COVID-19 vs. Air Quality

The Unexpected Correlation between Lockdowns and Air Quality

Our Question:

How did the COVID 19 lockdowns influence Air Quality (AQI) throughout the United States?

What is AQI?

- Air Quality Index
- A numerical scale ranging 0-500 ppm that measures the quality of air in a specific location, and how it may affect human health
- Measures the concentration of six major air pollutants
  - Ground-level ozone
  - Particle pollution
  - Carbon monoxide
  - Sulfur dioxide
  - Nitrogen Dioxide.
- Can change from day to day or hour to hour
- Major sources of pollution include:
  - Transportation
  - Power Plants
  - Industrial Facilities
  - Agriculture

AQI monitoring station ^

What do AQI Measurements Mean?

Air Quality Index Levels of Health Concern	Numerical Value	Meaning
Good	0-50	Air quality is considered satisfactory, and air pollution poses little or no risk.
Moderate	51-100	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.
Unhealthy for Sensitive Groups	101-150	Members of sensitive groups may experience health effects. The general public is not likely to be affected.
Unhealthy	151-200	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects.
Very Unhealthy	201-300	Health alert: everyone may experience more serious health effects.
Hazardous	> 300	Health warnings of emergency conditions. The entire population is more likely to be affected.

Executive Summary and Overview

- Source monthly AQI data from 2019-2021 for 3 different US cities with varying population levels
  - Los Angeles, California (Pop. 3.8 Million)
  - St, Louis, Missouri (Pop 280,000)
  - Jeaneu, Alaska (Pop 31,500)

- By sourcing cities with different population levels and geographical regions, we hope to get a more definitive picture of the data

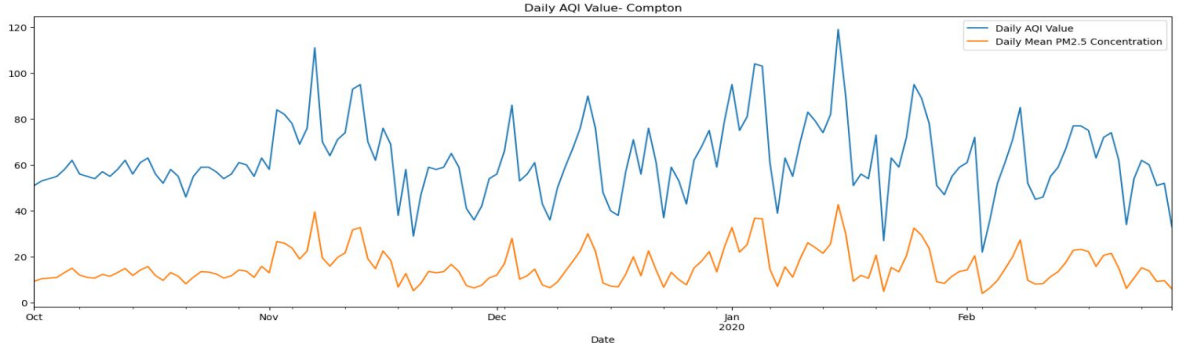
- How did the AQI change in each city from 2019-2021?
  - 6 months before pandemic declaration (March 11th, 2020)
  - 6 months during pandemic declaration
  - 6-12 months after pandemic exploration

- Hypothesis: Overall Air Quality would increase due to less commerce, driving, etc.

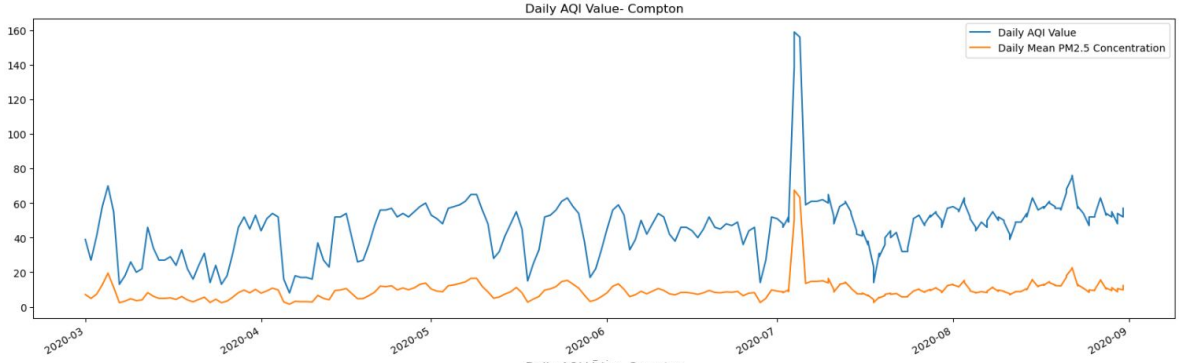
Data Collection/ Demo

Los Angeles

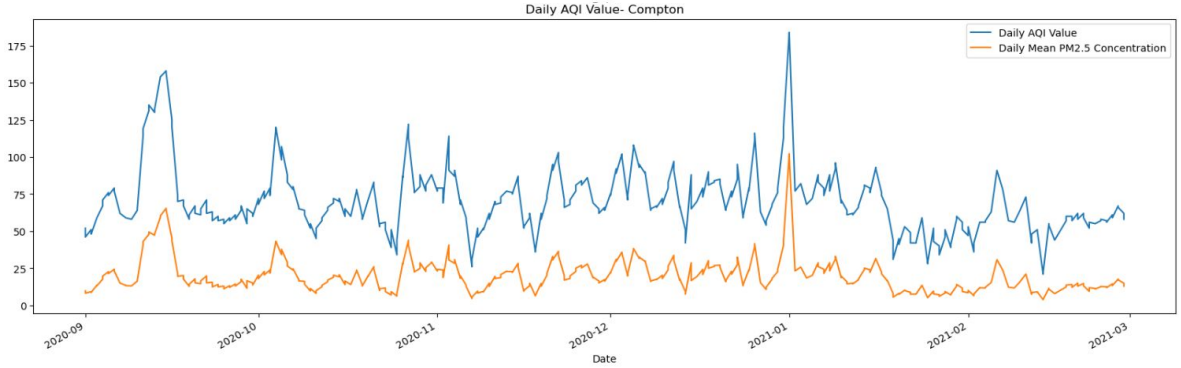
AQI Index 6 months before pandemic declaration:



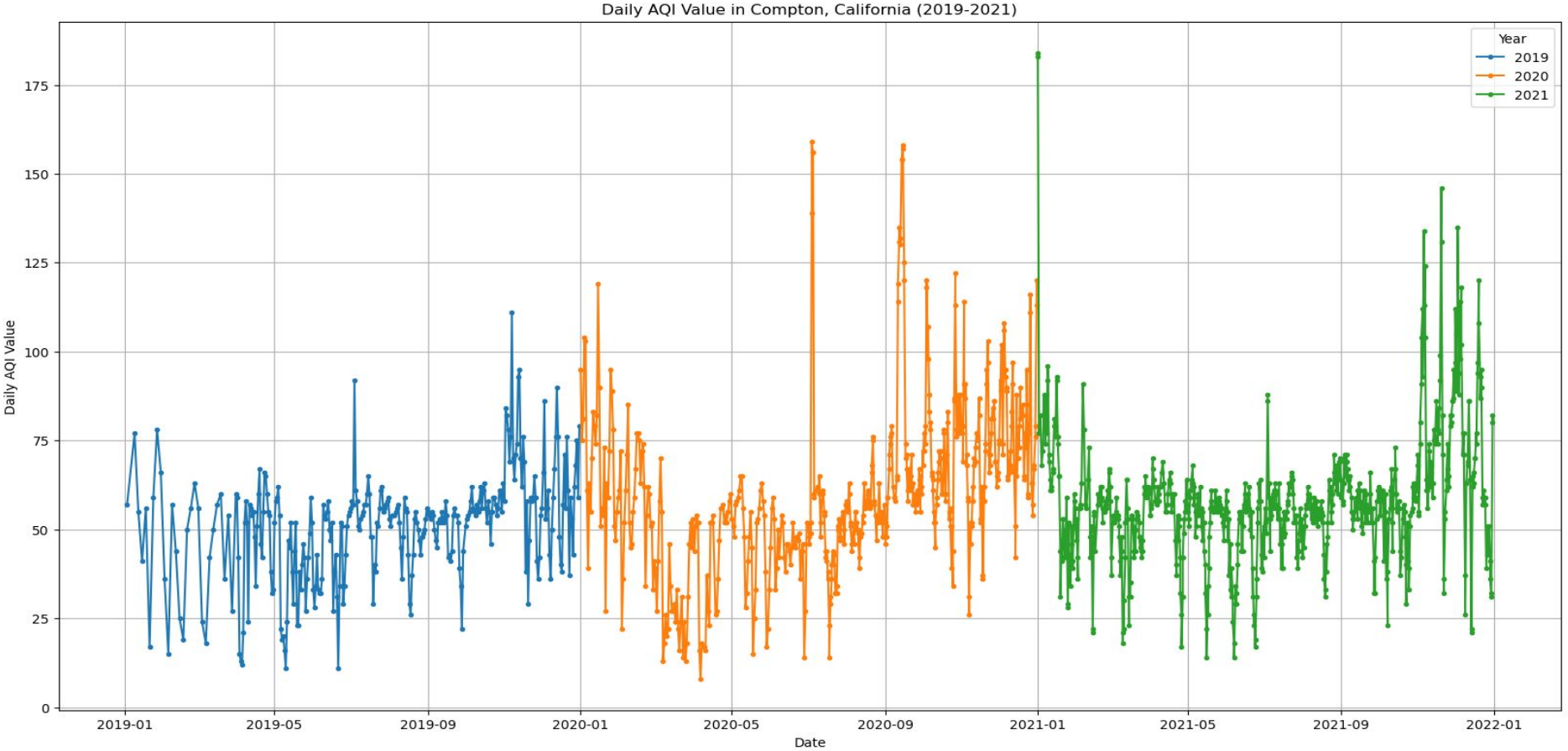
AQI Index during pandemic declaration:



AQI Index 6 months post pandemic declaration:

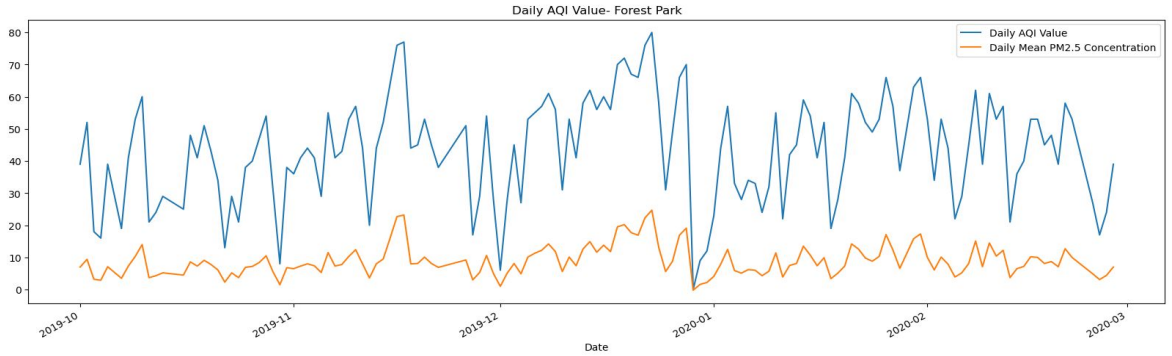


Los Angeles

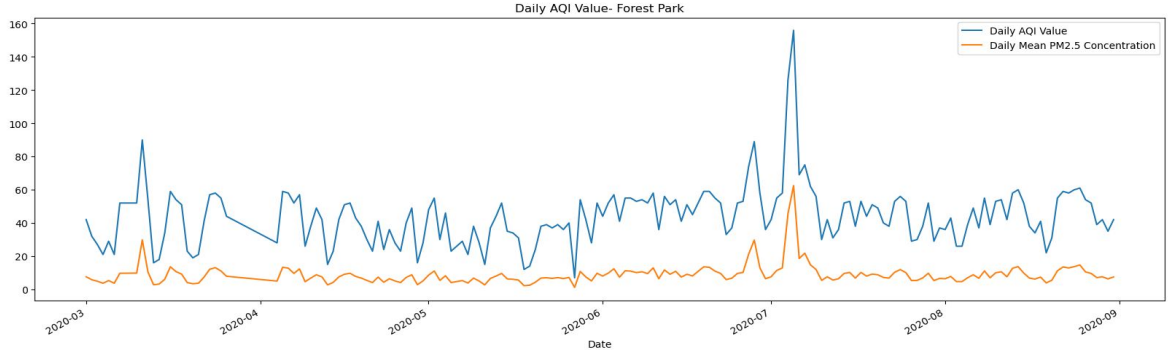

Daily AQI Value in Compton, California (2019-2021)
Year
2019
2020
2021
Daily AQI Value
0
25
50
75
100
125
150
175
2019-01
2019-05
2019-09
2020-01
2020-05
2020-09
2021-01
2021-05
2021-09
2022-01
Date

St. Louis

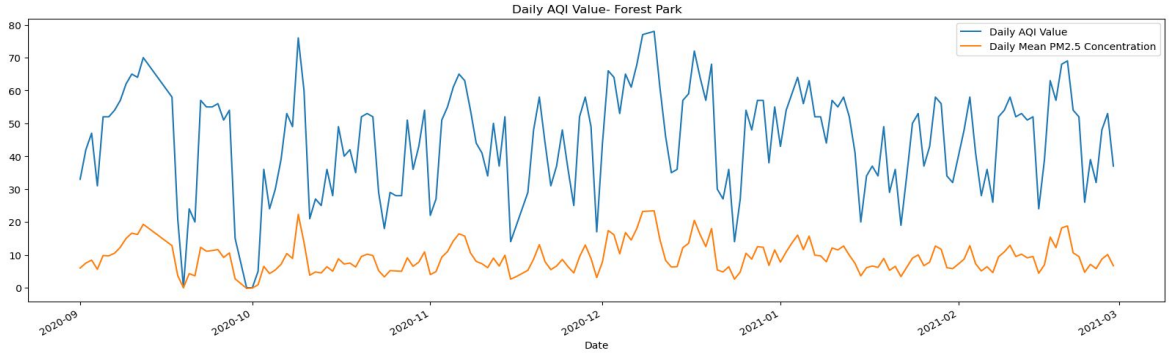
AQI Index 6 months before pandemic declaration



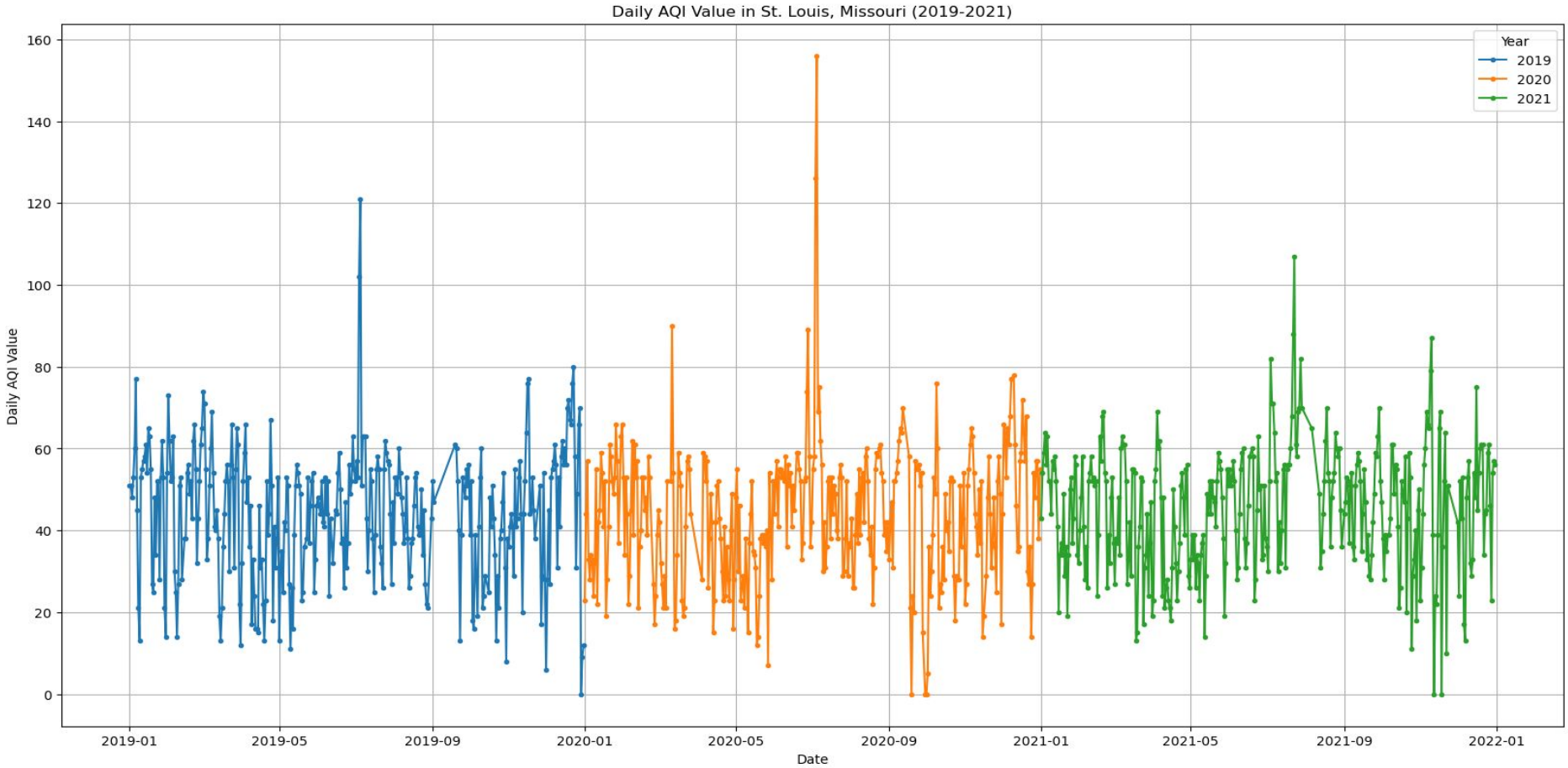
AQI Index during pandemic declaration



AQI Index 6 months post pandemic declaration

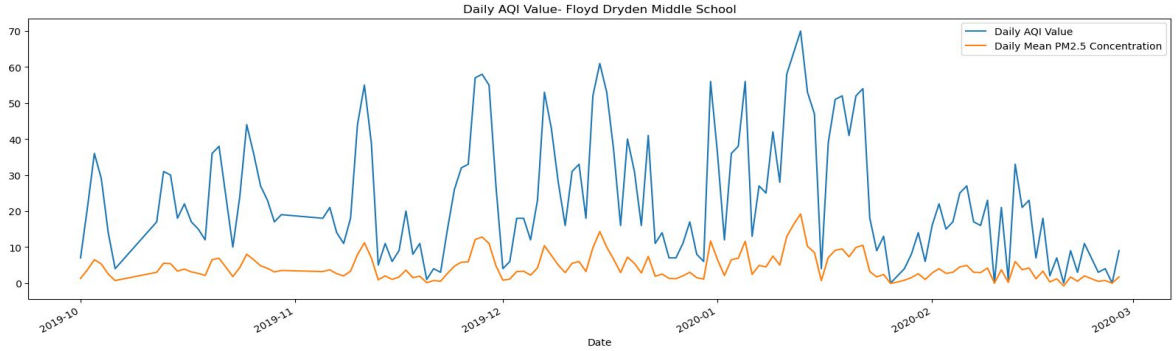


St. Louis

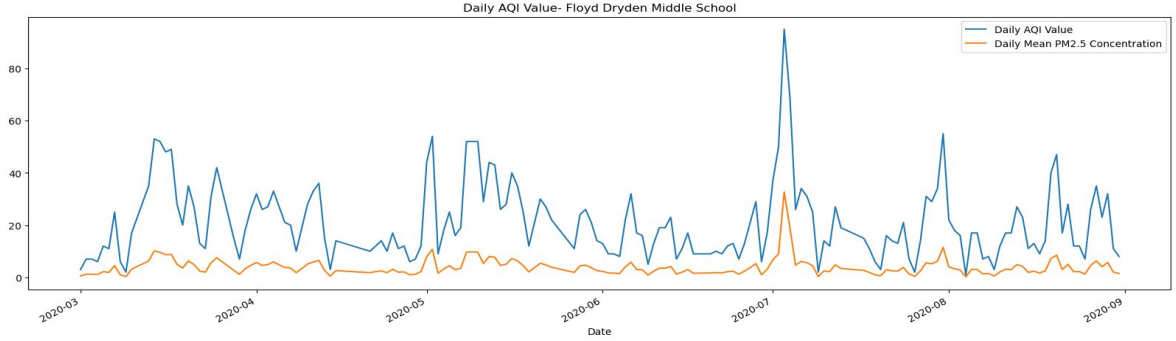

Daily AQI Value in St. Louis, Missouri (2019-2021)
Year
2019
2020
2021
Daily AQI Value
Date
0
20
40
60
80
100
120
140
160
2019-01
2019-05
2019-09
2020-01
2020-05
2020-09
2021-01
2021-05
2021-09
2022-01

Jeaneu

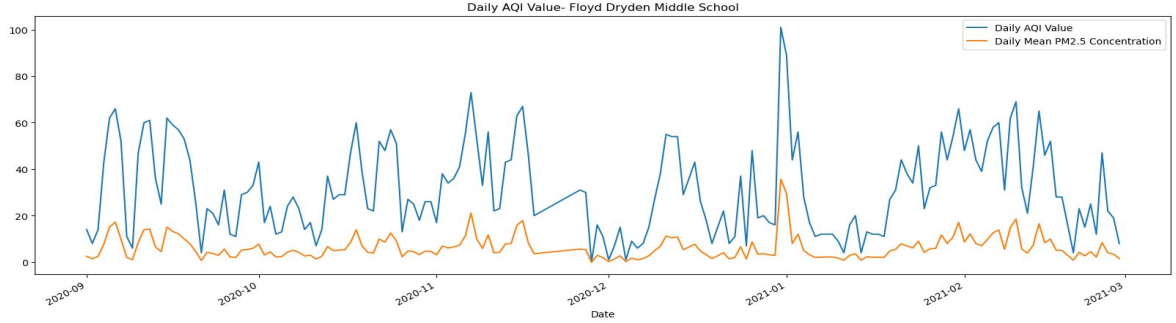
AQI Index 6 months before pandemic declaration



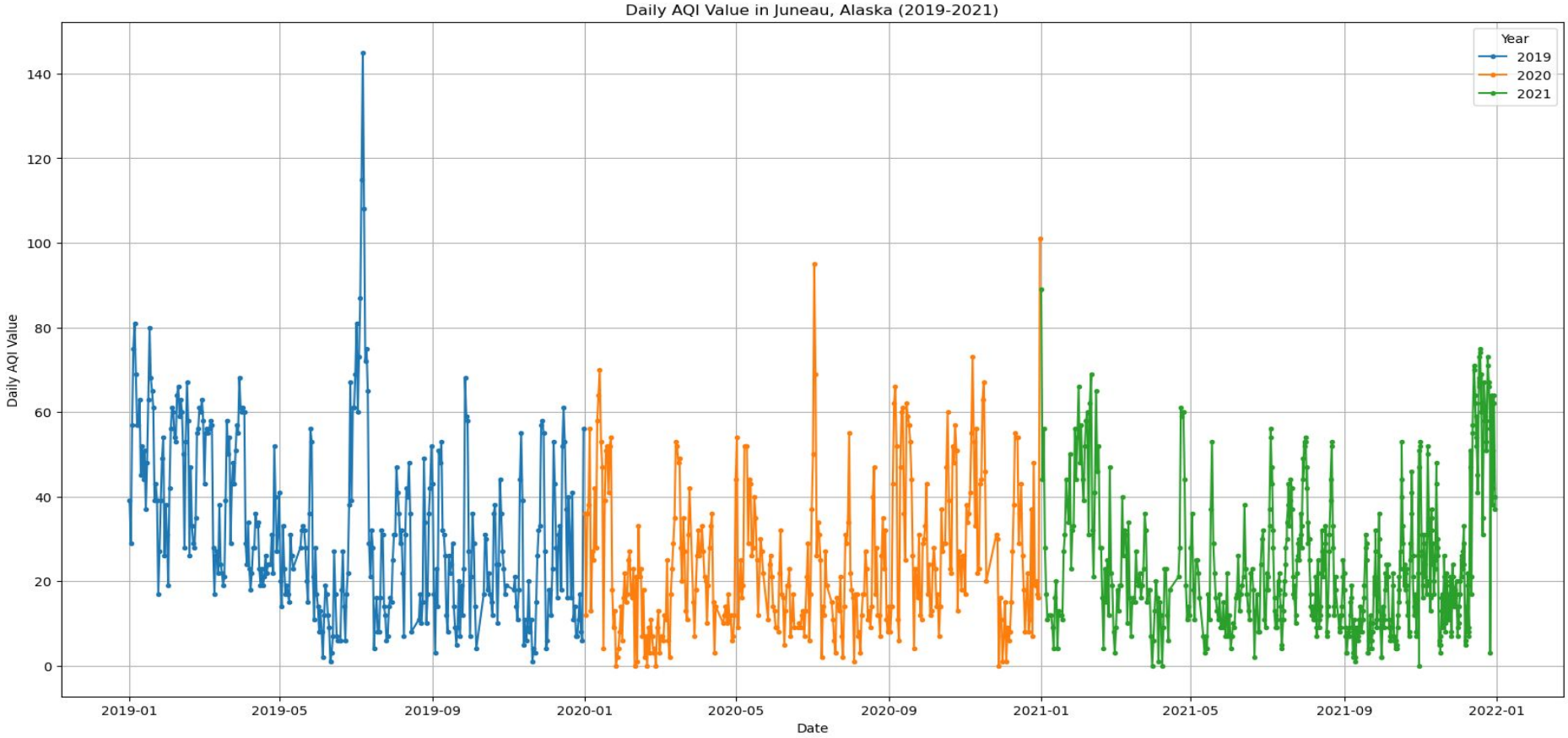
AQI Index during pandemic declaration



AQI Index 6 months post pandemic declaration



Jeaneu


Daily AQI Value in Juneau, Alaska (2019-2021)
Year
2019
2020
2021
Daily AQI Value
0
20
40
60
80
100
120
140
Date
2019-01
2019-05
2019-09
2020-01
2020-05
2020-09
2021-01
2021-05
2021-09
2022-01

Findings

- Not a strong correlation between AQI and lockdowns

- The overall summertime spike in AQI was due to extraneous factors
  - Statistics show AQI has always increased during the summers
  - Pollen?
  - Uptick in travel?
  - Weather Patterns?

- Further study is needed to determine why exactly AQI increases so highly during summertime months in the United States.

QUESTIONS?

Citations for the presentation

(Slide 3 graphic source):

https://bazallergy.com/understand-the-basics-of-the-air-quality-index/

(Slide 3 information source):

https://www.healthpartners.com/blog/air-quality-index/#:~:text=Poor%20air%20quality%20is%20polluted,of%20smoke%2C%20soot%20and%20smog.

(Slide 2 graphic source):

https://edition.cnn.com/2020/04/07/us/los-angeles-pollution-clean-air-coronavirus-trnd/index.html

(Slide 1 graphic source):

https://www.latimes.com/la-fi-port-container-ships-pg-photogallery.html