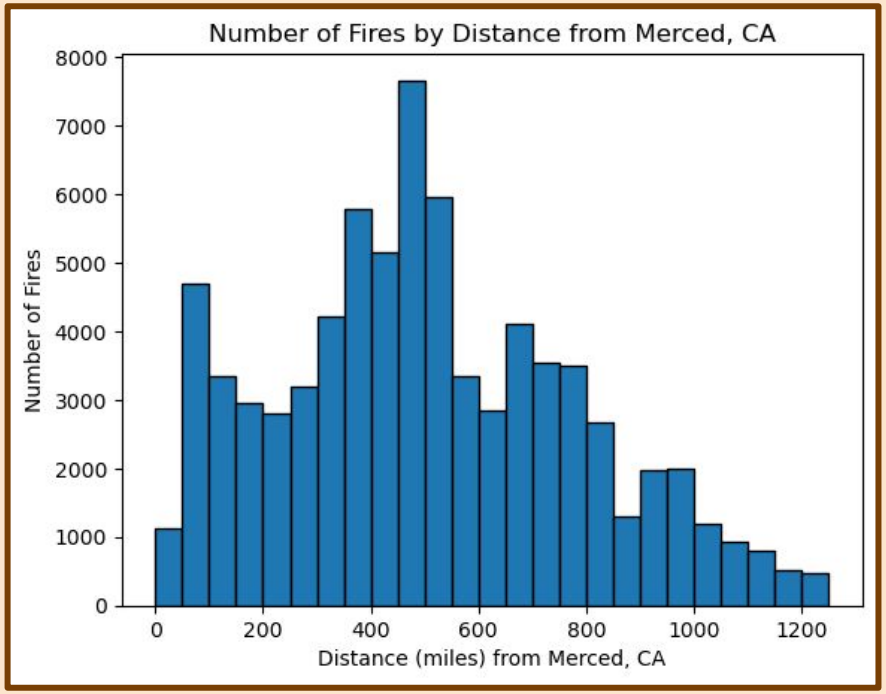
Importance of mitigating premature deaths

Premature deaths refer to fatalities that occur before the expected lifespan based on statistical or demographic norms. Air pollution alone is associated with 6.7 million premature deaths annually.

- **Human Impact**
  Causes emotional distress and disrupting the social fabric.

- **Societal Contribution**
  Loss of potential contributors to societal socio-economic growth.

- **Economic Consequences**
  Potential disruption to the labor force can have long-term economic impacts on communities and regions.

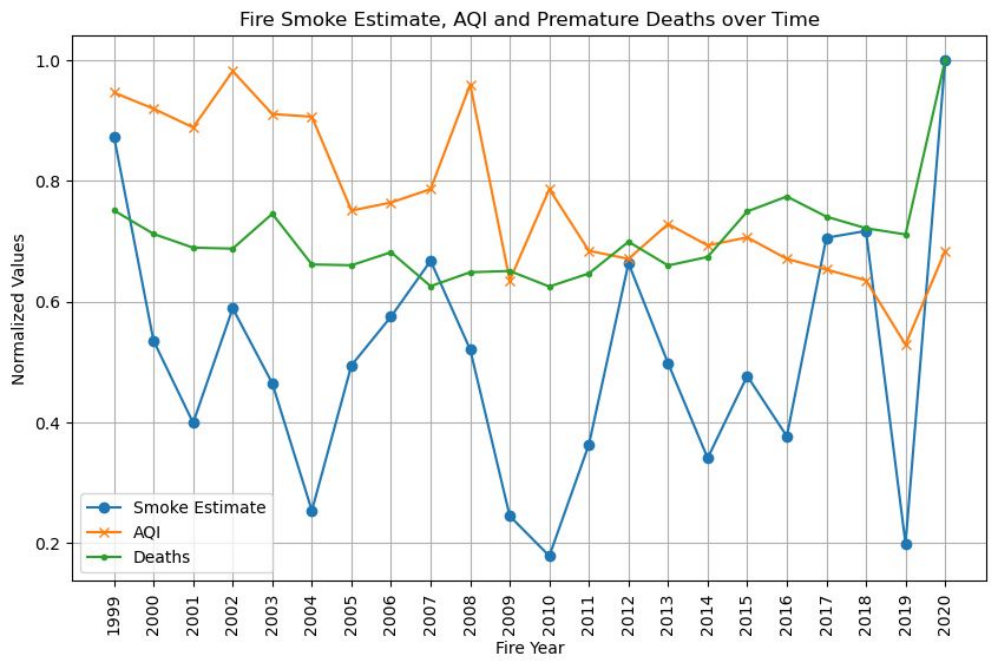


Where do maximum number of fires contributing to pollution in Merced occur?

A large number of fires in 350-500 mile radius from Merced, CA

On investigation, I saw that near Merced, areas around cities like Los Angeles and Riverside are most susceptible to fires.

Guess what? They lie in that exact radius from Merced i.e. 350-500 miles.



I had hypothesized that the AQI in a region is directly proportional to the number of premature deaths. While it was intuitively clear, the time series graphs confirmed it.

I collected data from Federal Economic Reserve Data bank, drilled down to county level. Data is available from 1999-2020. The units of measurement is number of premature deaths per 100k population. The graph conforms to the trend that premature deaths have been increasing over the years due to deteriorating air quality.

Important to consider confounding variables!

- **Socioeconomic Status**
  Individuals with lower socioeconomic status may be more exposed to air pollution facing higher risks of premature death due to limited access to healthcare, education, and other resources.

- **Occupational Exposure**
  People working in certain industries may have higher exposure to occupational pollutants, which could contribute to premature deaths independently of general air pollution.

- **Health Behavior**
  Lifestyle choices such as smoking, diet, and physical activity can influence both individual health and susceptibility to air pollution-related health effects.

- **Pre-existing Health Conditions**
  Individuals with pre-existing health conditions may be more vulnerable to the health effects of air pollution.

Important to consider confounding variables!

- **Genetic Factors**
  Genetic predispositions may affect an individual's susceptibility to the health impacts of air pollution, potentially influencing premature mortality.

- **Urbanization and Built Environment**
  Urban areas may have higher pollution levels, but they also offer different healthcare infrastructure, social support systems, and living conditions that can affect premature death rates.

- **Psychosocial Stressors**
  Chronic stressors, such as noise pollution or psychosocial stress, could contribute to health problems independently of air pollution.

- **Migration Patterns**
  Migration patterns may introduce variability in exposure levels, as individuals moving from rural to urban areas may experience changes in air quality.

Policy recommendations for community wellbeing

- Prevention and Education
- Vegetation Management
- Early Detection and Monitoring
- Emergency Planning
- Community Resilience
- Research and Innovation
- Climate Change Mitigation