Laurel Andrews   Spring 2025
Statistical and Data Sciences
Advised by Dr. Colby Long

Burning Questions

An Interactive Visualized Data Exploration into Increasing

Wildfire Trends in the United States and Associated

Societal and Environmental Effects

Introduction

Wildfires are increasing in size, frequency, and severity

Central Questions:
Why is this happening?
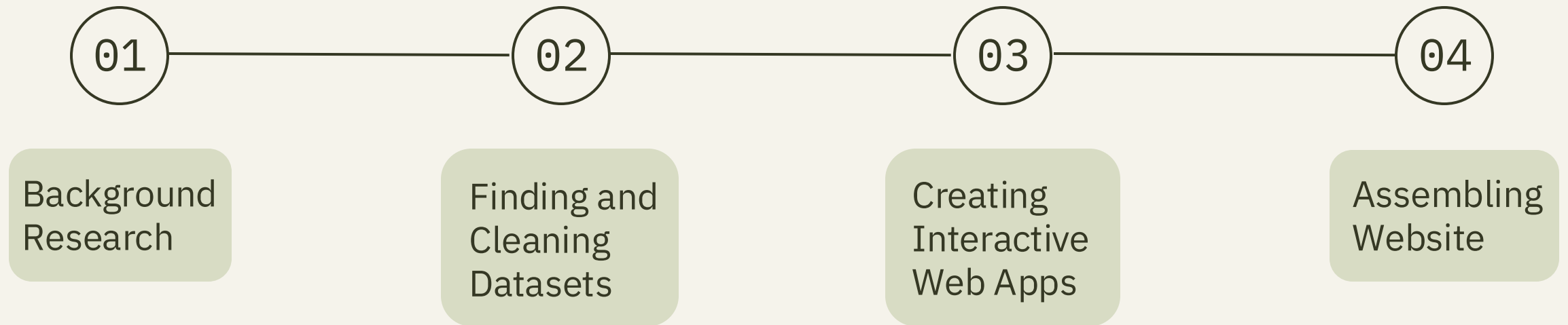Who and what are being impacted?

Project Goal:
Explore these questions using interactive data storytelling

Photo taken in Davenport, California, August 2020

Project Steps

Steps I took to create my final deliverable

01 — **02** — **03** — **04**

Background Research

Finding and Cleaning Datasets

Creating Interactive Web Apps

Assembling Website

01 Background Research

Causes

- Environmental
- Human
  - Wildfire Management History
  - Increasing Wildland-Urban Interface
  - Climate Change

Impacts: Environmental

- Natural Fire Regimes
- Increased Fire Impacts
  - Organisms
  - Smoke
  - Soil and Water Quality

Impacts: Human

- Infrastructure
- Human Health
- Economic and Socioeconomic Costs
- Case Study: LA Wildfires

② Finding and Cleaning Datasets

Dataset	Source
US Wildfire Incident Reports (2014-2017)	Federal Emergency Management Agency (FEMA)
US Total Wildfire Area (2000-2024)	National Oceanic and Atmospheric Administration (NOAA)
Wildfire Risk to Homes by County	United States Department of Agriculture (USDA) Forest Service
Tree Cover Loss from Wildfire (2001-2023)	Global Forest Watch
California Time Series Smoke Level (2010-2019)	NOAA Office of Satellite and Product Operations Hazard Mapping System's Smoke Product
California County Demographics (2022)	American Community Survey (ACS) Integrated Public Use Microdata Series (IPUMS) National Historical Geographic Information System (NHGIS)
California Zip Code Home Insurance Renewals (2015-2021)	California Department of Insurance (CDI)

(03) Creating Interactive Web Apps

- 5 total web apps using 6 of the 7 datasets

- To make datasets accessible and explorable

- Software used:
  o R and RStudio
  o Shiny Package
  o Shinyapps.io
  o Quarto in RStudio
  o GitHub

Shiny in RStudio

Server and User Interface (UI) code in R to create interactive web apps

Quarto in RStudio

Used with shinyapps.io for creating the final website which was mounted on GitHub

04 Assembling Website

https://landrews15.github.io/ISwebsite/

Thank you!

Thanks especially to

Dr. Colby Long and the College of Wooster Statistical and Data Sciences department

Dr. Eric Godat, Mateo Langston Smith, and Southern Methodist University Research Experience for Undergraduates