

### Introduction

- The ultimate goal for this project is to create an alert system for top retailers if the PM 2.5 level increases over a specific threshold due to a forest fire and to prevent false alarms.
- The business objective for this forecasting model is to prevent losses to top retailers during wildfires, increase revenue, and to alert customers and suppliers regarding blocked routes to and away from top retailer.
- Our project scope focuses on wildfire prone areas in California, and within, the scope is narrowed to the top 5 counties within California.
- The existing limitations might be that we cannot predict wildfires at every specific top retailer location, no live data is provided, and the data needs to be streamlined as much as possible.

### Research Methodology

- We utilized public data such as data from government websites, air quality websites, and existing public research data.
- We combined the top 5 counties with the most top retailers and wildfires occurrences.
- We cleaned the data and interpolated the PM2.5 and wildfire data on to the map to view the correlations and establish the need to integrate the data further into the model. This should look like Figure 1.
- For the data collected, we used a statistical model formula to implement the data through R (Purdue Anvil) and build constraints for our model that includes, spline functions, smooth periodic spline functions, autoregressive error, and other variables.

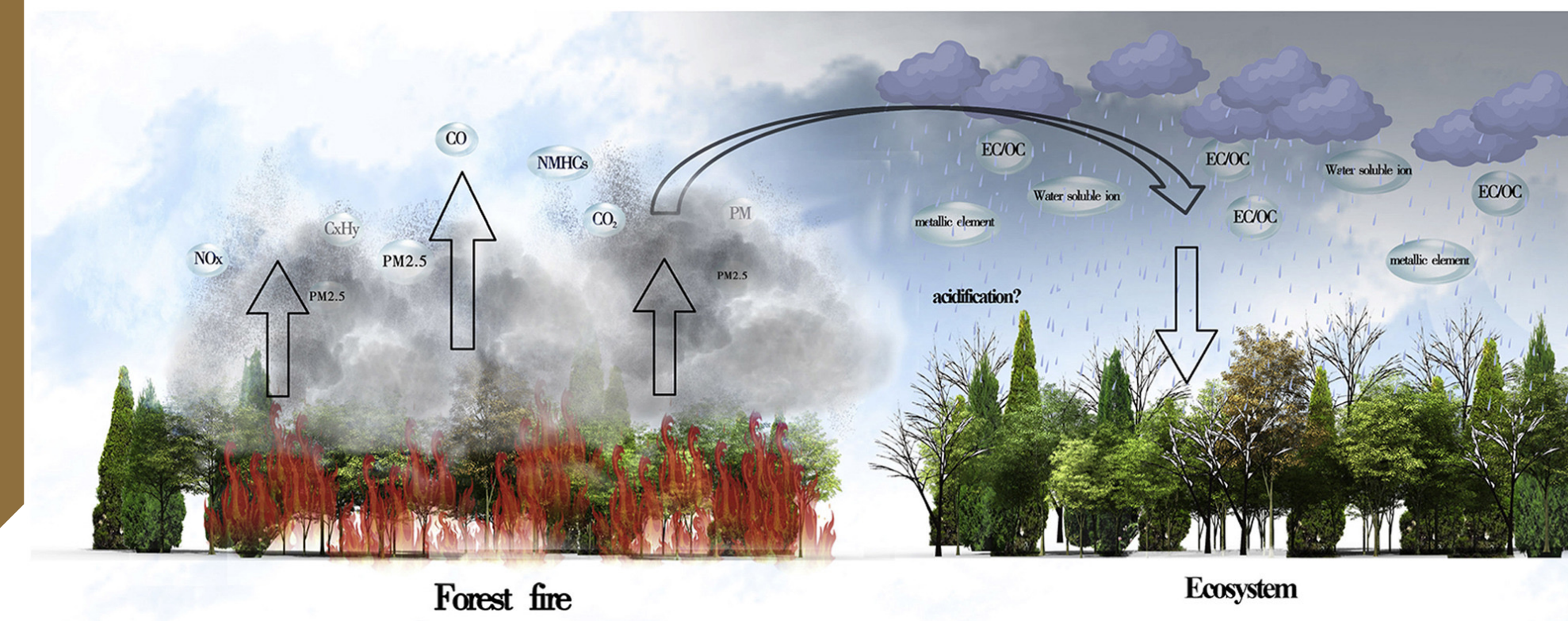


Figure 4. Wildfire Cycle

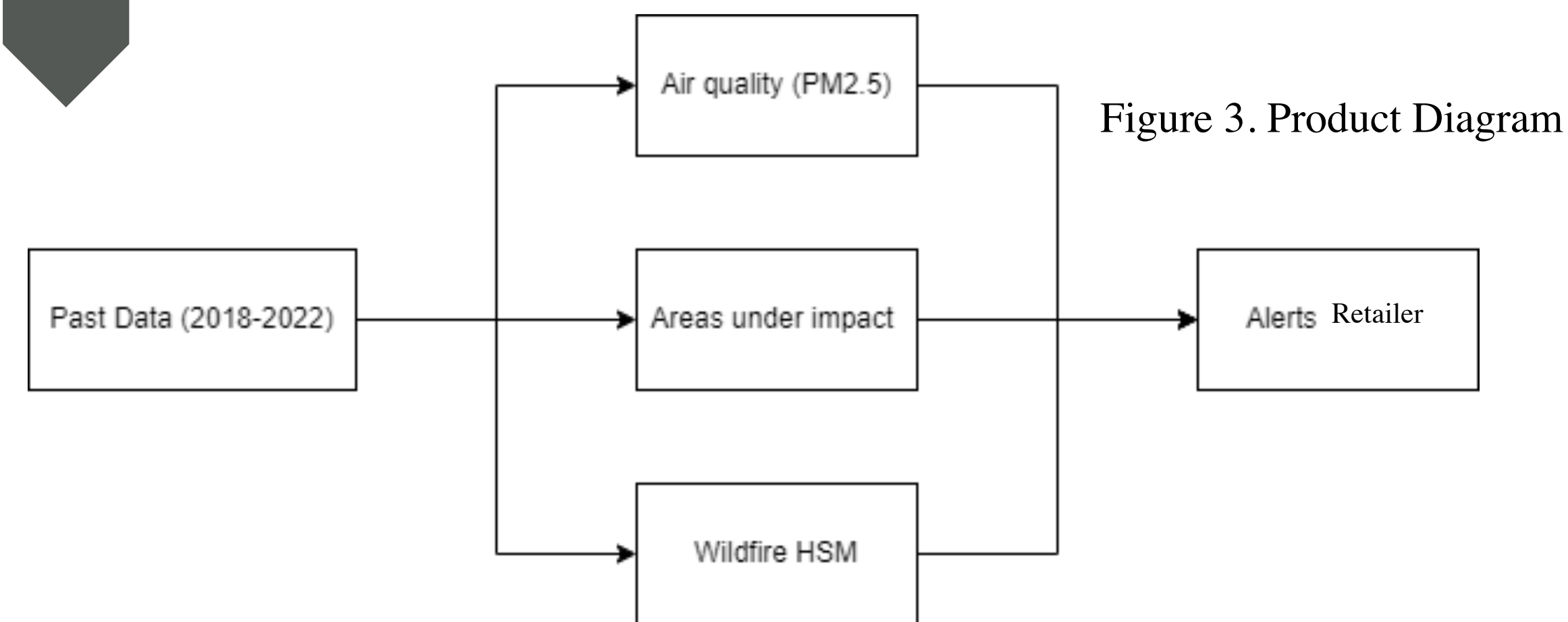


Figure 3. Product Diagram

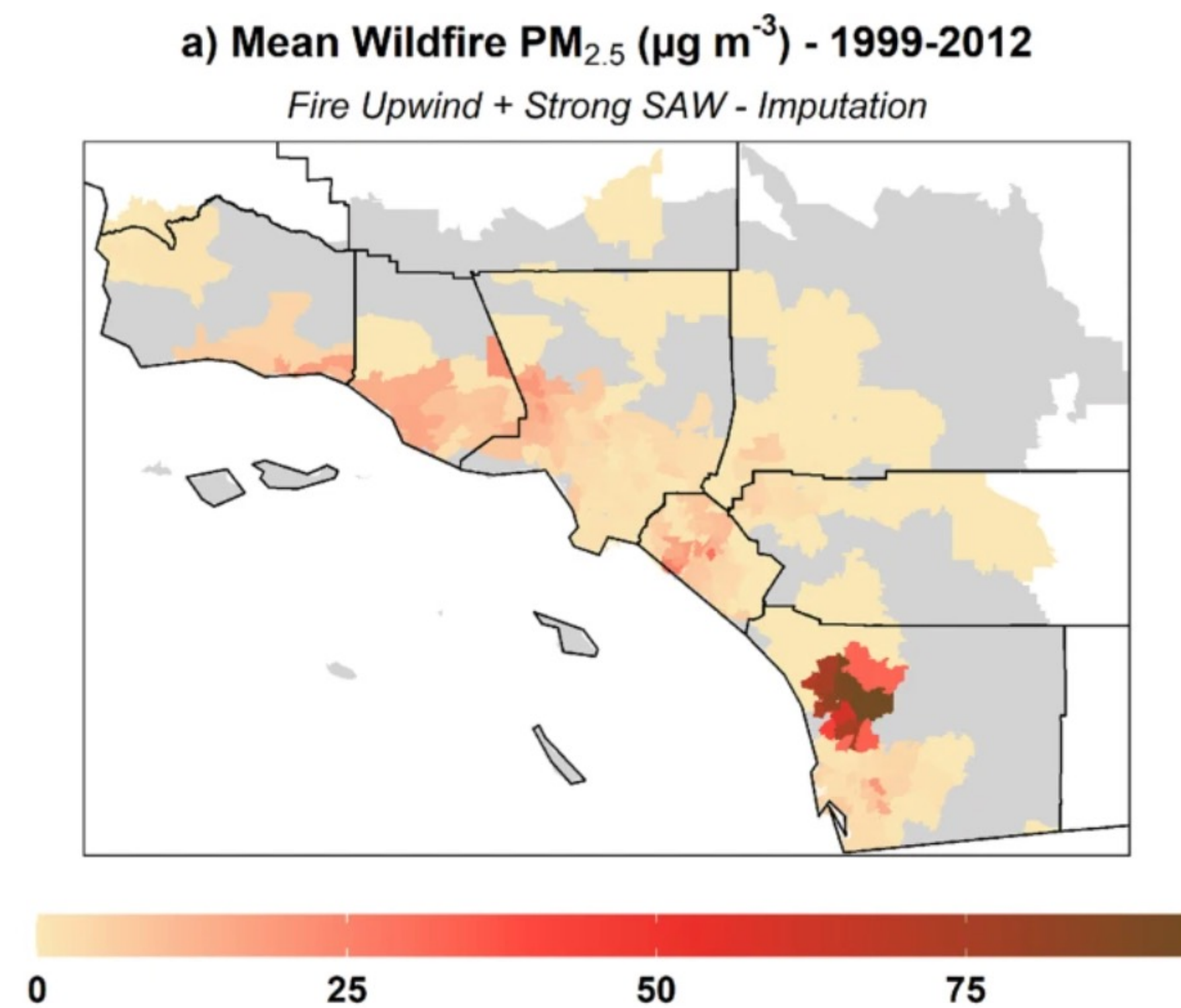


Figure 1. Mean Wildfire PM 2.5 in California

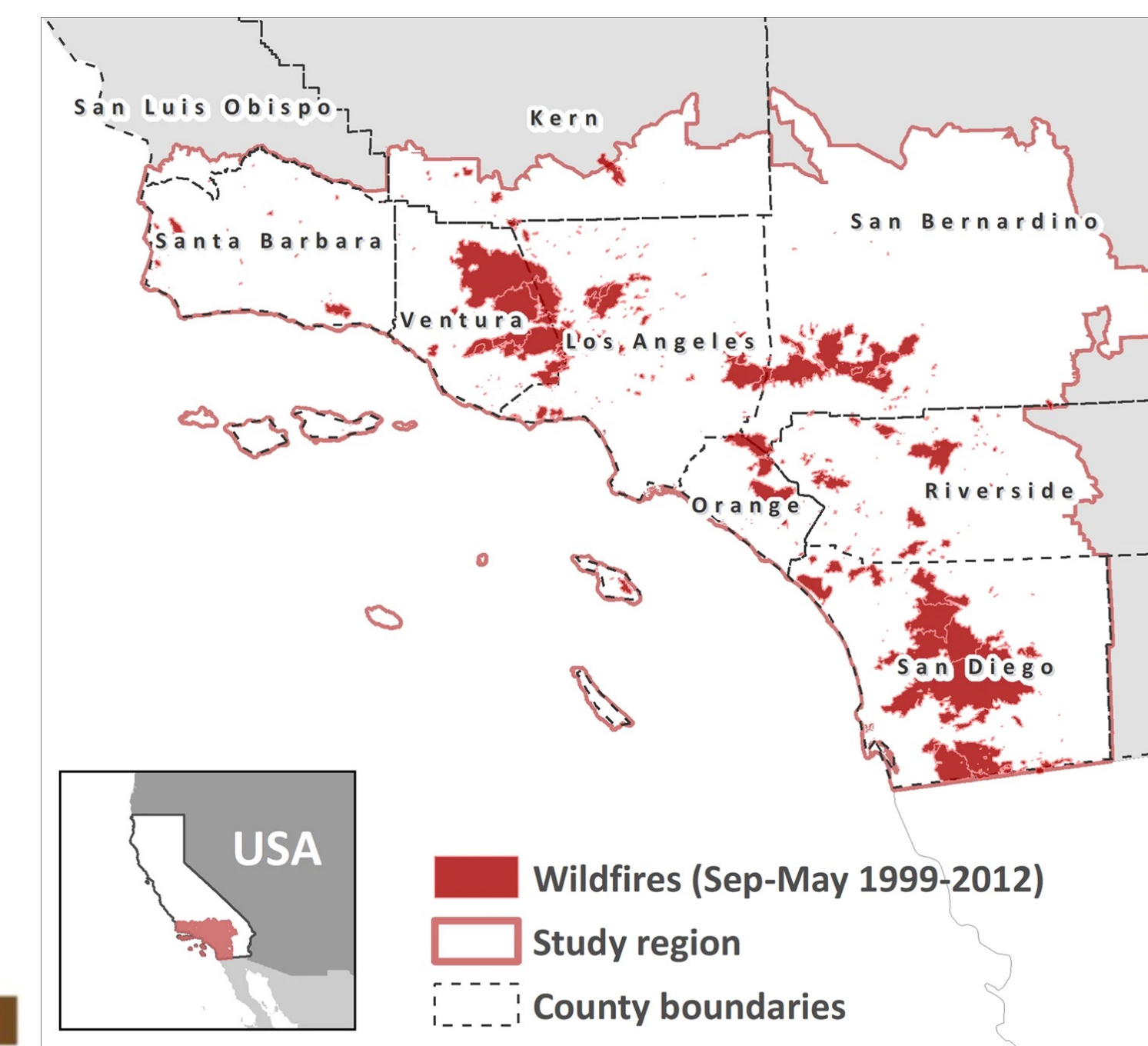


Figure 2. California Counties

### Conclusion/Future Goals

- We have got statistical results from air quality and wildfire data from 2018-2022 and converted them into visually interpretable graphs.
- We have converted the area impacted by wildfires into percentages in graph forms by counties.
- For our future, we plan to work on live data to alert top retailers and would focus on additional areas that are prone to wildfires.

### References/Acknowledgements

- We wholeheartedly thank top retailer for their support for our project, especially our corporate mentors.
- We also thank The Data Mine and the accompanying staff, specifically, Dr. Mark Ward, Kevin, Jain Aashi Ajitkumar, and Chopra Darsh.
- We have sources our data from: California Air Resource Board and CAL Fire.